

Focus on Energy
Calendar Year 2016 Evaluation Report
Volume II

May 19, 2017

Public Service Commission of Wisconsin
610 North Whitney Way
P.O. Box 7854
Madison, WI 53707-7854

The Cadmus Group, Inc.
An Employee-Owned Company • www.cadmusgroup.com

This page left blank.

CADMUS

Prepared by:
Cadmus
Apex Analytics
St. Norbert College Strategic Research Institute

This page left blank.

CADMUS

Table of Contents

List of Acronyms xxi

Introduction 1

Residential Segment Programs 5

Home Performance with ENERGY STAR® Program 6

Evaluation, Measurement, and Verification Approach 10

Impact Evaluation 13

Process Evaluation 48

Program Cost-Effectiveness 112

Evaluation Outcomes and Recommendations 116

New Homes Program 124

Evaluation, Measurement, and Verification Approach 126

Impact Evaluation 126

Process Evaluation 131

Program Cost-Effectiveness 135

Evaluation Outcomes 136

Retailer Lighting and Appliance Program 137

Evaluation, Measurement, and Verification Approach 139

Impact Evaluation 142

Process Evaluation 160

Program Cost-Effectiveness 179

Evaluation Outcomes and Recommendations 180

Simple Energy Efficiency Program 183

Evaluation, Measurement, and Verification Approach 185

Impact Evaluation 187

Process Evaluation 195

Program Cost-Effectiveness 219

Evaluation Outcomes and Recommendations 220

Multifamily Energy Savings and Multifamily Direct Install Programs 223

Evaluation, Measurement, and Verification Approach 225

Impact Evaluation 228

Process Evaluation 236
Program Cost-Effectiveness 272
Evaluation Outcomes and Recommendations 274
Nonresidential Segment Programs 277
Agriculture, Schools, and Government Program 278
Evaluation, Measurement, and Verification Approach 280
Impact Evaluation 283
Process Evaluation 292
Program Cost-Effectiveness 323
Evaluation Outcomes and Recommendations 324
Business Incentive Program 329
EM&V Approach 330
Impact Evaluation 333
Process Evaluation 342
Program Cost-Effectiveness 377
Evaluation Outcomes and Recommendations 378
Chain Stores and Franchises Program 382
Evaluation, Measurement, and Verification Approach 383
Impact Evaluation 387
Process Evaluation 395
Program Cost-Effectiveness 428
Evaluation Outcomes and Recommendations 429
Design Assistance Program 432
Evaluation, Measurement, and Verification Approach 433
Impact Evaluation 435
Process Evaluation 440
Program Cost-Effectiveness 452
Evaluation Outcomes and Recommendations 452
Large Energy Users Program 455
Evaluation, Measurement, and Verification Approach 457
Impact Evaluation 460

Process Evaluation 469
Program Cost-Effectiveness 504
Evaluation Outcomes and Recommendations 505
Small Business Program 509
Evaluation, Measurement, and Verification Approach 511
Impact Evaluation 513
Process Evaluation 519
Program Cost-Effectiveness 547
Evaluation Outcomes and Recommendations 548
Renewable Energy Competitive Incentive Program 552
Evaluation, Measurement, and Verification Approach 553
Impact Evaluation 554
Process Evaluation 559
Program Cost-Effectiveness 562
Evaluation Outcomes and Recommendations 563
Renewable Energy Loan Fund 565
Evaluation, Measurement, and Verification Approach 567
Impact Evaluation 568
Process Evaluation 575
Fund Cost-Effectiveness 585
Evaluation Outcomes 587
Pilot Programs 589
Manufactured Homes Pilot 590
EM&V Approach 591
Impact Evaluation 592
Process Evaluation 596
Program Cost-Effectiveness 598
Evaluation Outcomes and Recommendations 599
Seasonal Savings Pilot 601
EM&V Approach 602
Impact Evaluation 603

Program Cost-Effectiveness 608
Evaluation Outcomes and Recommendations 608
On Demand Savings Pilot 609
EM&V Approach 609
Process Evaluation 610
Evaluation Outcomes and Recommendations 620

List of Figures

Figure 1. Quadrennium Evaluation Steps 2
Figure 2. Home Performance with ENERGY STAR Program Whole Home and HVAC Paths Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 7
Figure 3. Home Performance with ENERGY STAR Program Renewable Rewards Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 9
Figure 4. Distribution of CY 2016 Self-Reported GSHP Freeridership Scores (n=24) 39
Figure 5. Distribution of CY 2015 and CY 2016 Self-Reported Solar PV Freeridership Scores 40
Figure 6. Distribution of Smart Thermostat Participant Freeridership Scoring Combinations 41
Figure 7. Average Savings Per Whole Home Project (*Ex Ante* Gross Annual Savings) 54
Figure 8. Frequency of Promoting Focus on Energy 57
Figure 9. "Big Red Door" Campaign Advertisement 58
Figure 10. Trade Ally Advertising by Path 60
Figure 11. Trade Ally Website Activity by Path 60
Figure 12. Registered Trade Allies at Midyear CY 2016, by Trade Type[1] 62
Figure 13. Frequency of Problems with the Application Process 66
Figure 14. Trade Allies Very or Somewhat Satisfied with Program Components, by Trade 68
Figure 15. Trade Ally Satisfaction with the Home Performance with ENERGY STAR Program 69
Figure 16. CY 2016 Overall Satisfaction with Home Performance with ENERGY STAR 70
Figure 17. CY 2016 Overall Satisfaction with the Program—HVAC Component 71
Figure 18. CY 2016 Satisfaction with Program Upgrades—HVAC Component 72
Figure 19. CY 2016 Satisfaction with Program Contractors—HVAC Component 73
Figure 20. CY 2016 Satisfaction with Program Incentive—HVAC Component 74
Figure 21. CY 2016 Likelihood of Initiating Energy Efficiency Improvements—HVAC Component 75
Figure 22. CY 2016 Intentions for Future Improvements—HVAC Component 76
Figure 23. CY 2016 Likelihood of Recommending the Program—HVAC Component 77
Figure 24. CY 2016 Positive Comments about the Program—HVAC Component 78
Figure 25. CY 2016 Suggestions for Improving the Program—HVAC Component 78
Figure 26. CY 2016 Overall Satisfaction with the Program—Whole Home Component 79
Figure 27. CY 2016 Satisfaction with Program Upgrades—Whole Home Component 80
Figure 28. CY 2016 Satisfaction with Contractor for the Program—Whole Home Component 81

Figure 29. CY 2016 Satisfaction with the Program Incentive—Whole Home Component 82
Figure 30. CY 2016 Likelihood of Initiating Energy Efficiency Improvement—Whole Home Component . 83
Figure 31. CY 2016 Intentions for Future Improvements—Whole Home Component 84
Figure 32. CY 2016 Likelihood of Recommending the Program—Whole Home Component 85
Figure 33. CY 2016 Positive Comments about the Program 86
Figure 34. CY 2016 Suggestions for Improving the Program 87
Figure 35. CY 2016 Overall Satisfaction with the Program-Renewable Rewards 88
Figure 36. CY 2016 Satisfaction with Program Upgrades-Renewable Rewards 89
Figure 37. CY 2016 Satisfaction with Program Contractors-Renewable Rewards 90
Figure 38. CY 2016 Satisfaction with Program Incentive-Renewable Rewards 91
Figure 39. CY 2016 Likelihood of Initiating Energy Efficiency Improvement-Renewable Rewards 92
Figure 40. CY 2016 Intentions for Future Improvements-Renewable Rewards 93
Figure 41. CY 2016 Likelihood of Recommending the Program-Renewable Rewards 94
Figure 42. CY 2016 Positive Comments about the Program-Renewable Rewards 95
Figure 43. CY 2016 Suggestions for Improving the Program-Renewable Rewards 95
Figure 44. 2016 Customer Sources for Renewable Rewards Program Awareness 97
Figure 45. Preferred Method of Receiving Program Information from Focus on Energy 98
Figure 46. Renewable Rewards Program Customer Reasons for Participation 99
Figure 47. Importance of Renewable Rewards Incentive in Customer Decision to Install Solar Electric . 100
Figure 48. Additional Financial Incentives Received by PV Renewable Rewards Recipients 102
Figure 49. Additional Financial Incentives Received by GSHP Renewable Rewards Recipients 103
Figure 50. How Renewable Rewards Recipients Funded Out-of-Pocket Expenses 104
Figure 51. Total Household Income before Taxes 105
Figure 52. Customer Sources for Smart Thermostat Pilot Awareness 106
Figure 53. Smart Thermostat Pilot Type of Thermostat Purchased 107
Figure 54. Smart Thermostat Pilot Ease of Thermostat Installation 108
Figure 55. Smart Thermostat Pilot Ease of Thermostat Use 109
Figure 56. Smart Thermostat Pilot Participant Total Household Income 110
Figure 57. Smart Thermostat Pilot Participant Age Categories 111
Figure 58. Smart Thermostat Pilot Participant Highest Level of School Completed 112
Figure 59. New Homes Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 125
Figure 60. CY 2016 New Homes Program Management and Delivery Structure 132
Figure 61. Retailer Lighting and Appliance Program's Lighting Component Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 138
Figure 62. Predicted Versus Actual Bulb Sales by Month 150
Figure 63. Illustration of Hypothetical Demand Curve 151
Figure 64. Marketing Efforts Employed by Storefront Managers 169
Figure 65. Benefits to Participation 171
Figure 66. In-Home Audit Bulb Penetration 175
Figure 67. Benchmarking of Residential CFL and LED Bulb Penetration 176

Figure 68. Saturation of All Household Sockets by Bulb Type 177
Figure 69. Benchmarking of Residential CFL and LED Bulb Saturation 178
Figure 70. In-Home Audit CFL and LED Longitudinal Saturation 178
Figure 71. Simple Energy Efficiency Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 184
Figure 72. Distribution of CY 2016 Self-Reported Specialty LED and Upgrade Showerhead Freeridership Scores 193
Figure 73. Geographic Reach of CY 2015 Express Energy Efficiency Program vs. CY 2016 Simple Energy Efficiency Program 197
Figure 74. Customer Sources for Simple Energy Efficiency Program Awareness 200
Figure 75. Best Methods for Focus on Energy Programs to Contact Participants 201
Figure 76. CY 2016 Satisfaction and Likelihood Ratings for the Simple Energy Efficiency Program 203
Figure 77. CY 2016 Likelihood of Recommending the Simple Energy Efficiency Program 204
Figure 78. CY 2016 Positive Comments About the Program 205
Figure 79. CY 2016 Suggestions for Improving the Program 206
Figure 80. Simple Energy Efficiency Program Customer Satisfaction by Measure 208
Figure 81. Other Energy-Saving Actions That Participants Implemented 215
Figure 82. Simple Energy Efficiency Program Participant Total Household Income 217
Figure 83. Simple Energy Efficiency Program Participant Age Categories 218
Figure 84. Simple Energy Efficiency Program Participant Highest Level of School Completed 219
Figure 85. Multifamily Energy Savings Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 224
Figure 86. Multifamily Direct Install Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1] ... 225
Figure 87. How Customers Learned of Multifamily Energy Savings Program Incentives 246
Figure 88. Multifamily Energy Savings Program Project Initiation Source 247
Figure 89. Respondent Word Association with “Focus on Energy” 248
Figure 90. Agreement with Focus on Energy Statements 249
Figure 91. Trade Ally Multifamily Energy Savings Program Promotion 250
Figure 92. Trade Ally Mean Scores for Focus on Energy Statements 251
Figure 93. Overall Multifamily Programs Satisfaction 253
Figure 94. Satisfaction with Multifamily Program Upgrades 254
Figure 95. Multifamily Program Satisfaction with Focus on Energy Staff 255
Figure 96. Multifamily Energy Savings Program Satisfaction with Contractor and Program Incentives .. 256
Figure 97. Likelihood of Initiating Energy Efficiency Improvement 257
Figure 98. CY 2016 Likelihood of Recommending the Program 258
Figure 99. Multifamily Energy Savings Program Participation Motivations 260
Figure 100. Multifamily Building Upgrade Approval Timelines by Building Type 261
Figure 101. Barriers to Implementing Multifamily Energy Savings Program Projects 262
Figure 102. Multifamily Energy Savings Program Improvement Suggestions 263
Figure 103. Source of Multifamily Energy Savings Program Incentives Awareness 264
Figure 104. Incentive Reduction Impact on Trade Allies’ Program Promotion 268
Figure 105.Trade Ally Promotion of Project Financing 269

Figure 106. Trade Ally Satisfaction with Energy Advisor Support 270
Figure 107. Performance Ratings 271
Figure 108. Agriculture, Schools, and Government Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 279
Figure 109. How Participant Learned About Focus on Energy Incentives 296
Figure 110. Trusted Sources of Information 297
Figure 111. Summary of Services Document 300
Figure 112. Prescriptive Versus Custom Incentives Infographic 300
Figure 113. Trade Ally Co-Branded Mailer 301
Figure 114. Power Connect Chat Session Email 302
Figure 115. Press Release 303
Figure 116. Radio Ad 304
Figure 117. Digital Ad 304
Figure 118. Word Cloud 305
Figure 119. Agreement with Focus on Energy Claims 306
Figure 120. Perceived Benefits of Participation 307
Figure 121. Program Stakeholders Involved in Initiating the Project 308
Figure 122. Influences on Decision Making 309
Figure 123. Biggest Challenges to Participation 310
Figure 124. CY 2016 Overall Program Satisfaction 311
Figure 125. CY 2016 Satisfaction with Program Upgrades 312
Figure 126. CY 2016 Satisfaction with Focus on Energy Staff 313
Figure 127. CY 2016 Satisfaction with Program Contractors 314
Figure 128. CY 2016 Satisfaction with Program Incentives 315
Figure 129. CY 2016 Likelihood of Initiating Energy-Efficiency Improvement 316
Figure 130. CY 2016 Likelihood of Recommending the Program 317
Figure 131. CY 2016 Positive Comments About the Program 318
Figure 132. CY 2016 Suggestions for Improving the Program 319
Figure 133. Trade Ally Agreement with Phrases About Focus on Energy 320
Figure 134. Reasons Trade Ally Chose to Participate 321
Figure 135. Usefulness of Program Information Sources 322
Figure 136. Trade Ally Perceptions on Focus on Energy Support 322
Figure 137. Type of Farm 323
Figure 138. Business Incentive Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 330
Figure 139. Source of Program Awareness 348
Figure 140. Respondent Word Association with “Focus on Energy” 349
Figure 141. Agreement with Focus on Energy Claims 349
Figure 142. Trade Ally Challenges with Paperwork by Ranking 351
Figure 143. Value of Trade Ally Program Performance Feedback 354
Figure 144. Mean Likelihood of Sharing or Promoting Performance Feedback 355

Figure 145. Trade Ally Mean Scores for Focus on Energy Statements 356
Figure 146. Trade Ally Preferred Information Sources 357
Figure 147. Trade Ally Satisfaction with Focus on Energy by Business Incentive Program Performance Rating 358
Figure 148. CY 2016 Focus on Energy Performance Ratings 359
Figure 149. Business Incentive Program Participation Motivations 362
Figure 150. Business Participant Decision-Makers 363
Figure 151. Business Incentive Program Participation Benefits 364
Figure 152. Perceived Barriers to Business Incentive Program Participation 365
Figure 153. Suggestions for Overcoming Energy-Efficient Improvement Barriers 366
Figure 154. Suggestions for Improving the Business Incentive Program 367
Figure 155. CY 2016 Overall Program Satisfaction 368
Figure 156. CY 2016 Satisfaction with Program Upgrades 369
Figure 157. CY 2016 Satisfaction with Focus on Energy Staff 370
Figure 158. CY 2016 Satisfaction with Program Contractors 371
Figure 159. CY 2016 Satisfaction with Program Incentives 372
Figure 160. CY 2016 Likelihood of Initiating Energy Efficiency Improvement 373
Figure 161. CY 2016 Likelihood of Recommending the Program 374
Figure 162. CY 2016 Positive Comments about the Program 375
Figure 163. CY 2016 Suggestions for Improving the Program 376
Figure 164. Distribution of Surveyed Participants by Industry 377
Figure 165. CY 2016 Chain Stores and Franchises Program Achievement of Gross Lifecycle Savings Goals[1] 383
Figure 166. Source of Chain Stores and Franchises Program Awareness 401
Figure 167. Source of Awareness of the Franchise Participation Milestone Offering 403
Figure 168. Respondent Word Association with “Focus on Energy” 405
Figure 169. Agreement with Focus on Energy Brand Affinity Statements 406
Figure 170. Trusted Sources for Information About Energy Efficiency Upgrades 407
Figure 171. Corporate Involvement in Energy Efficiency Upgrades 410
Figure 172. Supporting Stakeholders in Project Initiation 411
Figure 173. Most Important Factor for Investing in Energy Efficiency Upgrades 412
Figure 174. Importance of Energy Efficiency in Capital Upgrades 413
Figure 175. Ideas to Address Customer Challenges to Making Efficiency Upgrades 415
Figure 176. Perceived Energy-saving Opportunities 417
Figure 177. CY 2016 Overall Satisfaction with the Chain Stores and Franchises Program 420
Figure 178. CY 2016 Satisfaction with Chain Stores and Franchises Program Upgrades 421
Figure 179. CY 2016 Satisfaction with Contractors for the Chain Stores and Franchises Program 421
Figure 180. CY 2016 Satisfaction with Incentive for the Chain Stores and Franchises Program 422
Figure 181. CY 2016 Likelihood of Initiating Another Energy-Efficiency Improvement 423
Figure 182. CY 2016 Likelihood of Recommending the Chain Stores and Franchises Program 424

Figure 183. CY 2016 Positive Comments about the Chain Stores and Franchises Program 424
Figure 184. CY 2016 Suggestions for Improving the Chain Stores and Franchises Program 425
Figure 185. Participant Business Segment 427
Figure 186. Number of Franchise and Chain Store Locations 427
Figure 187. Number of Employees at Business Location Where Project was Implemented 428
Figure 188. Design Assistance Program Achievement of CY 2016 Gross Lifecycle Savings Goals[1, 2] 433
Figure 189. Building Owner Agreement with Focus on Energy Claims 445
Figure 190. Importance of Energy Efficiency Statements 446
Figure 191. Building Owner and Design Team Satisfaction Ratings 449
Figure 192. Building Owner and Design Team Likelihood to Recommend Program 451
Figure 193. Building Owner Industries Represented in the CY 2016 Interviews 451
Figure 194. Large Energy Users Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1, 2] 456
Figure 195. Customer Reported Source of Awareness of the Large Energy Users Program 477
Figure 196. Respondent Word Association with “Focus on Energy” 478
Figure 197. Customer Agreement with Focus on Energy Statements 479
Figure 198. CY 2015 and CY 2016 Overall Program Satisfaction 481
Figure 199. CY 2016 Satisfaction with Program Upgrades 482
Figure 200. CY 2016 Satisfaction with Focus on Energy Staff 483
Figure 201. CY 2016 Satisfaction with Program Contractors 484
Figure 202. CY 2016 Satisfaction with Program Incentives 485
Figure 203. CY 2016 Likelihood of Initiating Energy Efficiency Improvement 486
Figure 204. CY 2016 Likelihood of Recommending the Program 487
Figure 205. CY 2016 Positive Comments about the Program 488
Figure 206. CY 2016 Suggestions for Improving the Program 489
Figure 207. Most Important Participation Factor for Participating Customers 490
Figure 208. Benefits from Program Participation 492
Figure 209. Customer Suggestions 493
Figure 210. Strategic Energy Management Pilot Program Elements Completed as of March 2017 495
Figure 211. Strategic Energy Management Pilot Program Satisfaction 498
Figure 212. Strategic Energy Management Meeting Company Needs 499
Figure 213. Trade Ally Satisfaction with Program Elements 501
Figure 214. Trade Ally Rating of Importance of Incentive Factors to Motivate Customers 502
Figure 215. Trade Ally Report of Effectiveness of Financial Incentives to Motivate Customers 503
Figure 216. Participant Company Industry Segment 504
Figure 217. Small Business Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 510
Figure 218. How Small Business Program Participants Learned About the Program 524
Figure 219. Trade Ally Assessment of Marketing and Outreach Efforts 525
Figure 220. Trade Ally Familiarity with New Refrigeration Product Offerings 526
Figure 221. Trade Ally Agreement Level to Statement 527
Figure 222. Most Important Factor in Making Energy-Efficient Upgrades 528

Figure 223. Top Benefits Resulting from Energy-Efficient Upgrades 529
Figure 224. LEDs' Importance on Decision to Participate in Program 529
Figure 225. CY 2016 Overall Satisfaction with the Small Business Program 531
Figure 226. CY 2016 Satisfaction with Small Business Program Upgrades 532
Figure 227. CY 2016 Positive Comments About Small Business Program Measures 533
Figure 228. CY 2016 Suggestions for Improvement for Small Business Program Measures 534
Figure 229. CY 2016 Satisfaction with Small Business Program Contractors 535
Figure 230. CY 2016 Positive Comments About Small Business Program Trade Allies 536
Figure 231. CY 2016 Suggestions for Small Business Program Trade Ally Improvement 537
Figure 232. CY 2016 Satisfaction with Small Business Program Discounts 538
Figure 233. CY 2016 Likelihood of Initiating Another Energy Efficiency Improvement 539
Figure 234. CY 2016 Intentions for Future Improvements 540
Figure 235. CY 2016 Likelihood of Recommending the Small Business Program 541
Figure 236. CY 2016 Positive Comments About the Small Business Program 542
Figure 237. CY 2016 Suggestions for Improving the Small Business Program 543
Figure 238. Trade Ally Satisfaction with Focus on Energy 544
Figure 239. Trade Ally Awareness of Reduced Incentives 545
Figure 240. Changes in Trade Allies' Sales Volume Due to Focus on Energy 546
Figure 241. RECIP Achievement of CY 2016 Gross Lifecycle Savings Goal[1] 553
Figure 242. Residential Motivations for Installing Renewable Equipment 582
Figure 243. Nonresidential Motivations for Installing Renewable Equipment 582
Figure 244. Manufactured Homes Pilot Percentage of CY 2015 Gross Lifecycle Savings Goals Achieved[1] 591
Figure 245. Seasonal Savings Pilot Percentage of CY 2016 Gross Lifecycle Savings Goals Achieved[1] 602
Figure 246. Seasonal Savings Participant Summer Cooling Run Time by Thermostat Cooling Setpoint 605
Figure 247. MyMeter Frequency of Use 616
Figure 248. Participant Savings Compared to Expectations 617
Figure 249. Mean Customer Satisfaction 619
Figure 250. Participant Demographics 620

List of Tables

Table 1. Home Performance with ENERGY STAR Program Whole Home and HVAC Paths Summary 7
Table 2. Home Performance with ENERGY STAR Program Renewable Rewards Summary 8
Table 3. CY 2016 Home Performance with ENERGY STAR Program Smart Thermostat Pilot Summary[1] 10
Table 4. CY 2016 Home Performance with ENERGY STAR Program Data Collection Activities and Sample Sizes 11
Table 5. CY 2016 Home Performance with ENERGY STAR Impact Evaluation Methods 14
Table 6. CY 2016 Whole Home Path Database Tracking Review Adjustments 15
Table 7. CY 2016 HVAC Path Database Tracking Review Adjustments 15

Table 8. CY 2016 Smart Thermostats Pilot Gross Billing Analysis Results 18
Table 9. Smart Thermostat Evaluated Electric Gross Energy Savings from Billing Analysis 18
Table 10. Smart Thermostat Evaluated Gas Gross Energy Savings from Billing Analysis 19
Table 11. Comparison of Smart Thermostat Pilot Results to Similar Studies 20
Table 12. CY 2016 Home Performance with ENERGY STAR Program Annual and Lifecycle Realization Rates by Program Component 21
Table 13. CY 2016 Whole Home Path Annual and Lifecycle Realization Rates by Measure Type 22
Table 14. CY 2016 HVAC Path Annual and Lifecycle Realization Rates by Measure Type 23
Table 15. CY 2016 Renewable Rewards Annual and Lifecycle Realization Rates by Measure Type 23
Table 16. CY 2016 Home Performance with ENERGY STAR Program Annual Gross Savings Summary by Program Component[1] 24
Table 17. CY 2016 Whole Home Path Annual Gross Savings Summary by Measure Type 24
Table 18. CY 2016 HVAC Path Annual Gross Savings Summary by Measure Type 25
Table 19. CY 2016 Renewable Rewards Annual Gross Savings Summary by Measure Type 25
Table 20. CY 2016 Home Performance with ENERGY STAR Program Lifecycle Gross Savings Summary by Program Component[1] 26
Table 21. CY 2016 Whole Home Path Lifecycle Gross Savings Summary by Measure Type 26
Table 22. CY 2016 HVAC Path Lifecycle Gross Savings Summary by Measure Type 27
Table 23. CY 2016 Renewable Rewards Lifecycle Gross Savings Summary by Measure Type 27
Table 24. CY 2016 Smart Thermostat Pilot Annual and Lifecycle Realization Rates by Measure Type 28
Table 25. CY 2016 Smart Thermostat Pilot Annual Gross Savings Summary by Measure Type 28
Table 26. CY 2016 Smart Thermostat Pilot Lifecycle Gross Savings Summary by Measure Type 28
Table 27. CY 2015 HPwES Program Billing Analysis Results Applied to CY 2016 emHome Projects 29
Table 28. CY 2016 NTG Ratios Applied to Snugg Pro Modeled Savings 30
Table 29. CY 2016 Weighted Average NTG Ratios 30
Table 30. CY 2016 Freeridership Methodology by Program Component and Measure Type 31
Table 31. Measures and Savings Type Assessed with Standard Market Practice Methodology 32
Table 32. Gas Furnaces: CY 2016 Net-of-Freeridership Savings (Therms) 34
Table 33. Gas Furnace Freeridership Comparison between CY 2015 and CY 2016 35
Table 34. Comparison of Values Used for Freeridership Calculation in CY 2015 and CY 2016 35
Table 35. Air Conditioners: CY 2016 Net-of-Freeridership Electric Savings 36
Table 36. ECMs: CY 2016 Net-of-Freeridership Electric and Demand Savings 37
Table 37. CY 2016 Summary of Net-of-Freeridership Savings by Measure 38
Table 38. CY 2016 Self-Reported Freeridership Estimates by Program Component 38
Table 39. CY 2016 Reported Spillover Measures—Renewable Rewards 42
Table 40. CY 2016 Reported Spillover Measures—Smart Thermostat Pilot 42
Table 41. CY 2016 Participant Spillover Estimate 42
Table 42. CY 2016 Program Annual Net Savings and NTG Ratio 43
Table 43. CY 2016 Home Performance with ENERGY STAR Program Annual Net Savings by Program Component 43

Table 44. CY 2016 Whole Home Path Annual Net Savings by Measure Type 44
Table 45. CY 2016 HVAC Path Annual Net Savings by Measure Type..... 45
Table 46. CY 2016 Renewable Rewards Annual Net Savings by Measure Type 45
Table 47. CY 2016 Home Performance with ENERGY STAR Program Lifecycle Net Savings by Program Component 46
Table 48. CY 2016 Whole Home Path Lifecycle Net Savings by Measure Type 46
Table 49. CY 2016 HVAC Path Lifecycle Net Savings by Measure Type 47
Table 50. CY 2016 Renewable Rewards Lifecycle Net Savings by Measure Type..... 47
Table 51. CY 2016 Smart Thermostat Pilot Annual Net Savings and NTG Ratio 47
Table 52. CY 2016 Smart Thermostat Pilot Annual Net Savings by Measure Type 48
Table 53. CY 2016 Smart Thermostat Pilot Lifecycle Net Savings by Measure Type 48
Table 54. CY 2016 Eligibility and Incentives: Whole Home Measures..... 49
Table 55. CY 2016 Eligibility and Incentives: HVAC Measures 50
Table 56. CY 2016 Eligibility and Incentives: Renewable Energy Measures 51
Table 57. Changes in Participation by Path from CY 2015 to CY 2016..... 54
Table 58. Home Performance with ENERGY STAR CY 2016 KPIs 55
Table 59. Whole Home Trade Ally Responses to Key Program Design Changes 67
Table 60. Participant Renewable Energy Installation Plans in the Next Five Years[1]..... 101
Table 61. Whole Home and HVAC Path Incentive Costs..... 112
Table 62. Whole Home and HVAC Path Costs and Benefits 113
Table 63. Renewable Rewards Program Incentive Costs..... 113
Table 64. Renewable Rewards Program Costs and Benefits 114
Table 65. Whole Home and HVAC Path + Renewable Rewards Incentive Costs 114
Table 66. Whole Home and HVAC Path + Renewable Rewards Costs and Benefits..... 115
Table 67. Smart Thermostat Pilot Incentive Costs..... 115
Table 68. Smart Thermostat Pilot Costs and Benefits 115
Table 69. New Homes Program Summary 125
Table 70. New Homes Program Data Collection Activities and Sample Sizes 126
Table 71. CY 2016 New Homes Program Annual and Lifecycle Realization Rates by Measure Type 127
Table 72. CY 2016 New Homes Program Annual Gross Savings Summary by Measure Type 128
Table 73. CY 2016 New Homes Program Lifecycle Gross Savings Summary by Measure Type..... 128
Table 74. CY 2015 Program Billing Analysis Results Applied to CY 2016 Projects 130
Table 75. CY 2016 New Homes Program Annual Net Savings by Measure Type..... 130
Table 76. CY 2016 New Homes Program Lifecycle Net Savings by Measure Type 131
Table 77. CY 2016 New Homes Program Incentive Levels..... 132
Table 78. CY 2015 and CY 2016 New Homes Efficiency Level and Incentive Changes – Electric and Gas Homes 133
Table 79. CY 2016 Percentage of Homes by Efficiency and Incentive Level – Electric and Gas Homes ... 134
Table 80. New Homes CY 2016 Key Performance Indicators..... 135
Table 81. New Homes Program Incentive Costs 135

Table 82. New Homes Program Costs and Benefits 136
Table 83. Retailer Lighting and Appliance Program Lighting Component Summary 138
Table 84. Retailer Lighting and Appliance Program Data Collection Activities and Sample Sizes 139
Table 85. CY 2016 Lighting Unit Savings by Measure 143
Table 86. CY 2016 Lighting Measure-Level First-Year In-Service Rates 144
Table 87. Lifetime CFL and LED In-Service Rates 145
Table 88. EISA (Phase 1) Lumen Bins and Baseline Watts for Standard Bulbs 146
Table 89. CY 2016 *Ex Ante* and Verified Gross Delta Watts 147
Table 90. CY 2016 Retailer Lighting and Appliance Program Annual and Lifecycle Realization Rates by Measure Type 148
Table 91. CY 2016 Retailer Lighting and Appliance Program Annual Gross Savings Summary by Measure Type 149
Table 92. CY 2016 Retailer Lighting and Appliance Program Lifecycle Gross Savings Summary by Measure Type 149
Table 93. CY 2016 Average Elasticity Coefficient by Channel 152
Table 94. CY 2016 Percentage Change in Sales and Prices – Month-to-Month 152
Table 95. CY 2016 Demand Elasticity Modeling Freeridership Ratio Estimates by Measure 153
Table 96. Corporate Retailer and Manufacturer Self-Report Results 155
Table 97. Net-to-Gross Calculations 157
Table 98. Summary of Lighting Net-to-Gross Results 157
Table 99. Summary of Lighting Net-to-Gross Components 158
Table 100. Summary of Lighting Net-to-Gross Methods: Strengths and Limitations 158
Table 101. Summary of Lighting Net-to-Gross Results for LEDs 159
Table 102. CY 2016 Retailer Lighting and Appliance Program Annual Net Savings 160
Table 103. CY 2016 Retailer Lighting and Appliance Program Lifecycle Net Savings 160
Table 104. Distinctions between Resource Acquisition and Market Transformation Programs 161
Table 105. CY 2016 Retail Products Platform Qualified Products and Specifications 163
Table 106. Retailer Lighting and Appliance Program CY 2016 Goals and Achievements 165
Table 107. CY 2016 Retail Products Platform Alternative Market Indicators 166
Table 108. Retailer Lighting and Appliance Program CY 2016 Key Performance Indicators 167
Table 109. Storefront Manager Satisfaction with Focus on Energy Marketing 170
Table 110. Storefront Manager Satisfaction with Focus on Energy Retailer Lighting and Appliance Program 172
Table 111. Storefront Manager Satisfaction with Program Representative 173
Table 112. Retailer Lighting and Appliance Program Incentive Costs 180
Table 113. Retailer Lighting and Appliance Program Costs and Benefits 180
Table 114. CY 2016 Simple Energy Efficiency Program Summary Compared to 184
Table 115. Simple Energy Efficiency Program Data Collection Activities and Sample Sizes 185
Table 116. Simple Energy Efficiency Program Completed Surveys by Pack Type 186
Table 117. First-Year Measure-Level In-Service Rates 188

Table 118. Lifetime Lighting In-Service Rates[1] 189
Table 119. CY 2016 Simple Energy Efficiency Program Measure-Level In-Service Rates 189
Table 120. TRM vs. Evaluated In-Service Rates 190
Table 121. CY 2016 Simple Energy Efficiency Program Unit Savings by Measure 190
Table 122. CY 2016 Simple Energy Efficiency Program Annual and Lifecycle Realization Rates by Measure Type 191
Table 123. CY 2016 Simple Energy Efficiency Program Annual Gross Savings Summary by Measure Type[1] 191
Table 124. CY 2016 Simple Energy Efficiency Program Lifecycle Gross Savings Summary by Measure Type[1] 192
Table 125. CY 2016 Self-Reported Freeridership Estimates by Program Component 192
Table 126. CY 2016 Simple Energy Efficiency Program Annual Net Savings and NTG Ratio 194
Table 127. CY 2016 Simple Energy Efficiency Program Annual Net Savings 194
Table 128. CY 2016 Simple Energy Efficiency Program Lifecycle Net Savings 194
Table 129. CY 2016 Simple Energy Efficiency Program Packs 196
Table 130. County Participation of CY 2015 Express Energy Efficiency Program vs. CY 2016 Simple Energy Efficiency Program 198
Table 131. Simple Energy Efficiency Program CY 2016 Key Performance Indicators 198
Table 132. Customer Awareness of and Participation in Other Focus on Energy Programs 202
Table 133. Simple Energy Efficiency Program Measure Removal or Non-Install Rates 209
Table 134. Participant Reasons for Measure Removal[1] 209
Table 135. Participant Reasons for Not Installing Measure[1] 210
Table 136. CY 2016 Simple Energy Efficiency Program Measure First-Year In-Service Rates 212
Table 137. Mailed Kit Program First-Year In-Service Rates by Measure 212
Table 138. Mailed Kit Program Contents 213
Table 139. Energy-Saving Actions Listed on the Insert that Participants Implemented 214
Table 140. Simple Energy Efficiency Program Incentive Costs 219
Table 141. Simple Energy Efficiency Program Costs and Benefits 220
Table 142. Multifamily Programs Summary 223
Table 143. Multifamily Programs' Data Collection Activities and Sample Sizes 226
Table 144. CY 2016 Multifamily Programs In-Service Rates by Category 230
Table 145. CY 2016 Multifamily Energy Savings Program Annual and Lifecycle Realization Rates 231
Table 146. CY 2016 Multifamily Direct Install Program Annual and Lifecycle Realization Rates 231
Table 147. CY 2016 Multifamily Energy Savings Program Annual Gross Savings Summary 231
Table 148. CY 2016 Multifamily Direct Install Program Annual Gross Savings Summary 232
Table 149. CY 2016 Multifamily Energy Savings Program Lifecycle Gross Savings Summary 232
Table 150. CY 2016 Multifamily Direct Install Program Lifecycle Gross Savings Summary 233
Table 151. CY 2015 and CY 2016 Self-Reported Freeridership 233
Table 152. CY 2016 Multifamily Energy Savings Program Participant Spillover Measures and Savings 234
Table 153. CY 2016 Multifamily Energy Savings Program Participant Spillover Percentage Estimate 234

Table 154. CY 2016 Multifamily Energy Savings Program Annual Net Savings and NTG 235
Table 155. CY 2016 Multifamily Energy Savings Program Annual Net Savings 235
Table 156. CY 2016 Multifamily Energy Savings Program Lifecycle Net Savings 236
Table 157. CALP Lifecycle Electric Savings 238
Table 158. CY 2016 Multifamily Energy Savings Program: Custom Measure Incentives 238
Table 159. Multifamily Direct Install Program Measures and Installation Requirements 239
Table 160. CY 2016 Changes to Multifamily Energy Savings Program Prescriptive Offerings 240
Table 161. Multifamily Programs' CY 2016 Goals and Achievements 241
Table 162. Multifamily Programs Verified Net Savings Achievements 241
Table 163. Multifamily Programs' CY 2016 Key Performance Indicators 242
Table 158. Participant Reaction to Marketing Statements 249
Table 165. Trade Ally Ranking of Focus on Energy Information Sources 251
Table 166. Barriers to Moving Forward with Additional Upgrades 266
Table 167. Comparison of Bill Payment Responsibility 272
Table 168. Multifamily Energy Savings Program Incentive Costs 272
Table 169. Multifamily Energy Savings Program Costs and Benefits 273
Table 170. Multifamily Direct Install Program Incentive Costs 273
Table 171. Multifamily Direct Install Program Costs and Benefits 273
Table 172. Multifamily Programs Incentive Costs 274
Table 173. Multifamily Programs Costs and Benefits 274
Table 174. Agriculture, Schools, and Government Program Summary 279
Table 175. Agriculture, Schools, and Government Program Data Collection Activities and Sample Sizes 280
Table 176. Marketing Review Research Approach 281
Table 177. CY 2016 Agriculture, Schools, and Government Program Annual and Lifecycle Realization Rates 284
Table 178. CY 2016 Agriculture, Schools, and Government Program Annual Gross Savings Summary 284
Table 179. CY 2016 Agriculture, Schools, and Government Program Lifecycle Gross Savings Summary 286
Table 180. CY 2015 and CY 2016 Self-Reported Freeridership 287
Table 181. CY 2016 Agriculture, Schools, and Government Program Participant Spillover Measures and Savings 288
Table 182. CY 2016 Agriculture, Schools, and Government Program Participant Spillover Percentage Estimate 288
Table 183. CY 2016 Agriculture, Schools, and Government Program Annual Net Savings and NTG 289
Table 184. CY 2016 Agriculture, Schools, and Government Program Annual Net Savings 289
Table 185. CY 2016 Agriculture, Schools, and Government Program Lifecycle Net Savings 290
Table 186. Agriculture, Schools, and Government Program CY 2016 Key Performance Indicators 294
Table 187. Top 10 Best Practice Elements for Marketing Materials 298
Table 188. Marketing Clusters and Associated Materials 299
Table 189. Agriculture, Schools and Government Program Incentive Costs 323

Table 190. Agriculture, Schools and Government Program Costs and Benefits 324
Table 191. Marketing Materials Recommendations 326
Table 192. Business Incentive Program Summary 329
Table 193. Business Incentive Program Data Collection Activities and Sample Sizes 331
Table 194. CY 2016 Business Incentive Program Annual and Lifecycle Realization Rates 335
Table 195. CY 2016 Business Incentive Program Annual Gross Savings Summary 335
Table 196. CY 2016 Business Incentive Program Lifecycle Gross Savings Summary 337
Table 197. CY 2015 and CY 2016 Self-Reported Freeridership 338
Table 198. Business Incentive Program Participant Spillover Measures and Savings 339
Table 199. Business Incentive Program Participant Spillover Percentage Estimate 339
Table 200. CY 2016 Business Incentive Program Annual Net Savings and NTG Ratio 340
Table 201. CY 2016 Business Incentive Program Annual Net Savings 340
Table 202. CY 2016 Business Incentive Program Lifecycle Net Savings 341
Table 203. Business Incentive Program KPIs 344
Table 204. Business Incentive Program Trade Ally Activity Tiers 346
Table 205. Participant Reaction to Marketing Statements 350
Table 206. Trade Ally Recognition 356
Table 207. Business Incentive Program Incentive Costs 377
Table 208. Business Incentive Program Costs and Benefits 378
Table 209. Chain Stores and Franchises Program Summary 382
Table 210. Chain Stores and Franchises Program Data Collection Activities and Sample Sizes 384
Table 211. Franchise Operators Interviewed 385
Table 212. CY 2016 Chain Stores and Franchises Program Annual and Lifecycle Realization Rates 389
Table 213. CY 2016 Chain Stores and Franchises Program Annual Gross Savings Summary 389
Table 214. CY 2016 Chain Stores and Franchises Program Lifecycle Gross Savings Summary 390
Table 215. CY 2015 and CY 2016 Self-Reported Non-NRA Freeridership 391
Table 216. CY 2016 National Rebate Administrator Respondent Freeridership Scores 392
Table 217. Chain Stores and Franchise Program Participant Spillover Measures and Savings 392
Table 218. Chain Stores and Franchise Program Participant Spillover Percentage Estimate 393
Table 219. CY 2016 Chain Stores and Franchises Program Annual Net Savings and NTG Ratio 393
Table 220. CY 2016 Chain Stores and Franchises Program Annual Net Savings 393
Table 221. CY 2016 Chain Stores and Franchises Program Lifecycle Net Savings 394
Table 222. Chain Stores and Franchises Program CY 2016 Key Performance Indicators 399
Table 223. Source of Chain Stores and Franchises Program Awareness by Number of Business Locations and Ownership Structure 402
Table 224. Franchise Operator Awareness of Milestone Participation Offering 403
Table 225. Contractor Communication Preferences 404
Table 226. Participant Reaction to Marketing Statements 406
Table 227. Franchise Operator Decision-Making Criteria 414
Table 228. Reasons for Choosing Equipment Upgrades in CY 2016 418

Table 229. Chain Stores and Franchises Program Strengths According to National Rebate Administrator 426
Table 230. Chain Stores and Franchises Program Incentive Costs 428
Table 231. Chain Stores and Franchises Program Costs and Benefits 429
Table 232. Design Assistance Program Summary[1] 432
Table 233. Design Assistance Program Data Collection Activities and Sample Sizes[1] 433
Table 234. CY 2016 Design Assistance Program Annual and Lifecycle Realization Rates[1] 436
Table 235. CY 2016 Design Assistance Program Annual Gross Savings Summary 437
Table 236. CY 2016 Design Assistance Program Lifecycle Gross Savings Summary 437
Table 237. CY 2014, CY 2015, and CY 2016 Self-Reported Freeridership 438
Table 238. Design Assistance Program Participant Spillover Measures and Savings 438
Table 239. Design Assistance Program Participant Spillover Percentage Estimate 439
Table 240. CY 2016 Design Assistance Program Annual Net Savings and NTG Ratio 439
Table 241. CY 2016 Design Assistance Program Annual Net Savings 439
Table 242. CY 2016 Design Assistance Program Lifecycle Net Savings 440
Table 243. Design Assistance Program Incentive Structure in CY 2016 440
Table 244. Design Assistance Program CY 2016 Key Performance Indicators 442
Table 245. Design Assistance Program Incentive Costs 452
Table 246. Design Assistance Program Costs and Benefits 452
Table 247. CY 2016 and CY 2015 Large Energy Users Program Summary[1] 456
Table 248. Large Energy Users Program and Strategic Energy Management Pilot Program Data Collection Activities and Sample Sizes 457
Table 249. CY 2016 Large Energy Users Program Annual and Lifecycle Realization Rates 462
Table 250. CY 2016 Large Energy Users Program Annual Gross Savings Summary 462
Table 251. CY 2016 Large Energy Users Program Lifecycle Gross Savings Summary 463
Table 252. CY 2015 and CY 2016 Self-Reported Freeridership 465
Table 253. Large Energy Users Program Participant Spillover Measures and Savings 465
Table 254. Large Energy Users Program Participant Spillover Percentage Estimate 466
Table 255. CY 2016 Large Energy Users Program Annual Net Savings and Net-to-Gross 466
Table 256. CY 2016 Large Energy Users Program Annual Net Savings 466
Table 257. CY 2016 Large Energy Users Program Lifecycle Net Savings 468
Table 258. CY 2015 to CY 2016 Program Incentive Changes 472
Table 259. Large Energy Users Program CY 2016 Key Performance Indicators 473
Table 260. Strategic Energy Management Pilot Program CY 2016 Key Performance Indicators 475
Table 261. Strategic Energy Management Pilot Program Participant Motivating Factors 494
Table 262. Large Energy Users Program Incentive Costs 504
Table 253. Large Energy Users Program Costs and Benefits 505
Table 264. Small Business Program Summary 510
Table 265. Small Business Program Data Collection Activities and Sample Sizes 511
Table 266. CY 2016 Small Business Program Annual and Lifecycle Realization Rates 515

Table 267. CY 2016 Small Business Program Annual Gross Savings Summary 515
Table 268. CY 2016 Small Business Program Lifecycle Gross Savings Summary 516
Table 269. CY 2015 and CY 2016 Self-Reported Freeridership 517
Table 270. Small Business Program Participant Spillover Measures and Savings 517
Table 271. Small Business Program Participant Spillover Percentage Estimate 517
Table 272. CY 2016 Small Business Program Annual Net Savings and NTG Ratio 518
Table 273. CY 2016 Small Business Program Annual Net Savings 518
Table 274. CY 2016 Small Business Program Lifecycle Net Savings 519
Table 275. Small Business Program CY 2016 Key Performance Indicators 522
Table 276. Small Business Program Incentive Costs 547
Table 277. Small Business Program Costs and Benefits 547
Table 278. RECIP Summary 552
Table 279. RECIP Data Collection Activities and Sample Sizes 553
Table 280. CY 2016 RECIP Annual Realization Rates by Measure Type 556
Table 281. CY 2016 RECIP Annual Gross Savings Summary by Measure Type 557
Table 282. CY 2016 RECIP Lifecycle Gross Savings Summary by Measure Type 557
Table 283. Historical RECIP Self-Reported Freeridership 558
Table 284. CY 2016 RECIP Annual Net Savings and NTG Ratio 558
Table 285. CY 2016 RECIP Annual Net Savings 558
Table 286. CY 2016 RECIP Lifecycle Net Savings 559
Table 287. RECIP Participant Awareness 561
Table 288. RECIP Program Incentive Costs 562
Table 289. RECIP Program Costs and Benefits 562
Table 290. Renewable Energy Loan Fund Summary 566
Table 291. Renewable Energy Loan Fund Data Collection Activities and Sample Sizes 567
Table 292. Renewable Energy Loan Fund Participant Survey Respondents by Sector and Equipment Type 567
Table 293. CY 2016 Renewable Energy Loan Fund Annual and Lifecycle Realization Rates by Measure Type – Financing-Only Projects 569
Table 294. CY 2016 Renewable Energy Loan Fund Annual Gross Savings Summary by Measure Type – Financing-Only Projects 569
Table 295. CY 2016 Renewable Energy Loan Fund Lifecycle Gross Savings Summary by Measure Type – Financing-Only Projects 569
Table 296. Renewable Rewards Program Verified Gross Savings for Financing and Rebate Fund Projects 570
Table 297. Fund NTG Rate by Participant Survey Respondent 571
Table 298. CY 2016 Renewable Energy Loan Fund Annual Net Savings – Financing-Only Projects 571
Table 299. CY 2016 Renewable Energy Loan Fund Lifecycle Net Savings – Financing-Only Projects 572
Table 300. Hypothetical Net Savings for Financing and Rebate Fund Projects 572
Table 301. Allocation Scoring by Respondent (n=7) 573

Table 302. Allocation Results by Incentive and Customer Type 574
Table 303. Hypothetical Annual Net Savings from Financing and Rebate Projects Allocable to the Renewable Energy Loan Fund 575
Table 304. Eligible Projects by Market Segment 576
Table 305. Renewable Energy Loan Fund CY 2016 Key Performance Indicators 578
Table 306. Participation and Allocation of Renewable Energy Loan Fund Disbursements[1] 578
Table 307. Renewable Energy Loan Fund Projects Funded 579
Table 308. Lender Experience and Perspective on Market for Renewable Financing 580
Table 309. Renewable Energy Loan Fund Incentive Costs 586
Table 310. Renewable Energy Loan Fund Costs and Benefits (Net Savings) 586
Table 311. Renewable Energy Loan Fund Costs and Benefits (Allocated Net Savings) 587
Table 312. CY 2016 Pilots and New Programs Annual and Lifecycle *Ex Ante* Gross Savings Summary 589
Table 313. CY 2016 Pilots and New Programs Annual and Lifecycle Verified Gross Savings Summary 589
Table 314. Manufactured Homes Pilot Summary 590
Table 315. Manufactured Homes Pilot Data Collection Activities and Sample Sizes 592
Table 316. Manufactured Homes Pilot Measure Package 1 593
Table 317. Add-On Measures 593
Table 318. Manufactured Homes Pilot Billing Analysis Results 594
Table 319. Manufactured Homes Pilot Electric Gross Energy Savings from Billing Analysis 595
Table 320. Manufactured Homes Pilot Annual Realization Rates 595
Table 321. Manufactured Homes Pilot Annual Gross Savings Summary 595
Table 322. Manufactured Homes Pilot Lifecycle Gross Savings Summary 596
Table 323. Manufactured Homes Pilot Annual Gross Savings and Realization Rate 596
Table 324. Manufactured Homes Pilot Annual Net Savings Results 596
Table 325. Manufactured Homes Pilot Lifecycle Net Savings Results 596
Table 326. Manufactured Homes Pilot Incentive Costs 598
Table 327. Manufactured Homes Pilot Costs and Benefits 599
Table 328. CY 2016 Seasonal Savings Pilot Summary 601
Table 329. CY 2016 Seasonal Savings Pilot Data Collection Activities and Sample Sizes 602
Table 330. CY 2016 Seasonal Savings Pilot Program Billing Analysis Results 605
Table 331. CY 2016 Seasonal Savings Pilot Electric Gross Energy Savings from Billing Analysis 606
Table 332. CY 2016 Seasonal Savings Pilot Evaluated Gas Gross Energy Savings from Billing Analysis 606
Table 333. CY 2016 Seasonal Savings Pilot Annual Realization Rates 607
Table 334. CY 2016 Seasonal Savings Pilot Annual and Lifecycle Gross Savings Summary 607
Table 335. CY 2016 Seasonal Savings Pilot Annual Gross Savings and Realization Rate 607
Table 336. CY 2016 Seasonal Savings Pilot Annual and Lifecycle Net Savings Results 607
Table 337. Seasonal Savings Pilot Incentive Costs 608
Table 338. Seasonal Savings Pilot Costs and Benefits 608
Table 339. On Demand Savings Pilot Summary 609
Table 340. On Demand Savings Data Collection Activities and Sample Sizes 610

Table 341. On Demand Savings Pilot Incentives 611
Table 342. On Demand Savings Pilot CY 2016 Key Performance Indicators 613
Table 343. Participant Satisfaction with MyMeter 616
Table 344. Demand Reduction Strategies Implemented 618

List of Acronyms

Acronym	Term
A/C	Air conditioner
ACS	American Community Survey
AFUE	Annual fuel utilization efficiency
AHRI	Air Conditioning, Heating and Refrigeration Institute
B/C	Benefit/cost
BPC	Building Performance Consultant
BPI	Building Performance Institute
CALP	Common area lighting package
CB&I	Chicago Bridge & Iron Company
CFL	Compact fluorescent lamp
COP	Coefficient of precision
CREED	Consortium for Retail Energy Efficiency Data
CY	Calendar Year
DHW	Domestic hot water
DIY	Do-it-yourself
DOE	U.S. Department of Energy
ECM	Electronically commutated motor
EAI	Efficiency Arkansas, Inc.
EER	Energy efficiency rating
EIA	Energy Information Administration
EISA	Energy Independence and Security Act of 2007
EMS	Energy management system
EM&V	Evaluation, measurement, and verification
EPA	U.S. Environmental Protection Agency
EUL	Effective useful life
EWG	Energy Working Group
GHSP	Ground source heat pump
HVAC	Heating, ventilation, and air conditioning
ISR	In-service rate
KAM	Key Account Manager
KBtu/h	Thousand British thermal units per hour
kW	Kilowatt
kWh	Kilowatt hour
KPI	Key performance indicator
LED	Light-emitting diode
MMBtu	Million British thermal units

Acronym	Term
MOU	Memorandum of understanding
MThm	Megatherm
MWh	Megawatt hour
NEO	Net energy optimizer
NPS	Net promotor score
NTG	Net-to-gross
NYSERDA	New York State Energy Research and Development Authority
POP	Point-of-purchase
PRISM	PRInceton Scorekeeping Method
PSC	Public Service Commission of Wisconsin
PV	Photovoltaic
QA/QC	Quality assurance/quality control
RECIP	Renewable Energy Competitive Incentive Program
RFP	Request for proposal
RPP	Retail Products Platform
SEER	Seasonal energy efficiency rating
SMI	State median income
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
TRC	Total resource cost (test)
TRM	Technical reference manual
UDC	Uniform Dwelling Code
UMP	Uniform Methods Project
VFD	Variable-frequency drive (also known as variable-speed drive)
VRF	Variable refrigerant flow
WPS	Wisconsin Public Service Corporation

Introduction

Volume II of the Focus on Energy CY 2016 Evaluation Report presents program-specific evaluation findings and details about specific evaluation approaches and results for the residential and nonresidential programs, including pilot programs. This introduction presents additional details on the overall roles and responsibilities of the Evaluation Team,[1] as well as descriptions of standard evaluation practices and approaches the Team used across multiple program evaluations

The diagram presented in Figure 3 of Volume I, and repeated below as Figure 1 of Volume II of the CY 2016 Evaluation Report, is a useful summary of the steps involved in the calculation of net savings from the gross savings recorded in the program tracking databases. In addition to these steps, there are many planning and coordination activities that are a part of the evaluation process. The remainder of Volume II of the evaluation report presents program-specific evaluation findings and greater details about specific evaluation approaches and results. This chapter presents some additional details on the overall roles and responsibilities of the Evaluation Team, as well as providing descriptions of some of the standard evaluation practices and approaches the Team used across multiple program evaluations.

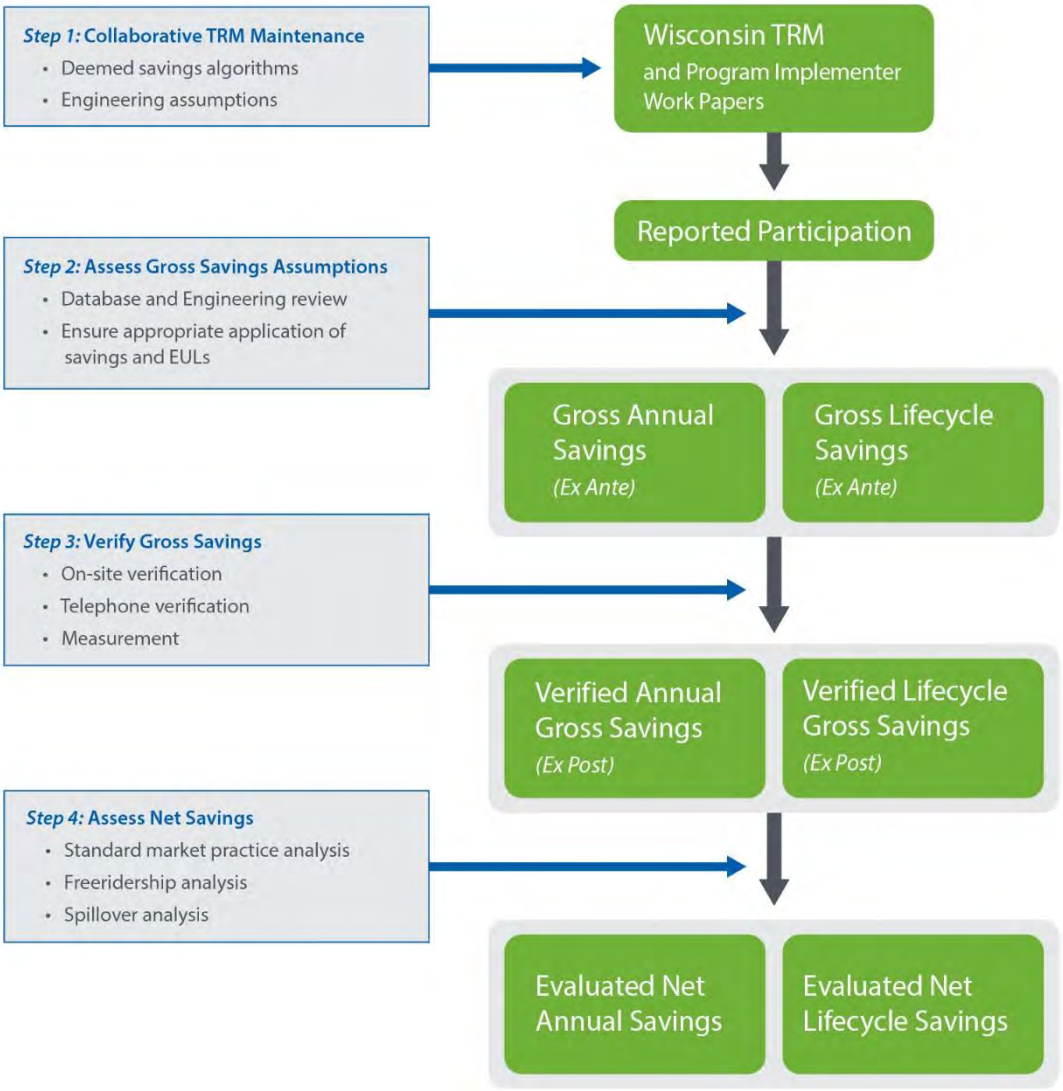
To accomplish steps 1 through 3 in Figure 1, the Evaluation Team coordinates with staff from the Public Service Commission of Wisconsin (PSC), the Program Administrator, and Program Implementers to assess the measures expected to be installed across programs in future years. To determine priorities for additional research, the Evaluation Team also reviews the deemed savings values or algorithms contained in the Wisconsin Technical Reference Manual (TRM) and entered into Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management (SPECTRUM), the program tracking database. The Evaluation Team prioritizes measures for evaluation, measurement, and verification (EM&V) that demonstrate the highest priority by meeting one or more of the following criteria:

- New to the programs
- Expected to contribute an increasing share of savings
- Have experienced technical or other market changes (such as increased energy codes or standards)
- Have significant uncertainty around the savings calculation (independent measurement of key assumptions are dated)

The Team then applies the findings from these activities to the savings calculations summarized in the Evaluation Report, which ultimately end up in the TRM.

[1] The Evaluation Team comprises Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute.

Figure 1. Quadrennium Evaluation Steps



Wisconsin Technical Reference Manual

The Wisconsin TRM is a document managed collaboratively by the Program Administrator, Program Implementers, Evaluation Team, and PSC staff. The information contained in the TRM presents the consensus calculations of the electric and gas energy savings and the electric demand reductions achieved from installing the energy efficiency and renewable energy technologies supported by Focus on Energy programs. The TRM is publicly available on the Focus on Energy website.[2]

The values presented in the TRM fall into one of two categories:

- **Deemed Savings.** Specific per-unit savings (or demand reduction) values the Program Administrator, Program Implementer, Evaluation Team, and the PSC have accepted as reliable because the measures, and the uses for these measures, are consistent and because sound research supports the savings achieved.
- **Savings Algorithms.** The equations used for calculating savings (or demand reductions) based upon project- and measure-specific details. The TRM also makes these calculations transparent by identifying and justifying all relevant formulas, variables, and assumptions.

The TRM is also a reference guide for how program stakeholders classify measures in SPECTRUM, the programs' tracking database. The Evaluation Team revises the document annually to account for any changes to the programs and technologies.

Deemed Savings Report

The annual deemed savings report details changes or updates to deemed savings or savings algorithms in the TRM based upon evaluation measurement and verification activities. The Evaluation Team prepares and circulates the report for review among the primary members of the Focus on Energy team including the Program Administrator, and the Program Implementers, and the PSC. After this review process, the Evaluation Team incorporates the findings into the next iteration of the TRM.

Work Papers

Although evaluation activities often initiate updates to the TRM through the deemed savings report process, Program Implementers can also initiate revisions or additions to the TRM. Rather than a deemed savings report, Program Implementers prepare work papers to present the savings assumptions for new measures or, when appropriate, revisions to the savings calculations for existing measures. Implementers submit these work papers to the Program Administrator, who forwards them to the Evaluation Team and the PSC for review, comment, and approval. Once a work paper receives final approval from the PSC, the Evaluation Team incorporates the work paper into the next iteration of the TRM.

---

[2] Public Service Commission of Wisconsin. *Focus on Energy, Wisconsin Focus on Energy Technical Reference Manual.* Prepared by Cadmus. October 2016. Available online: http://www.focusonenergy.com/about/evaluation-reports

Standard Evaluation Methods

The Evaluation Team uses several standard methods across evaluation cycles to assess the impact of Focus on Energy programs: tracking database review, project audits, and on-site inspections. This chapter details each of these methods. Individual program chapters specify when the Evaluation Team applied these (or other methods) during the current or previous evaluation cycles.

Tracking Database Review

For each program, the Evaluation Team reviews the tracking database, SPECTRUM, for completeness and quality of data. The review includes the following activities:

- Downloading and reviewing data for projects completed during the program year (January 1 to December 31 for each calendar year [CY], based on the "payment approved date" in SPECTRUM)
- Checking program totals against program status reports generated by SPECTRUM
- Verifying the presence and completeness of key data fields (savings, incentives, quantities, etc.)
- Checking for duplicate entries
- Reassigning adjustment measures to original application IDs (where possible) using supplemental tracking databases from the Program Administrator

Project Audits (Engineering Desk Review)

The Evaluation Team reviews SPECTRUM for complete and accurate key project documentation, including the following information:

- Project applications
- Savings workbooks
- Savings calculations performed by participants or third-party contractors (if applicable)
- Energy audits or feasibility studies
- Customer metered data
- Customer billing data (monthly utility bills)
- Invoices for equipment or contracting services
- Other documentation submitted to Focus on Energy

On-Site Inspections

For projects selected for evaluation, Evaluation Team inspectors verify the presence of equipment at a project site and collect data through a variety of methods such as installing data loggers or taking spot measurements of power usage. Inspectors may also gather data by reviewing daily operations and maintenance logs, gathering operations data from central energy management systems, and reviewing historical trend data. (Inspectors may also ask customers to initiate trends during a site visit to collect real-time energy consumption data and then follow up with the customer several weeks later to obtain the results.)

Residential Segment Programs

Home Performance with ENERGY STAR® Program

The Home Performance with ENERGY STAR Program encourages comprehensive energy efficiency retrofits in single-family and multifamily homes with three or fewer units. Focus on Energy designed the Program to address customers' uncertainty about home improvements, their possible costs, and the potential for energy savings, by providing information and recommendations specific to each customer's home. The Program offers three paths for participation: a whole home path for building shell improvements, an HVAC path, and a renewables path. The Program has always offered home energy assessments and incentives for building shell improvements, which make up the whole home path.

In CY 2016, Focus on Energy restructured the Program to comply with Home Performance with ENERGY STAR Sponsor Guide v.1.5,[3] which prioritizes a more comprehensive approach. The most notable of these changes involved integrating the HVAC incentives, previously offered through the Residential and Enhanced Rewards Program, and encouraging contractors to more actively promote combined building shell and HVAC upgrades (dual-path projects). The Program also incorporated incentives for solar and geothermal projects, which were previously available through the Renewable Rewards Program.

Since CY 2014, Focus on Energy has administered a single Home Performance with ENERGY STAR Program that offers two tiers of incentives for energy efficiency improvements. Tier 1, the standard track, offers incentives that are available to all homeowners. Tier 2, the income-qualified track (IQT), offers enhanced incentives to homeowners with a household income at or below 80% of the state median income. As of 2016, the two-tier structure applies to both whole home and HVAC measures. The Program maintains a budget and savings target for both tiers, and a separate budget and targets for the renewables path (named the Renewable Rewards Program).

As the fourth component of the Program, the Smart Thermostat Pilot offered an incentive for homeowners residing in We Energies and Wisconsin Public Service (WPS) utility territory to replace their existing thermostat with a "smart" thermostat (for example, a Nest or Ecobee thermostat). The Pilot tested the market response to this measure as well as the potential for savings. The Smart Thermostat Pilot operated under its own budget and performance targets from August 2015 through June 2016.

This chapter provides aggregated and independent findings for both tiers, as well as renewable incentives and Smart Thermostat Pilot incentives. Table 1 lists the Program's actual spending, savings, participation, and cost-effectiveness for whole home and HVAC projects.

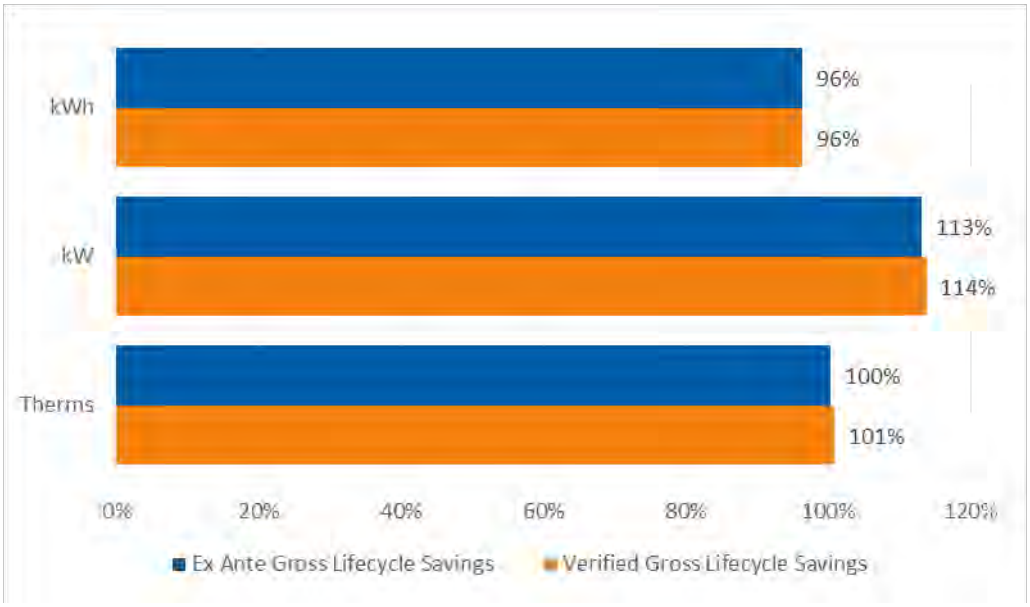
[3] U.S. Department of Energy. Home Performance with ENERGY STAR Sponsor Guide and Reference Manual (v1.5). Building Technologies Office. March 2014. Accessed online January 17, 2017: https://www.energystar.gov/ia/home_improvement/downloads/HPwES_Sponsor_Guide_v1-5.pdf

Table 1. Home Performance with ENERGY STAR Program Whole Home and HVAC Paths Summary

Item	Units	CY 2016	CY 2015 Home Performance with ENERGY STAR, Residential Rewards, and Enhanced Rewards Programs
Incentive Spending	$	$5,416,782	$6,975,545
Participation	Number of Participants	20,013	21,797
Verified Gross Lifecycle Savings	kWh	205,095,725	229,527,065
	kW	2,908	2,188
	therms	28,236,648	35,193,832
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	100%
Net Annual Savings	kWh	8,432,816	9,614,390
	kW	2,976	1,682
	therms	1,060,429	1,149,680
Annual Net-to-Gross Ratio	% (MMBtu)	85%	80%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.23	1.43

Figure 2 shows the percentage of gross lifecycle savings goals achieved by the whole home and HVAC paths in CY 2016. The Program met 96% of its CY 2016 goal for kWh savings and exceeded its CY 2016 kW and therms goals for both *ex ante* and verified gross savings.

Figure 2. Home Performance with ENERGY STAR Program Whole Home and HVAC Paths Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementation contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Table 2 lists the Program's actual spending, savings, participation, and cost-effectiveness for the Renewable Rewards Program.

Table 2. Home Performance with ENERGY STAR Program Renewable Rewards Summary

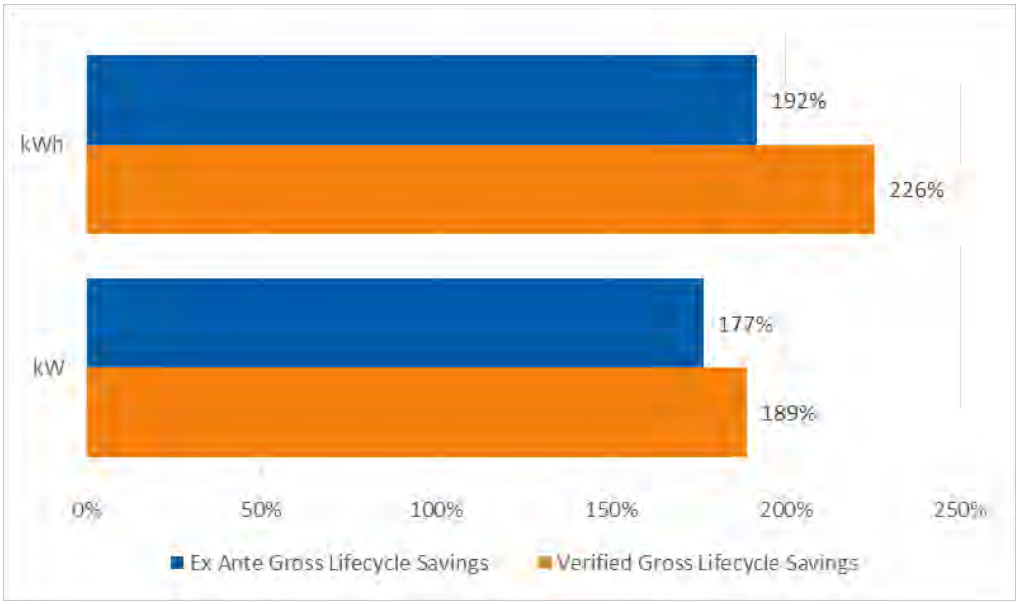
Item	Units	CY 2016	CY 2015
Incentive Spending	$	$1,158,198	$878,099
Participation	Number of Participants	546	478
Verified Gross Lifecycle Savings	kWh	126,495,441	59,013,209
	kW	1,833	1,129
	therms	0	3,465
Verified Gross Lifecycle Realization Rate	% (MMBtu)	118%	100%
Net Annual Savings	kWh	3,615,302	1,739,686
	kW	1,302	677
	therms	0	56
Annual Net-to-Gross Ratio	% (MMBtu)	69%	58%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	0.89	1.38

Figure 3 shows the percentage of gross lifecycle savings goals achieved by the Renewable Rewards Program in CY 2016. The Program exceeded electric and demand CY 2016 goals for both *ex ante* and verified gross savings.

The exceptionally high Program achievement results were bolstered by high Program realization rates indicating that significantly more energy was produced than the programmatic goals. More information regarding the higher realization rates can be found in the *Evaluation of Gross Savings* section.

Another driver of high Program achievement was the number of large businesses participating in the Program. According to the Program Implementer, because funds for the Renewable Energy Competitive Incentive Program (RECIP) were limited in CY 2016, larger projects that would have participated in the RECIP instead participated in the business component of the Renewable Rewards Program. A review of SPECTRUM data supports this claim. In CY 2015, 25 businesses participated in the Renewable Rewards Program and their annual *ex ante* savings averaged 14,252 kWh and 5.72 kW. In CY 2016, 32 businesses participated in the Program and their annual *ex ante* savings averaged 18,656 kWh and 7.49 kW.

Figure 3. Home Performance with ENERGY STAR Program Renewable Rewards Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementation contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Although the Smart Thermostat Pilot began operations in CY 2015, no evaluated savings were reported for CY 2015. The Evaluation Team was not able to verify energy savings from any Pilot operations until early 2017 because of the significant length of time needed to collect data and conduct a billing analysis, considered the best-practice approach to assessing energy savings from smart thermostat technologies. The scope of the billing analysis covered all Pilot activities in both CY 2015 and CY 2016, and all verified and net energy savings for the Pilot are, therefore, credited in CY 2016.

Evaluation results from the Smart Thermostat Pilot are reported separately from overall Home Performance with ENERGY STAR Program results within the *Impact Evaluation* section of this chapter and in Volume I of this report, similar to the results from other pilots evaluated in CY 2016.

Table 3 lists actual spending, savings, participation, and cost-effectiveness for the full duration of the Smart Thermostat Pilot.

Table 3. CY 2016 Home Performance with ENERGY STAR Program Smart Thermostat Pilot Summary[1]

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$251,557	$272,464
Participation	Number of Participants	2,605	2,651
Verified Gross Lifecycle Savings	kWh	22,684,281	
	kW	3,629	
	therms	1,650,113	
Verified Gross Lifecycle Realization Rate	% (MMBtu)	47%	
Net Annual Savings	kWh	1,633,268	
	kW	2,613	
	therms	118,808	
Net-to-Gross Ratio	% (MMBtu)	72%	
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	3.66	

[1] Energy savings span the two-year period that the Pilot operated. Given the significant length of time needed to collect data to conduct a billing analysis, Pilot savings were not verified until early 2017. Therefore, all verified and net energy savings were credited in CY 2016.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for the Home Performance with ENERGY STAR Program in CY 2016.[4] The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing the Program's performance. Table 4 lists the specific data collection activities and sample sizes used in the evaluations for each Home Performance with ENEGY STAR Program path.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and the Program Implementer in July 2016 to assess the current status of the Program. Interview topics included program performance and goals, marketing and outreach, Trade Ally networks, recent changes to the Program, and upcoming changes to the Program going forward.

[4] For Renewable Rewards, the Evaluation Team included projects completed in both CY 2015 and CY 2016 in its desk review and site visit samples. As CY 2015 projects had not previously been evaluated, there were no notable differences between the two Program years for this group, and the larger sample resulted in better confidence and precision in the results.

Table 4. CY 2016 Home Performance with ENERGY STAR Program Data Collection Activities and Sample Sizes

Activity	Whole Home Path	HVAC Path	Renewable Rewards	Smart Thermostat Pilot
Program Actor Interviews	2			
Tracking Database Review	Census			
Participant Surveys	n/a	n/a	171	70
Ongoing Participant Satisfaction Surveys	487	622	153	n/a
Trade Ally Interviews	11	10	n/a	n/a
Trade Ally Online Surveys	57			n/a
Engineering Desk Reviews	n/a	n/a	70	n/a
Verification Site Visits	n/a	n/a	10	n/a
Modeling Software Calibration	77	n/a	n/a	n/a
Electric Billing Analysis	2,367[1]	n/a	n/a	2,110
Gas Billing Analysis	2,695[1]	n/a	n/a	2,427

[1] These numbers are from the CY 2015 Home Performance with ENERGY STAR Program billing analysis, and were applied to CY 2016 emHome projects and used to calculate a NTG ratio for CY 2016 Snugg Pro projects.

Tracking Database Review

The Evaluation Team review of the census of the Program SPECTRUM tracking data included these tasks:

- Thoroughly reviewing the data to ensure the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to measure names
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Participant Surveys

In March 2016, the Evaluation Team conducted telephone surveys with 70 Smart Thermostat Pilot participants. Survey topics included Pilot awareness, customer experience, baseline and smart thermostat use, freeridership, spillover, and demographics. The Evaluation Team structured the sample to achieve 90% confidence at ±10% precision for the Pilot overall and to randomly sample customers from a list including all participants who received a Focus on Energy Reward through the Pilot.

The Evaluation Team also fielded online surveys to a census of Renewable Rewards Program ground source heat pump (GSHP) and photovoltaic (PV) participants to achieve 90% confidence at ±10% precision at the measure level, and received responses from 29 GSHP customers and 142 PV system customers who participated in the Renewable Rewards Program. Survey topics included Program awareness, reasons for participation, project financing, system maintenance, demographics, freeridership, and spillover.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the 2015–2018 quadrennial. The goal of these surveys was to provide a quick and easy feedback opportunity to recent program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow-up information to interested participants.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2016 participants with e-mail addresses within two weeks of completing participation in the program. The Evaluation Team gathered online survey results via SPECTRUM, and sent, received, and scanned mail survey responses, which were combined with the online results for quarterly and annual reporting.

In CY 2016, 1,109 Home Performance with ENERGY STAR Program participants (487 whole home, 622 HVAC, and 153 Renewable Rewards) responded to the customer satisfaction survey.

Trade Ally Interviews

The Evaluation Team interviewed 21 participating Trade Allies—11 who offer whole home services such as energy assessments or insulation and 10 who offer HVAC installation—randomly selected by the Team from each trade group. The interviews focused on the potential for overlap between HVAC and whole home projects, so the Evaluation Team did not interview any Trade Allies who offered renewable services. The interviews covered recruitment, motivation to participate, training needs, satisfaction with Program design and implementation, assessment and installation practices, and the impact of CY 2016 Program changes.

Trade Ally Online Survey

In October 2016, the Evaluation Team surveyed an additional 57 Program Trade Allies who participated in the Home Performance with ENERGY STAR Program and asked them certain core questions regarding engagement and satisfaction. The Evaluation Team combined these survey results with the results of the Trade Ally interviews, for a total sample of 78 core responses.

Engineering Desk Reviews

To calculate Renewable Rewards realization rates, the Evaluation Team randomly selected 10 GSHP applications, 50 residential PV applications, and 10 business PV applications. The Evaluation Team verified GSHP projects' energy savings by performing engineering calculations using application information. The Evaluation Team used the PVWatts calculator and information from each PV participant's application to estimate verified gross savings for PV projects.[5] Of the 60 PV applications reviewed, 10 were selected for on-site inspections to verify the information on the application. For both PV and GSHP participants, the Evaluation Team also verified that the *ex ante* calculations were conducted in accordance with the TRM.

[5] National Renewable Energy Laboratory. "PVWatts Calculator." Accessed March 2017: http://pvwatts.nrel.gov/

Verification Site Visits

The Evaluation Team conducted site visits for the 10 PV projects, selected from those that had received a desk review, with priority given to sites that the desk review found to have realization rates greater or less than one standard deviation from the sample mean. For each, the Evaluation Team verified the system components and system configuration, including site characteristics such as tilt, azimuth, and shading of the PV arrays. The Evaluation Team also inspected the installation quality and workmanship, noting any obvious defects.

Modeling Software Calibration

During CY 2016, the Focus on Energy Home Performance with ENERGY STAR Program whole home path made the transition from emHome to Snugg Pro as the required modeling software. To allow results of the CY 2015 billing analysis to be used to calculate CY 2016 net savings, the Evaluation Team analyzed the modeled usage and savings estimates for 77 projects by both emHome and Snugg Pro. The Team used the results of this comparative analysis to calculate an adjusted net-to-gross (NTG) ratio, which the Evaluation Team applied to Snugg Pro projects.

Electric and Gas Billing Analysis

The Evaluation Team conducted billing analyses to estimate the Smart Thermostat Pilot's gross savings for electric and gas usage. The Evaluation Team submitted a request to We Energies and Wisconsin Public Service in January 2017 for billing data from January 2014 to December 2016 for all Smart Thermostat participants that installed a smart thermostat between July 2015 and January 2016. The Evaluation Team's CY 2016 Smart Thermostat billing analysis was based on billing data from a sample of 2,110 participant electric accounts and 2,427 participant gas accounts.

The Evaluation Team also applied the CY 2015 billing analysis results from the Home Performance with ENERGY STAR Program to CY 2016 whole home projects modeled using emHome software.

Impact Evaluation

This section presents impact evaluation findings for the whole home path and HVAC path by income track, the renewables path, and the Smart Thermostat Pilot. The Evaluation Team based the impact evaluations on the methods shown in Table 5.

Table 5. CY 2016 Home Performance with ENERGY STAR Impact Evaluation Methods

Activity	Whole Home Path	HVAC Path	Renewable Rewards	Smart Thermostat Pilot
Tracking database review	✓	✓	✓	✓
Engineering desk reviews	-	-	✓	-
Site visits	-	-	✓	-
Billing analysis	✓[1]	-	-	✓
Participant surveys	-	✓[2]	✓	✓
Modeling software calibration	✓	-	-	-
Standard market practice	-	✓	-	-

[1] CY 2015 billing analysis results were applied to CY 2016 emHome projects.

[2] CY 2015 Residential Rewards participant survey self-report NTG results were applied to HVAC path measures that were not included in the standard market practice analysis.

Evaluation of Gross Savings

The Evaluation Team assessed gross savings for the Program through tracking database and engineering reviews, site visits, and billing analyses.

Tracking Database Review

The Evaluation Team reviewed the census of CY 2016 Home Performance with ENERGY STAR Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings and effective useful life (EUL) in adherence with the Wisconsin TRM or other deemed savings sources.

As mentioned above, in previous years Focus on Energy offered separate programs (Home Performance with ENERGY STAR, Assisted Home Performance with ENERGY STAR, Residential Rewards, and Enhanced Rewards), and the Evaluation Team could easily apply its analyses to HVAC, whole home, standard track, and income-qualified track participants based on the "Program name" field in SPECTRUM. In CY 2016, when these programs were integrated under the Home Performance with ENERGY STAR Program, every component's Program name was simply Home Performance with Energy Star V3. The Evaluation Team had to manually update the "Program name" field for each SPECTRUM record so that it could accurately apply its verified gross and net analyses to the correct Program components.

Whole Home Path

The Evaluation Team adjusted unit therms savings for two measures and EUL values for two measures, as shown in the Table 6, in accordance with the Focus on Energy TRM. The adjustments had little effect on whole home path realization rates because of the small number of installed units for each measure.

Table 6. CY 2016 Whole Home Path Database Tracking Review Adjustments

Measure (MMID)	SPECTRUM Per Unit		Adjustments to SPECTRUM Per Unit	
	therms	EUL	therms	EUL
Condensing Water Heater, NG, 90%+, Claim Only (MMID 3584)	54	15	46	15
Water Heater, >= 0.67 EF, Storage, NG, Claim Only (MMID 3587)	28	12	28	10
Water Heater, >= 0.82 EF, Tankless, Residential, NG, Claim Only (MMID 3588)	59	20	44	13

HVAC Path

The Evaluation Team made minor adjustments in EULs and more significant adjustments to the unit therms savings values of one furnace measure and one water heater measure to align these values with the Focus on Energy TRM. The Evaluation Team also made adjustments in unit kW savings to eight furnace measures for which SPECTRUM had incorrect prescriptive values; the Team calculated the correct kW savings using the algorithms and inputs approved by the TRM. Table 7 documents these adjustments.

Table 7. CY 2016 HVAC Path Database Tracking Review Adjustments

Measure (MMID)	SPECTRUM Per Unit			Adjustments to SPECTRUM Per Unit		
	kW	therms	EUL	kW	therms	EUL
LP Furnace with ECM, 90%+ AFUE (Existing) (MMID 3679)	0.0779	0	23	0.0792	0	23
NG Furnace with ECM, 96%+ AFUE (MMID 3868)	0.0760	30	23	0.0792	30	23
NG Furnace with ECM, 97%+ AFUE (MMID 3440)	0.0759	39	23	0.0792	47	23
NG Furnace with ECM, 98%+ AFUE (MMID 3869)	0.0759	48	23	0.0792	48	23
Water Heater, Indirect, Claim Only (MMID 3585)	0	61	14	0	93	15
LP Furnace with ECM, Tier 2, 90%+ AFUE (Existing) (MMID 3781)	0.0783	0	23	0.0792	0	23
NG Furnace with ECM, Tier 2, 95%+ AFUE (Existing) (MMID 3782)	0.0789	189	23	0.0792	189	23
NG Furnace with ECM, Tier 2, 96%+ AFUE (MMID 3870)	0.0759	174	23	0.0792	174	23
NG Furnace with ECM, Tier 2, 97%+ AFUE (MMID 3871)	0.0759	183	23	0.0792	183	23
NG Furnace with ECM, Tier 2, 98%+ AFUE (MMID 3872)	0.0759	191	23	0.0792	191	23

Renewable Rewards

The Evaluation Team found no discrepancies for the Renewable Rewards Program during its tracking database review.

Smart Thermostat Pilot

The Evaluation Team found no discrepancies for the Smart Thermostat Pilot during its tracking database review.

Engineering Desk Reviews – Renewable Rewards

The Evaluation Team calculated verified gross savings for 10 GSHP applications from the Renewable Rewards Program. On average, the installed heating capacity was 49% higher than the heating capacity deemed value in the TRM, and the installed cooling capacity was 40% higher than the cooling capacity deemed value in the TRM. For every project, the coefficient of precision (COP) and energy efficiency rating (EER) fell below the TRM deemed values (10% for COP and 18% for EER). However, the full-load installed efficiencies were conservative, so the Evaluation Team determined that the annual average part-load efficiency may better align with the deemed values. Overall, the savings for GSHP exceeded the *ex ante* values, probably because of the low TRM values for system capacity compared to the system sizes that were actually installed.

The Evaluation Team also calculated verified gross savings for 50 residential PV participants and 10 business PV participants. The Evaluation Team reviewed each application for key system characteristics such as tilt, system size, and azimuth then identified the sites in Google Earth to confirm orientation details and the accuracy of reported shading. Finally, the Evaluation Team entered the resulting parameters into PVWatts and created an hourly generation profile that produced results for annual electricity generation and peak load reduction.

Overall, the evaluated electricity generation for PV systems in the Renewable Rewards Program were substantially higher than the TRM calculations indicated. This is likely due to several factors:

- The DC-to-AC derate factor of 0.8 (i.e., 20% overall system losses) stipulated in the TRM has been shown to be too low, so the National Renewable Energy Laboratory has set the loss factor at 11.4% (0.886 equivalent to the DC-to-AC derate factor) as the new PVWatts default with no shading losses. While future users of PVWatts will automatically have results adjusted for these factors, the existing TRM will continue to use the older assumptions until it is updated.
- Actual shading losses reported and verified based on desktop review were frequently less than the 10% assumed in the TRM. The Evaluation Team estimated an actual average shading loss of 2.7%.

Similar to annual electricity generation, the evaluated peak demand also exceeded the *ex ante* values, albeit by a smaller margin. The Evaluation Team attributed this overage to the same factors driving the high realization rate for electricity production, though the impact is likely blunted somewhat by an

update to the PVWatts model—between Version 1 and Version 5[6]—that applied a more detailed efficiency curve for inverters and made an adjustment to off-axis sun angle corrections.

Both of these factors have minimal impact on annual generation but, as the sun moves through the western sky in the afternoon (during peak period), these changes may be having a more pronounced effect on average power output near the end of the day. It was not possible for the Evaluation Team to document these differences explicitly, as PVWatts Version 1, which appears to have been used in developing the prescriptive savings in the Wisconsin TRM, has been retired and is no longer available, but the updates are described in detail in the manual for the current version of PVWatts.[7]

Verification Site Visits – Renewable Rewards

During the Renewable Rewards engineering desk reviews, the Evaluation Team flagged 10 PV systems for verification site visit analysis because the realization rate was greater or less than one standard deviation from the mean (117% ±7.5%) or other anomalies were identified. During the site visits, the Evaluation Team visually inspected the installation and all major components, measured the available solar resource/shading, and recorded meter readings. The Evaluation Team also documented notable installation deficiencies (e.g., violations of electrical code, deviations from manufacturer instructions) and compared field observations to Renewable Rewards records.

The Evaluation Team found that the applications and SPECTRUM data generally matched the actual field conditions and that installations were generally operating as expected.

Billing Analysis – Smart Thermostat Pilot

The Evaluation Team conducted a billing analysis to estimate gross savings for the Smart Thermostat Pilot. To conduct the billing analysis, the Evaluation Team used regression models to measure the impact of smart thermostat installations on energy consumption. Specifically, the Evaluation Team evaluated the pre- and post-installation energy consumption, accounting for variables such as weather, to measure the impact of the Pilot on participant consumption. Because of limited post-period

[6] Note that there have been two fundamental versions of the online calculation tool, with five total updates, including updates to weather data and providing access to the calculations engine for other online applications. The current version is officially titled Version 5 and was released in September 2015.

[7] Dobbs, Aron P. *PVWATTS Version 5 Manual.* Prepared for National Renewable Energy Laboratory. Available online: http://www.nrel.gov/docs/fy14osti/62641.pdf

availability, the Team could not include a group of nonparticipants to estimate total net savings for the Program. Therefore, the savings estimates from the billing analysis are gross savings estimates.[8]

The Evaluation Team conducted two separate billing analyses, one for electricity and one for gas, to evaluate gross savings for the Smart Thermostat Pilot Program. Table 8 lists the realization rates and precision achieved for each analysis.

Table 8. CY 2016 Smart Thermostats Pilot Gross Billing Analysis Results

Savings Type	Realization Rate	Precision at 90% Confidence
Electricity	549%	9%
Gas	33%	9%

The following sections describe the results for each billing analysis the Evaluation Team conducted. Appendix H contains additional details on the methodology, attrition, and results for these analyses.

Billing Analysis for Electric Savings

The Evaluation Team used PRInceton Scorekeeping Method (PRISM) models to estimate realization rates and the standard errors around the savings. Table 9 shows the TRM *ex ante* and verified gross electric energy savings as well as the realization rate. The PRENAC variable in the table represents the pre-installation weather-normalized kWh usage. Because the thermostat installation is expected to only affect the weather-sensitive component of usage (summer and winter months), the savings are shown as a percentage of weather sensitive (i.e., heating and cooling usage instead of percentage of total usage).

Table 9. Smart Thermostat Pilot Evaluated Electric Gross Energy Savings from Billing Analysis

Ex Ante Savings per Participant (kWh)	Gross Model Savings (kWh)	Realization Rate	PRENAC (kwh)	Weather-Sensitive Usage (Heating + Cooling kWh)	*Ex Ante* Expected Percentage Weather-Sensitive Savings Per Customer	*Ex Post* Percentage Weather-Sensitive Savings Per Customer
81	444	549%	10,051	2,397	3.4%	18.5%

On average, Smart Thermostat Pilot participants saved 444 kWh. Compared to the *ex ante* savings estimate of 81 kWh, this represents a gross realization rate of 549%. With average pre-installation period weather-sensitive usage of 2,397 kWh, the gross savings represent an approximately 19%

[8] The decision to conduct the billing analysis and apply the results to CY 2016 evaluated findings is consistent with typical Focus on Energy practice for evaluating programs. However, as a pilot program that contains only one measure, this conflicts with Focus on Energy's standard evaluation practice of applying adjustments to evaluation findings for individual measures on a prospective basis. PSC concluded that in this case, program evaluation practices took precedence over measure-based practices, and directed the Evaluation Team to apply the results of the billing analysis to calculate verified savings for the Pilot.

reduction in weather-sensitive usage. The smart thermostat installations saved participants approximately 4% of pre-period electricity usage.

Billing Analysis for Gas Savings

Like the electric billing analysis, the Evaluation Team used the PRISM models to estimate realization rates and the standard errors around gas savings estimates. Table 10 shows the TRM *ex ante* and *ex post* electric gross energy savings as well as the realization rate.

Table 10. Smart Thermostat Pilot Evaluated Gas Gross Energy Savings from Billing Analysis

Ex Ante Savings Per Participant (therms)	Gross Model Savings (therms)	Realization Rate	PRENAC (therms)	Weather-Sensitive Usage (therms)	*Ex Ante* Expected Percentage Weather-Sensitive Savings Per Customer	*Ex Post* Percentage Weather-Sensitive-Savings Per Customer
96	31	33%	844	670	14.3%	4.7%

On average, Smart Thermostat Pilot participants saved 31 therms. Compared to the *ex ante* savings estimate of 96 therms, this represents a realization rate of 33%. With an average pre-installation period heating usage of 670 therms, the savings represent approximately a 5% reduction in heating usage. The smart thermostat installations saved approximately 4% of pre-period gas usage.

Factors Affecting Realization Rates

The Smart Thermostat Pilot achieved more electric savings than expected—a 549% realization rate. The Pilot achieved less gas savings than expected—a 33% realization rate. The Evaluation Team found that the TRM assumptions understated cooling consumption and overstated heating consumption, which the Evaluation Team believes drives these realization rates. The TRM assumes cooling usage of 920 kWh per household. However, the billing analysis showed a cooling usage of 1,587 kWh per household. For heating, the TRM assumes heating usage of 926 therms. However, the billing analysis shows heating usage that is much lower—670 therms. Both of these differences partially explain why the savings from the billing analysis are higher for cooling and lower for heating compared to the TRM. Although SPECTRUM did not provide the appropriate inputs to analyze Smart Thermostat Pilot participant heating capacity, cooling capacity, annual fuel utilization efficiency (AFUE), and seasonal energy efficiency rating (SEER), it is quite possible that the HVAC characteristics of Smart Thermostat Pilot participants did not match the TRM deemed values for these inputs.

Furthermore, The TRM relies on an assumption that 52% of thermostats are programmable. However, the Smart Thermostat Pilot survey results revealed that 70% of Pilot participants had programmable thermostats. This discrepancy may also affect the differences in billing analysis versus TRM savings estimates.

One reason the *ex ante* heating and cooling consumption assumptions were higher and lower, respectively, than the evaluation findings could be the difference between the TRM assumptions regarding the heating and cooling equipment full-load run-time hours and the actual full-load run-time

hours of the Pilot participants' furnaces and air conditioners. The TRM full-load hours are significant drivers in the *ex ante* savings calculations, and these assumptions appear to be over-estimated for heating and under-estimated for cooling for the Pilot participant group.

Lastly, the majority of smart thermostat evaluations have been based on smaller sample sizes and specific smart thermostat models (mostly Nest thermostats) and direct-install program delivery methods. However, the Smart Thermostat Pilot billing analysis included several types of smart thermostats (although approximately 76% of Pilot thermostats were Nest thermostats) that were purchased and self-installed by thousands of participants. Therefore, some previous studies may not accurately represent the energy savings one can expect from a program like the Smart Thermostat Pilot.

The Evaluation Team compared the Pilot's results to results from smart thermostat evaluations that are the most similar to the Pilot, shown in Table 11. Although these evaluations differ in design and delivery, the Evaluation Team found them to be the most comparable to the Pilot.

Table 11. Comparison of Smart Thermostat Pilot Results to Similar Studies

Evaluator	Year	Thermostats Offered	Evaluation Description	Population	Percent Heating Savings	Percent Cooling Savings
Focus on Energy	**2016**	**Multiple**	**Billing analysis of gas heating savings**	**2,427**	**4.7%**	**n/a**
Evaluator 1	2015	Nest	Billing analysis of gas heating savings	2,058	6.7%	n/a
Energy Trust of Oregon	2016	Honeywell and Nest	Billing analysis of gas heating savings	1,382	Lyric: -4.9% Nest: 6%	n/a
Nicor Gas/ ComEd	2015	Multiple	Billing analysis of gas heating savings	47	3.0%	n/a
NIPSCO	2015	Honeywell and Nest	Billing analysis of gas heating savings	455	8.0%	n/a
Focus on Energy	**2016**	**Multiple**	**Billing analysis of electric cooling savings**	**2,110**	**n/a**	**18.5%**
Evaluator 2	2016	Nest	Billing analysis of electric cooling savings	1,791	n/a	4.8%
NIPSCO	2015	Honeywell and Nest	Billing analysis of electric cooling savings	450	n/a	16.1%
Nicor Gas/ ComEd	2015	Multiple	Billing analysis of electric cooling savings	47	n/a	8.9%
Florida Solar Energy Center	2015	Nest	Billing analysis of electric cooling savings	22	n/a	9.6%

CY 2016 Verified Gross Savings Results

Overall, the Home Performance with ENERGY STAR Program achieved an evaluated annual realization rate of 102% weighted by MMBtu.[9] For the HVAC path, adjustments to the therms savings for natural gas furnaces (Table 7) account for much of the increase in verified gross savings above *ex ante* gross savings. The Renewable Rewards realization rates were driven by overly conservative and, in some cases, outdated calculation assumptions made in the Wisconsin TRM for each measure.

Table 12 shows realization rates by Program component, and Table 13 through Table 15 show realization rates by measure type for each Program component.

Table 12. CY 2016 Home Performance with ENERGY STAR Program
Annual and Lifecycle Realization Rates by Program Component

Program Component	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
HVAC - Standard Track	100%	101%	101%	101%	100%	101%	101%	101%
HVAC - IQT	100%	101%	100%	100%	100%	101%	100%	100%
Whole Home - Standard Track	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - IQT	100%	100%	100%	100%	100%	100%	100%	100%
Renewable Rewards	118%	107%	n/a	118%	118%	107%	n/a	118%
Total	**106%**	**103%**	**101%**	**102%**	**106%**	**103%**	**101%**	**102%**

[9] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

Table 13. CY 2016 Whole Home Path Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Whole Home - Standard Track	Adjustment Measure	100%	100%	n/a	100%	100%	100%	n/a	100%
Whole Home - Standard Track	CFL	100%	100%	n/a	100%	100%	100%	n/a	100%
Whole Home - Standard Track	Faucet Aerator	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - Standard Track	Insulation	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - Standard Track	LED	100%	100%	n/a	100%	100%	100%	n/a	100%
Whole Home - Standard Track	Pipe Insulation	100%	n/a	100%	100%	100%	n/a	100%	100%
Whole Home - Standard Track	Project Completion	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - Standard Track	Showerhead	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - Standard Track	Water Heater	100%	100%	88%	88%	100%	100%	71%	71%
Whole Home - Standard Track	Water Heater Temperature Turndown	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - Standard Track Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Whole Home - IQT	Adjustment Measure	n/a	100%	n/a	n/a	n/a	100%	n/a	n/a
Whole Home - IQT	CFL	100%	100%	n/a	100%	100%	100%	n/a	100%
Whole Home - IQT	Faucet Aerator	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - IQT	LED	100%	100%	n/a	100%	100%	100%	n/a	100%
Whole Home - IQT	Pipe Insulation	100%	n/a	100%	100%	100%	n/a	100%	100%
Whole Home - IQT	Project Completion	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - IQT	Showerhead	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - IQT	Water Heater	100%	100%	93%	93%	100%	100%	84%	84%
Whole Home - IQT	Water Heater Temperature Turndown	100%	100%	100%	100%	100%	100%	100%	100%
Whole Home - IQT Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Whole Home Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 14. CY 2016 HVAC Path Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
HVAC - Standard Track	Adjustment Measure	100%	100%	100%	100%	100%	100%	100%	100%
HVAC - Standard Track	Air Source Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
HVAC - Standard Track	Boiler	n/a	n/a	100%	100%	n/a	n/a	100%	100%
HVAC - Standard Track	Ductless Mini-split Heat Pump	100%	100%	n/a	100%	100%	100%	n/a	100%
HVAC - Standard Track	ECM	100%	100%	n/a	100%	100%	100%	n/a	100%
HVAC - Standard Track	Furnace and A/C	100%	100%	100%	100%	100%	100%	100%	100%
HVAC - Standard Track	Furnace with ECM	100%	101%	102%	101%	100%	101%	102%	101%
HVAC - Standard Track	Smart Thermostat	100%	100%	100%	100%	100%	100%	100%	100%
HVAC - Standard Track	Water Heater	n/a	n/a	101%	101%	n/a	n/a	101%	101%
HVAC - Standard Track Total		**100%**	**101%**	**101%**	**101%**	**100%**	**101%**	**101%**	**101%**
HVAC - IQT	Boiler	n/a	n/a	100%	100%	n/a	n/a	100%	100%
HVAC - IQT	Furnace	n/a	n/a	100%	100%	n/a	n/a	100%	100%
HVAC - IQT	Furnace and A/C	100%	100%	100%	100%	100%	100%	100%	100%
HVAC - IQT	Furnace with ECM	100%	102%	100%	100%	100%	102%	100%	100%
HVAC - IQT	Smart Thermostat	100%	100%	100%	100%	100%	100%	100%	100%
HVAC - IQT	Water Heater	n/a	n/a	100%	100%	n/a	n/a	100%	100%
HVAC - IQT Total		**100%**	**101%**	**100%**	**100%**	**100%**	**101%**	**100%**	**100%**
HVAC Total		**100%**	**101%**	**101%**	**101%**	**100%**	**101%**	**101%**	**101%**

Table 15. CY 2016 Renewable Rewards Annual and Lifecycle Realization Rates by Measure Type

Program Component	Measure	Annual Realization Rate				Lifecycle Realization Rate			
		kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Renewable Rewards	Ground Source Heat Pump	128%	108%	n/a	128%	128%	108%	n/a	128%
Renewable Rewards	Solar PV	117%	107%	n/a	117%	117%	107%	n/a	117%
Renewable Rewards Total		**118%**	**107%**	**n/a**	**118%**	**118%**	**107%**	**n/a**	**118%**

Table 16 lists the *ex ante* and verified annual gross savings for each Home Performance with ENERGY STAR Program component for CY 2016. Table 17 through Table 19 show verified annual gross savings by measure type for each Program component.

Table 16. CY 2016 Home Performance with ENERGY STAR Program Annual Gross Savings Summary by Program Component[1]

Program Component	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
HVAC - Standard Track	7,656,290	1,973	546,552	7,656,290	1,989	553,241
HVAC - IQT	389,242	91	183,741	389,242	92	183,741
Whole Home - Standard Track	762,164	775	383,948	762,164	775	383,794
Whole Home - IQT	229,392	52	165,758	229,392	52	165,630
Renewable Rewards	4,414,722	1,715	0	5,201,914	1,833	0
Total Annual	**13,451,809**	**4,605**	**1,279,998**	**14,239,002**	**4,741**	**1,286,405**

[1] Differences to the Home Performance with ENERGY STAR Program because of water adjustment measures were equivalent to 4,035 annual kWh (0.04%).

Table 17. CY 2016 Whole Home Path Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
Whole Home - Standard Track	Adjustment Measure	206	558	0	206	558	0
Whole Home - Standard Track	CFL	28,911	3	0	28,911	3	0
Whole Home - Standard Track	Faucet Aerator	2,935	1	306	2,935	1	306
Whole Home - Standard Track	Insulation	1,107	2	990	1,107	2	990
Whole Home - Standard Track	LED	2,970	0	0	2,970	0	0
Whole Home - Standard Track	Pipe Insulation	162	0	6	162	0	6
Whole Home - Standard Track	Project Completion	721,335	211	380,693	721,335	211	380,693
Whole Home - Standard Track	Showerhead	4,687	0	608	4,687	0	608
Whole Home - Standard Track	Water Heater	-297	0	1,318	-297	0	1,164
Whole Home - Standard Track	Water Heater Temperature Turndown	149	0	27	149	0	27
Whole Home - Standard Track Total Annual		**762,164**	**775**	**383,948**	**762,164**	**775**	**383,794**
Whole Home - IQT	Adjustment Measure	0	-23	0	0	-23	0
Whole Home - IQT	CFL	11,019	1	0	11,019	1	0
Whole Home - IQT	Faucet Aerator	1,947	0	197	1,947	0	197
Whole Home - IQT	LED	1,215	0	0	1,215	0	0
Whole Home - IQT	Pipe Insulation	162	0	9	162	0	9
Whole Home - IQT	Project Completion	212,243	73	163,366	212,243	73	163,366
Whole Home - IQT	Showerhead	3,251	0	272	3,251	0	272
Whole Home - IQT	Water Heater	-594	0	1,900	-594	0	1,772

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
Whole Home - IQT	Water Heater Temperature Turndown	149	0	14	149	0	14
Whole Home - IQT Total Annual		**229,392**	**52**	**165,758**	**229,392**	**52**	**165,630**
Whole Home Total Annual		**991,556**	**826**	**549,705**	**991,556**	**826**	**549,423**

Table 18. CY 2016 HVAC Path Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
HVAC - Standard Track	Adjustment Measure	206	0	133	206	0	133
HVAC - Standard Track	Air Source Heat Pump	35,454	11	0	35,454	11	0
HVAC - Standard Track	Boiler	0	0	60,077	0	0	60,077
HVAC - Standard Track	Ductless Mini-split Heat Pump	31,680	-12	0	31,680	-12	0
HVAC - Standard Track	ECM	52,290	10	0	52,290	10	0
HVAC - Standard Track	Furnace and A/C	1,549,338	829	86,577	1,549,338	829	86,577
HVAC - Standard Track	Furnace with ECM	5,979,680	1,123	378,941	5,979,680	1,139	385,565
HVAC - Standard Track	Smart Thermostat	7,642	13	10,194	7,642	13	10,194
HVAC - Standard Track	Water Heater	0	0	10,630	0	0	10,695
HVAC - Standard Track Total Annual		**7,656,290**	**1,973**	**546,552**	**7,656,290**	**1,989**	**553,241**
HVAC - IQT	Boiler	0	0	2,240	0	0	2,240
HVAC - IQT	Furnace	0	0	22,253	0	0	22,253
HVAC - IQT	Furnace and A/C	51,282	27	18,909	51,282	27	18,909
HVAC - IQT	Furnace with ECM	337,695	63	139,712	337,695	64	139,712
HVAC - IQT	Smart Thermostat	265	0	348	265	0	348
HVAC - IQT	Water Heater	0	0	279	0	0	279
HVAC - IQT Total Annual		**389,242**	**91**	**183,741**	**389,242**	**92**	**183,741**
HVAC Total Annual		**8,045,532**	**2,064**	**730,292**	**8,045,532**	**2,082**	**736,981**

Table 19. CY 2016 Renewable Rewards Annual Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
		kWh	kW	therms	kWh	kW	therms
Renewable Rewards	Ground Source Heat Pump	347,913	81	0	444,134	87	0
Renewable Rewards	Solar PV	4,066,809	1,634	0	4,757,780	1,746	0
Renewable Rewards Total Annual		**4,414,722**	**1,715**	**0**	**5,201,914**	**1,833**	**0**

Table 20 lists the *ex ante* and verified gross lifecycle savings by Program component for the Home Performance with ENERGY STAR Program in CY 2016. Table 21 through Table 23 show verified gross lifecycle savings by measure type for each Program component.

Table 20. CY 2016 Home Performance with ENERGY STAR Program Lifecycle Gross Savings Summary by Program Component[1]

Program Component	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
HVAC - Standard Track	175,368,244	1,973	12,074,931	175,368,244	1,989	12,228,342
HVAC - IQT	8,948,128	91	4,216,523	8,948,128	92	4,216,523
Whole Home - Standard Track	15,870,305	775	8,249,803	15,870,305	775	8,244,137
Whole Home - IQT	4,909,048	52	3,551,639	4,909,048	52	3,547,647
Renewable Rewards	107,553,620	1,715	0	126,495,441	1,833	0
Total Lifecycle	**312,649,345**	**4,605**	**28,092,895**	**331,591,165**	**4,741**	**28,236,648**

[1] Differences to the Home Performance with ENERGY STAR Program because of water adjustment measures were equivalent to 41,701 lifecycle kWh (0.47%).

Table 21. CY 2016 Whole Home Path Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
Whole Home - Standard Track	Adjustment Measure	4,718	558	0	4,718	558	0
Whole Home - Standard Track	CFL	172,680	3	0	172,680	3	0
Whole Home - Standard Track	Faucet Aerator	33,463	1	6,112	33,463	1	6,112
Whole Home - Standard Track	Insulation	22,140	2	19,800	22,140	2	19,800
Whole Home - Standard Track	LED	59,400	0	0	59,400	0	0
Whole Home - Standard Track	Pipe Insulation	2,430	0	62	2,430	0	62
Whole Home - Standard Track	Project Completion	15,530,677	211	8,197,541	15,530,677	211	8,197,541
Whole Home - Standard Track	Showerhead	46,867	0	6,080	46,867	0	6,080
Whole Home - Standard Track	Water Heater	-4,305	0	19,800	-4,305	0	14,134
Whole Home - Standard Track	Water Heater Temperature Turndown	2,235	0	408	2,235	0	408
Whole Home - Standard Track Total Lifecycle		**15,870,305**	**775**	**8,249,803**	**15,870,305**	**775**	**8,244,137**
Whole Home - IQT	Adjustment Measure	0	-23	0	0	-23	0
Whole Home - IQT	CFL	65,834	1	0	65,834	1	0
Whole Home - IQT	Faucet Aerator	22,161	0	3,934	22,161	0	3,934
Whole Home - IQT	LED	24,300	0	0	24,300	0	0
Whole Home - IQT	Pipe Insulation	2,430	0	94	2,430	0	94
Whole Home - IQT	Project Completion	4,768,490	73	3,519,295	4,768,490	73	3,519,295
Whole Home - IQT	Showerhead	32,508	0	2,720	32,508	0	2,720
Whole Home - IQT	Water Heater	-8,910	0	25,392	-8,910	0	21,400
Whole Home - IQT	Water Heater Temperature Turndown	2,235	0	204	2,235	0	204
Whole Home - IQT Total Lifecycle		**4,909,048**	**52**	**3,551,639**	**4,909,048**	**52**	**3,547,647**
Whole Home Total Lifecycle		**20,779,352**	**826**	**11,801,441**	**20,779,352**	**826**	**11,791,783**

Table 22. CY 2016 HVAC Path Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
HVAC - Standard Track	Adjustment Measure	4,718	0	3,083	4,718	0	3,083
HVAC - Standard Track	Air Source Heat Pump	638,172	11	0	638,172	11	0
HVAC - Standard Track	Boiler	0	0	1,201,540	0	0	1,201,540
HVAC - Standard Track	Ductless Mini-split Heat Pump	570,240	-12	0	570,240	-12	0
HVAC - Standard Track	ECM	941,220	10	0	941,220	10	0
HVAC - Standard Track	Furnace and A/C	35,604,864	829	1,964,607	35,604,864	829	1,964,607
HVAC - Standard Track	Furnace with ECM	137,532,610	1,123	8,644,396	137,532,610	1,139	8,796,748
HVAC - Standard Track	Smart Thermostat	76,420	13	101,939	76,420	13	101,939
HVAC - Standard Track	Water Heater	0	0	159,366	0	0	160,425
HVAC - Standard Track Total Lifecycle		**175,368,244**	**1,973**	**12,074,931**	**175,368,244**	**1,989**	**12,228,342**
HVAC - IQT	Boiler	0	0	44,800	0	0	44,800
HVAC - IQT	Furnace	0	0	512,347	0	0	512,347
HVAC - IQT	Furnace and A/C	1,178,496	27	435,501	1,178,496	27	435,501
HVAC - IQT	Furnace with ECM	7,766,985	63	3,216,214	7,766,985	64	3,216,214
HVAC - IQT	Smart Thermostat	2,647	0	3,476	2,647	0	3,476
HVAC - IQT	Water Heater	0	0	4,185	0	0	4,185
HVAC - IQT Total Lifecycle		**8,948,128**	**91**	**4,216,523**	**8,948,128**	**92**	**4,216,523**
HVAC Total Lifecycle		**184,316,372**	**2,064**	**16,291,453**	**184,316,372**	**2,082**	**16,444,864**

Table 23. CY 2016 Renewable Rewards Lifecycle Gross Savings Summary by Measure Type

Program Component	Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
		kWh	kW	therms	kWh	kW	therms
Renewable Rewards	Ground Source Heat Pump	6,262,434	81	0	7,994,416	87	0
Renewable Rewards	Solar PV	101,291,186	1,634	0	118,501,025	1,746	0
Renewable Rewards Total Lifecycle		**107,553,620**	**1,715**	**0**	**126,495,441**	**1,833**	**0**

The Evaluation Team also measured Smart Thermostat Pilot verified savings. Overall, the Pilot achieved an evaluated realization rate of 47%, weighted by MMBtu (Table 24).[10] (See the *Billing Analysis – Smart Thermostat Pilot* section for possible factors affecting the Smart Thermostat Pilot realization rates.)

[10] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

Table 24. CY 2016 Smart Thermostat Pilot Annual and Lifecycle Realization Rates by Measure Type

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Smart Thermostat	549%	549%	33%	47%	549%	549%	33%	47%

Table 25 lists the *ex ante* and verified annual gross savings for the Smart Thermostat Pilot for CY 2016.

Table 25. CY 2016 Smart Thermostat Pilot Annual Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
Smart Thermostat	413,220	661	505,283	2,268,428	3,629	165,011

Table 26 lists the *ex ante* and verified gross lifecycle savings by measure type for the Smart Thermostat Pilot in CY 2016.

Table 26. CY 2016 Smart Thermostat Pilot Lifecycle Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Smart Thermostat	4,132,198	661	5,052,829	22,684,281	3,629	1,650,113

Evaluation of Net Savings

This section details the methods the Evaluation Team used to estimate verified net savings, which included billing analysis, modeling software calibration, standard market practice, and participant surveys.

Billing Analysis – Whole Home Path

In CY 2016 the whole home path transitioned from emHome to Snugg Pro as the required modeling software, but 466 projects initiated in CY 2015 and modeled in emHome were completed in CY 2016. The Evaluation Team applied the CY 2015 billing analysis results to these emHome projects.

The billing analysis used regression models to measure the impact of energy efficiency measures on consumption. By evaluating the pre- and post-installation energy consumption, and accounting for variables such as weather, the Evaluation Team measured impacts for Program-related installations. The CY 2015 analysis included a control group (nonparticipants), which allowed the billing analysis to provide an estimate of net savings. The Evaluation Team compared the change in energy consumption for participants to the results of a similar analysis conducted for nonparticipants to estimate total net savings for the Program. The nonparticipant groups was identified by sampling future program participants—that is, customers who participated *after* the analysis period. This treatment group helped account for exogenous factors that may have occurred simultaneous to Program activity.

The Evaluation Team conducted four separate billing analyses to evaluate net savings for the Home Performance with ENERGY STAR Program. Table 27 lists NTG rates and precision achieved for each analysis in CY 2015. These results were applied to CY 2016 emHome projects.

Table 27. CY 2015 HPwES Program Billing Analysis Results Applied to CY 2016 emHome Projects

Track	Savings Type	NTG Rate	Precision at 90% Confidence
Standard Track	Electricity	127%	15%
	Gas	48%	7%
Income-Qualified Track	Electricity	129%	38%
	Gas	62%	18%
Overall	**MMBtu**	**59%**	**n/a**

Appendix J of the *Focus on Energy CY 2015 Evaluation Report* provides more detail about the results and the methodologies used in the billing analyses.[11]

Modeling Software Calibration – Whole Home Path

The NTG ratios calculated during the CY 2015 billing analysis are specific to projects modeled using emHome: the Evaluation Team calculated those NTG ratios specifically to yield net savings when multiplied by modeled savings from emHome. To determine NTG ratios that yield accurate estimates of net savings with Snugg Pro modeling software, which was implemented in CY 2016, the Evaluation Team used adjusted billing data from the CY 2015 billing analysis along with modeled savings from emHome and Snugg Pro for a sample of 77 projects. As much as practical, the Snugg Pro model for each project used the same inputs as the emHome model for that project. The Evaluation Team used the results of this analysis to calculate NTG ratios for Snugg Pro projects, shown in Table 28.

The analysis began with 40 CY 2012 to 2014 gas-savings projects originally modeled in emHome and then modeled by the Program Implementer in Snugg Pro. Of these homes, 20 were income-qualified participants and 20 were standard track participants. Within each of those groups, 10 projects were selected because they had high realization rates and 10 were selected because they had low realization rates. The Evaluation Team matched these projects to gas billing analysis results from the CY 2015 billing analysis. Twenty-one of these projects included electric measure savings, which allowed the Evaluation Team to also pull in electric billing analysis results.

To reduce variation, especially in modeled electric savings, the Evaluation Team modeled 40 additional emHome projects in Snugg Pro using measure and site data provided by the Program Implementer. For these additional projects, the Evaluation Team chose only projects that included electric measures. The Evaluation Team selected a random sample of 20 standard track projects and 20 income-qualified track projects.

[11] Cadmus *Focus on Energy Calendar Year 2015 Evaluation Report. Appendices.* Prepared for Public Service Commission of Wisconsin. May 20, 2016. Available online: https://www.focusonenergy.com/sites/default/files/WI%20FOE%20CY%202015%20Appendices.pdf

The Evaluation Team eliminated three of the 80 projects from the analysis: one home had received a new heating system and water heater that may have had skewed results; another home had substantial negative electric savings that could not be explained; and another home was not marked as complete in the tracking data. Electric and gas utility data were available for 58 and 72 projects, respectively.

Table 28 provides the NTG ratios applied to CY 2016 Snugg Pro projects for each fuel within each track. The Snugg Pro NTG ratios for gas savings are roughly equal to those for emHome, indicating that the two modeling programs tend to overestimate gas savings by a similar amount. For electric savings, Snugg Pro appears to underestimate savings substantially more than emHome, as indicated by the greater Snugg Pro NTG ratios.

Table 28. CY 2016 NTG Ratios Applied to Snugg Pro Modeled Savings

Track	Fuel	Sample Size (n)	CY 2016 Snugg Pro NTG Ratio	CY 2015 emHome NTG Ratio
Standard	Electricity (kWh)	27	217%	127%
Standard	Gas (therms)	36	44%	48%
IQT	Electricity (kWh)	31	164%	129%
IQT	Gas (therms)	36	64%	62%

Table 29 shows overall effective NTG values for all projects, including those modeled with emHome and Snugg Pro, which the Evaluation Team calculated by dividing total verified net savings by *ex post* verified gross savings for each track. These overall, weighted NTG values provide a perspective on the relationship of whole home gross energy savings to net energy savings.

Table 29. CY 2016 Weighted Average NTG Ratios

Track	Fuel	CY 2016 Weighted Average NTG Ratio
Standard	Electricity (kWh)	186%
Standard	Gas (therms)	45%
IQT	Electricity (kWh)	145%
IQT	Gas (therms)	63%

The task of calculating NTG ratios to apply to Snugg Pro modeled savings necessarily focused on comparing the software's modeling results to billing data; however, many factors can affect NTG ratios. Appendix J of the *Focus on Energy CY 2015 Evaluation Report* provides a detailed description of the CY 2015 billing analysis methodologies and results.[12]

[12] Cadmus *Focus on Energy Calendar Year 2015 Evaluation Report. Appendices.* Prepared for Public Service Commission of Wisconsin. May 20, 2016. Available online: https://www.focusonenergy.com/sites/default/files/WI%20FOE%20CY%202015%20Appendices.pdf

Freeridership

For the standard track HVAC path, the Evaluation Team used the standard market practice methodology to determine freeridership for furnaces, joint furnaces and air conditioners, and electronically commutated motors (ECMs). This methodology uses recent sales data to estimate a market baseline efficiency.

For the remaining standard track HVAC path measures, the Evaluation Team applied participant self-response freeridership scores from the CY 2015 Residential Rewards survey because there were no substantial changes to the measures offered or delivery of the Program component to customers from CY 2015 to CY 2016. For the renewables path, the Evaluation Team applied participant self-response freeridership from the CY 2016 Renewable Rewards survey, which targeted participants who purchased solar electric PV systems and ground-source heat pumps through the Program. For the Smart Thermostat Pilot, the Evaluation Team applied participant self-response freeridership from the CY 2016 Smart Thermostat Pilot survey.

Table 30 lists the freeridership methodology by measure for the standard track HVAC and renewables paths and Smart Thermostat Pilot.

Table 30. CY 2016 Freeridership Methodology by Program Component and Measure Type

Program Component	Measure	Freeridership Methodology	Freeridership
Standard Track HVAC Path	Adjustment Measure	CY 2015 Residential Rewards Participant Survey	77%
	Air Source Heat Pump	CY 2015 Residential Rewards Participant Survey	77%
	Boiler	CY 2015 Residential Rewards Participant Survey	77%
	Ductless Mini-Split Heat Pump	CY 2015 Residential Rewards Participant Survey	77%
	ECM	Standard Market Practice[1]	Varies
	Furnace and A/C	Standard Market Practice[1]	Varies
	Furnace with ECM	Standard Market Practice[1]	Varies
	Smart Thermostat	CY 2015 Residential Rewards Participant Survey	77%
	Water Heater	CY 2015 Residential Rewards Participant Survey	77%
HVAC Path Total Freeridership		**Varies**	**17%**
Renewable Rewards	Ground Source Heat Pump, Electric Backup	CY 2016 Renewable Rewards Participant Survey	69%
	Solar PV	CY 2016 Renewable Rewards Participant Survey	30%
Renewable Rewards Total Freeridership		**Varies**	**33%**
Smart Thermostat Pilot	Smart Thermostat	CY 2016 Smart Thermostat Pilot Survey	29%
Smart Thermostat Pilot Total Freeridership		**CY 2016 Smart Thermostat Pilot Survey**	**29%**

[1] Freeridership scores determined using standard market practice vary by savings and measure type. Table 37 presents these freeridership scores broken out by savings type.

Like CY 2015, the standard market practice analysis heavily weighted the HVAC path's freeridership, as furnaces and ECMs contribute the majority of savings to the HVAC path. The following sections provide more detail on each of the freeridership methodologies used to evaluate the HVAC and renewables paths.

Standard Market Practice Methodology

Where adequate market data were available, the Evaluation Team calculated net savings using standard market practice methodology. The analysis relied on Program tracking data and data collected through the evaluation process to define the average market baseline and average energy consumption of select measures installed through the HVAC path. To determine the baseline for each HVAC measure, the Evaluation Team used these two sources of sales and installation data: D+R International data and CY 2012 to CY 2016 Home Performance with ENERGY STAR Program assessment data.[13, 14]

Table 31 shows the measure and savings types assessed with standard market practice methodology. The following sections describe the specific standard market practice method for each measure.

Table 31. Measures and Savings Type Assessed with Standard Market Practice Methodology

Measure Type	Savings Type			Baseline Data Source
	kWh	kW	therms	
Gas Furnaces			✓	D+R International and HPwES Audit Data
Air Conditioners	✓	✓		D+R International and HPwES Audit Data
ECMs			✓	D+R International

The Evaluation Team first established a market baseline by reviewing and analyzing available market data that showed existing efficiency levels of a particular equipment type sold outside of Focus on Energy. These data included a range of efficiency levels (both inefficient and efficient) and nominally represented the average efficiency of equipment installed in Wisconsin in 2016. The end result was a baseline condition that represented a mixture of efficient and inefficient equipment. This baseline is assumed to capture freeridership.

The Evaluation Team then calculated net-of-freeridership savings as the difference between the average market baseline and the average energy consumption of measures installed through the Program, using actual Program database values for installed efficiencies. To calculate the NTG ratio, the Evaluation

[13] The Evaluation Team contracted with D+R to purchase a report of residential HVAC measures sold in Wisconsin during 2014 and 2015 that used sales data reported to D+R International by HARDI members participating in the Unitary HVAC Market Report. The report contained summaries of quantities of observed sales by efficiency level and estimations of the size of each measure's total market in 2014 and 2015.

[14] The Program Implementer for the Home Performance with ENERGY STAR Program shared data collected from all assessments conducted since 2012. The Evaluation Team limited the assessment data to manufacture dates of 2010 to 2016 for all furnaces and air conditioners used in the market data analysis (to align with the prior and current quadrennium).

Team compared the net-of-freeridership savings (and applied any participant spillover adjustments) to the adjusted savings. Freeridership represents the percent difference between the adjusted savings and the net-of-freeridership savings. Equations for all three of these quantities follow:

$$\begin{bmatrix}\text{Net-of-freeridership}\\ \text{savings}\end{bmatrix} = \begin{bmatrix}\text{Baseline energy consumption}\\ \text{using average market efficiency}\\ \text{and average Program capacity}\end{bmatrix} - \begin{bmatrix}\text{Efficient energy consumption}\\ \text{using average Program efficiency}\\ \text{and average Program capacity}\end{bmatrix}$$

$$\begin{bmatrix}\text{Net-to-gross}\\ \text{ratio}\end{bmatrix} = \frac{\begin{bmatrix}\text{Net-of-freeridership}\\ \text{savings}\end{bmatrix}}{\begin{bmatrix}\text{Adjusted ex ante}\\ \text{savings}\end{bmatrix}} + [\text{Spillover \%}]$$

$$[\text{Freeridership}] = \frac{\begin{bmatrix}\text{Adjusted ex ante}\\ \text{savings}\end{bmatrix} - \begin{bmatrix}\text{Net-of-freeridership}\\ \text{savings}\end{bmatrix}}{\begin{bmatrix}\text{Adjusted ex ante}\\ \text{savings}\end{bmatrix}}$$

Although the adjustments for market baseline and actual Program efficiency can be understood to have gross savings implications, for the Home Performance with ENERGY STAR Program they are by definition net adjustments. The measures involved are prescriptive and have verified gross savings that assume deemed values for baseline and installed efficiencies, and any other adjustments to these values must be net adjustments.

Gas Furnaces

The Evaluation Team calculated net-of-freeridership savings for each natural gas furnace measure by comparing the average consumption of furnaces rebated through the HVAC path to the market baseline. To do this, the Evaluation Team followed these steps:

- Cleaned and combined 2014 and 2015 market data from D&R International and the Home Performance with ENERGY STAR Program audit data to calculate a market baseline AFUE
- Looked up model numbers in SPECTRUM data to capture the actual AFUE and capacity for furnaces rebated through the Program in CY 2016
- Calculated consumption for both furnace types (assumed all savings algorithm parameters between market and Program furnace were equal except for market and actual furnace AFUEs)
- Subtracted the efficient consumption from the market consumption to yield the net-of-freeridership savings for each furnace

The Evaluation Team calculated a market baseline AFUE of 92.5% for gas furnaces (the baseline assumed in the *ex ante* values is 92.0). Table 32 lists the average of actual AFUE values and net-of-freeridership savings (therms) for gas furnaces rebated through the Program.

Table 32. Gas Furnaces: CY 2016 Net-of-Freeridership Savings (Therms)

Measure	Furnace Capacity (MMBtu/h)	AFUE, Market or Program Average	Adjusted Per-Unit Savings (therms)	Net-of-Freeridership Per-Unit Savings (therms)	Freeridership Percentage
Furnace Market Baseline	72.0	92.5	n/a	n/a	n/a
Furnace And A/C, ECM, 95% + AFUE, >= 16 SEER	72.0	96.6	28.95	37.49	-30%
NG Furnace with ECM, 95%+ AFUE (Existing)	70.5	96.2	28.67	33.76	-18%
NG Furnace with ECM, 96%+ AFUE	69.9	96.1	30.00	32.60	-9%
NG Furnace with ECM, 97%+ AFUE	71.9	97.2	47.00	42.89	9%
NG Furnace with ECM, 98%+ AFUE	85.4	98.0	48.00	59.72	-24%

Net-of-freeridership savings were typically greater than reported (adjusted *ex ante*) savings, generally producing negative freeridership values. Several factors influence freeridership in both directions, either strongly or weakly:

- Program average efficient AFUE was often higher than the TRM assumed, meaning that furnaces installed as part of the Program are more efficient than previously assumed. For instance, the *ex ante* assumptions for the "NG Furnace with ECM, 95%+ AFUE (Existing)" measure assumed an AFUE of 95%, but Program data revealed an average installed AFUE of 96.2%. This caused net-of-freeridership savings to increase and freeridership to decrease. The effect of this was disproportionate in that a small change in efficient AFUE had a large negative effect on freeridership. These findings also imply that in many cases, measures may have been mis-categorized.
- The market baseline AFUE was larger than the *ex ante* assumed AFUE, meaning that more efficient furnaces are being purchased and installed outside of the Program than previously assumed (92% *ex ante* and 92.5% market). This caused net-of-freeridership savings to decrease and freeridership to increase. The effect of this was also disproportionate—a small change in baseline had a large positive effect on freeridership.
- Furnaces rebated through the Program often had capacities larger or smaller than the TRM assumptions. The effect of this on freeridership was negative; for instance, larger actual furnace capacities produce higher net-of-freeridership savings, resulting in lower freeridership. This effect was relatively small, roughly proportional to the difference in actual Program capacity versus deemed capacity.

CY 2016 furnace freeridership results varied greatly from CY 2015, as seen in Table 33. Generally, freeridership was much lower in CY 2016. This is largely because, in CY 2015, all three furnace measures had SPECTRUM *ex ante* savings that were slightly higher than those deemed by the TRM. This produced artificially high freeridership for these measures in the CY 2015 standard market practice analysis, which simply used the values in SPECTRUM for adjusted savings in its freeridership calculation. This

misalignment was rectified in CY 2016 by setting adjusted savings equal to deemed TRM savings and using these adjusted savings for the freeridership calculation. This had a disproportionate effect in that a small change in SPECTRUM *ex ante* savings had a large effect on freeridership.

Table 33. Gas Furnace Freeridership Comparison between CY 2015 and CY 2016

Measure	CY 2015 Freeridership Percentage	CY 2016 Freeridership Percentage
Furnace And A/C, ECM, 95% + AFUE, >= 16 SEER	-8%	-30%
NG Furnace with ECM, 95%+ AFUE (Existing)	4%	-18%
NG Furnace with ECM, 96%+ AFUE[1]	n/a	-9%
NG Furnace with ECM, 97%+ AFUE	22%	9%
NG Furnace with ECM, 98%+ AFUE[1]	n/a	-24%

[1] These measures were not part of the CY 2015 evaluation because they were not offered to participants.

Table 34 shows CY 2016 *ex ante* values that are slightly lower than CY 2015 adjusted *ex ante* values, which drive CY 2016 freeridership lower than CY 2015 freeridership. This table also shows CY 2016 net-of-freeridership savings that are slightly higher than those in CY 2015, which also drive CY 2016 freeridership down. Other discrepancies are accounted for by slight changes to actual Program AFUE values and sizes from CY 2015 to CY 2016.

Table 34. Comparison of Values Used for Freeridership Calculation in CY 2015 and CY 2016

Measure	CY 2015 SPECTRUM *Ex Ante* Savings (therms)	CY 2015 Net-of-Freeridership Savings (therms)	CY 2016 Adjusted *Ex Ante* Savings (therms)	CY 2016 Net-of-Freeridership Savings (therms)
Furnace And A/C, ECM, 95% + AFUE, >= 16 SEER	32.41	34.87	28.95	37.49
NG Furnace with ECM, 95%+ AFUE (Existing)	30.49	29.16	28.67	33.76
NG Furnace with ECM, 96%+ AFUE[1]	n/a	n/a	30.00	32.60
NG Furnace with ECM, 97%+ AFUE	50.40	39.18	47.00	42.89
NG Furnace with ECM, 98%+ AFUE[1]	n/a	n/a	48.00	59.72

[1] These measures were not part of the CY 2015 evaluation because they were not offered to participants.

Appendix I provides a detailed discussion of the steps taken to combine the data sources, produce the average market AFUE, and calculate net-of-freeridership savings for these measures.

Air Conditioners

The Evaluation Team calculated net-of-freeridership electric savings for air conditioners in all applicable measures. The Team isolated the air conditioner measure from the ECM to conduct the standard market practice review, but then combined the savings from both components to estimate the net-of-freeridership electric savings for the measure.

Similar to gas furnaces, the Evaluation Team used the following steps to calculate air conditioner net-of-freeridership savings:

- Cleaned and combined 2014 and 2015 market data from D&R International and the Home Performance with ENERGY STAR audit data to calculate an average SEER
- Looked up Air Conditioning, Heating and Refrigeration Institute (AHRI) reference numbers in SPECTRUM and compared them against the AHRI database to capture the actual SEER and cooling capacity for air conditioners rebated through the Program in CY 2016
- Calculated the consumption for air conditioners (assumed energy algorithm parameters between the market and Program air conditioners were equal except for the market baseline and actual air conditioner SEER)
- Subtracted the efficient consumption from the market consumption to yield the net-of-freeridership savings for air conditioners

The Evaluation Team calculated a market baseline for air conditioner SEER of 13.8 (compared to 13.0 used for the *ex ante* value). Table 35 lists averages of the actual SEER Program-eligible air conditioners and net-of-freeridership electric savings. Because the Evaluation Team combined the electric savings for the air conditioner and ECM into one deemed savings value, it did not calculate net-of-freeridership for the air conditioner measure component. Table 36 shows the net-of-freeridership demand savings for air conditioners as a part of the standard market practice analysis for ECMs and Table 37 contains the combined electric savings and net-of-freeridership for this measure.

Table 35. Air Conditioners: CY 2016 Net-of-Freeridership Electric Savings

Measure	SEER[1]	Per-Unit kWh Savings[1]
AC Market Baseline	13.8	n/a
Furnace and A/C, ECM, 95% + AFUE, >= 16 SEER (A/C Only)	17.5	178.1

[1] Net-of-freeridership represents only the air conditioner component and does not include savings from the ECM.

Net-of-freeridership savings for air conditioners in CY 2016 were much higher than those in CY 2015, which were 136.8 kWh. This change is largely attributable to the actual Program SEER increasing from 16.5 in CY 2015 to 17.5 in CY 2016, while the market baseline remained relatively unchanged (13.9 in CY 2015 compared to 13.8 in CY 2016). Therefore, the measure saved even more energy than in CY 2015.

ECMs

Measuring net-of-freeridership savings for ECMs differs from the analysis for furnaces and air conditioners, which used an efficiency rating to determine the market baseline. Because there are no efficiency ratings for furnace fans, the Evaluation Team determined freeridership based on the percentage of market furnaces (sold outside of the Program) that had ECMs versus other types of motors such as a permanent split capacitor.

Using market data from D&R International, the Evaluation Team estimated that 18% of furnaces sold outside of the Program had ECMs. This fraction has changed very little since CY 2015 (18.2% compared to 17.8% in CY 2016). The Evaluation Team then used Wisconsin TRM savings of 416 kWh per motor and 345.5 kWh per air conditioners with ECMs and applied 18% freeridership to calculate net-of-freeridership savings for this measure.[15]

Table 36 lists the savings as per the TRM and the net-of-freeridership savings calculated by the Evaluation Team.

Table 36. ECMs: CY 2016 Net-of-Freeridership Electric and Demand Savings

Measure	WI TRM Per-Unit Savings		Freeridership	Net-of-Freeridership Per-Unit Savings	
	kWh	kW		kWh	kW
Furnace and Standalone ECM	416.0	0.079	18%	341.9	0.065
Furnace and A/C ECM	345.5	0.172	18%	284.0	0.188[1]

[1] Net-of-freeridership demand savings for the joint furnace and air conditioner measure includes demand savings from both the air conditioner and the ECM.

In CY 2015, the net-of-freeridership was 340.2 kWh for the furnace and standalone ECM and 282.5 kWh for the furnace and air conditioner ECM measures. These have changed little for CY 2016 because they depend only on the fraction of furnaces sold outside of the Program that had an ECM. The same is true for kW savings for the Furnace and Standalone ECM measure. For the furnace and air conditioner ECM measure, kW changed significantly since CY 2015 (0.141 kW). This is a result of the change in Program average SEER from 16.5 to 17.5.

Standard Market Practice Summary

Table 37 provides a summary of the standard market practice results, showing per-unit net-of-freeridership savings and the corresponding percentage of freeridership for all measures evaluated using standard market practice methodology. Overall, freeridership ranged from -30% for the joint furnace and air conditioners' measure's gas savings to 32% for the same measure's demand savings.

[15] These values exclude cooling savings achieved, because that variable is accounted for in the air conditioner analysis. The cooling savings from the air conditioner is added to the ECM savings in the total measure net-of-freeridership savings.

Table 37. CY 2016 Summary of Net-of-Freeridership Savings by Measure

Measure	Per-Unit Net-of-Freeridership Savings			Freeridership (Percentage)		
	kWh	kW	therms	kWh	kW	therms
ECM, Furnace, New or Replacement	342	0.0651	-	18%	18%	n/a
Furnace and A/C, ECM, 95%+ AFUE (Existing)	462[1]	0.1866	37	11%	33%	-30%
NG Furnace with ECM, 95%+ AFUE (Existing)	342	0.0651	34	18%	18%	-18%
NG Furnace with ECM, 96%+ AFUE	342	0.0651	32	18%	18%	-9%
NG Furnace with ECM, 97%+ AFUE	342	0.0651	43	18%	18%	9%
NG Furnace with ECM, 98%+ AFUE	342	0.0651	60	18%	18%	-24%
LP Furnace with ECM, 90%+ AFUE (Existing)	342	0.0651	-	18%	18%	n/a

[1] The Evaluation Team added the electric net-of-freeridership savings for the ECM and air conditioner measures to calculate the total electric savings for this measure.

Freeridership changed from CY 2015 to CY 2016 for the combined furnace and air conditioner measure. This measure's kWh freeridership went from 20% in CY 2015 to 11% in CY 2016. This freeridership value represents the combined results of the ECM and air conditioner cooling market baseline adjustments. The ECM market share adjustment by itself would place the freeridership for this measure at 12%, which differs from the 18% freeridership seen for furnace-only measures because the calculation also accounts for air conditioner cooling savings. Market adjustments for $SEER_{base}$, $SEER_{ee}$, and cooling capacity can raise or lower freeridership from this 12% value. In this case, the increase in $SEER_{base}$ from 16.5 in CY 2015 to 17.5 in CY 2016 is largely responsible for the notable decrease in freeridership across those years.

Self-Reported Freeridership

For standard track HVAC path measures not included in the standard market practice analysis and for all Renewable Rewards and Smart Thermostat Pilot measures,[16] the Evaluation Team estimated freeridership scores based on survey responses from each participant survey. Table 38 shows the freeridership scores by Program component.

Table 38. CY 2016 Self-Reported Freeridership Estimates by Program Component

Program Component	Self-Reported Freeridership
HVAC Path (Residential Rewards)	77%
Renewable Rewards	33%
Smart Thermostat Pilot	29%

[16] CY 2015 Residential Rewards NTG results were applied to HVAC path measures not included in the standard market practice analysis because no surveys were conducted with non-standard market practice HVAC path measure participants in CY 2016.

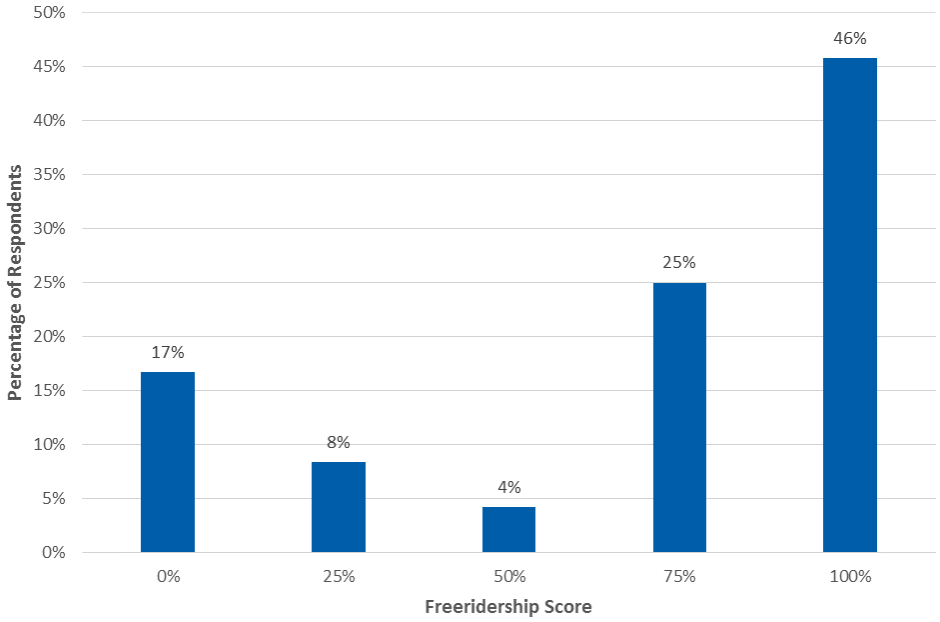
Standard Track HVAC Path Freeridership

For CY 2016 standard track HVAC path measures that were not included in the standard market practice analysis, the Evaluation Team applied the self-report results from the CY 2015 Residential Rewards survey. In CY 2015, 40% of participants were 100% freeriders and 28% of participants reported moderate freeridership (50% to 75%). Appendix J of the *Focus on Energy CY 2015 Evaluation Report* provides more detail about the results and the methodologies used in the CY 2015 Residential Rewards freeridership analysis.

Renewable Rewards Program Freeridership

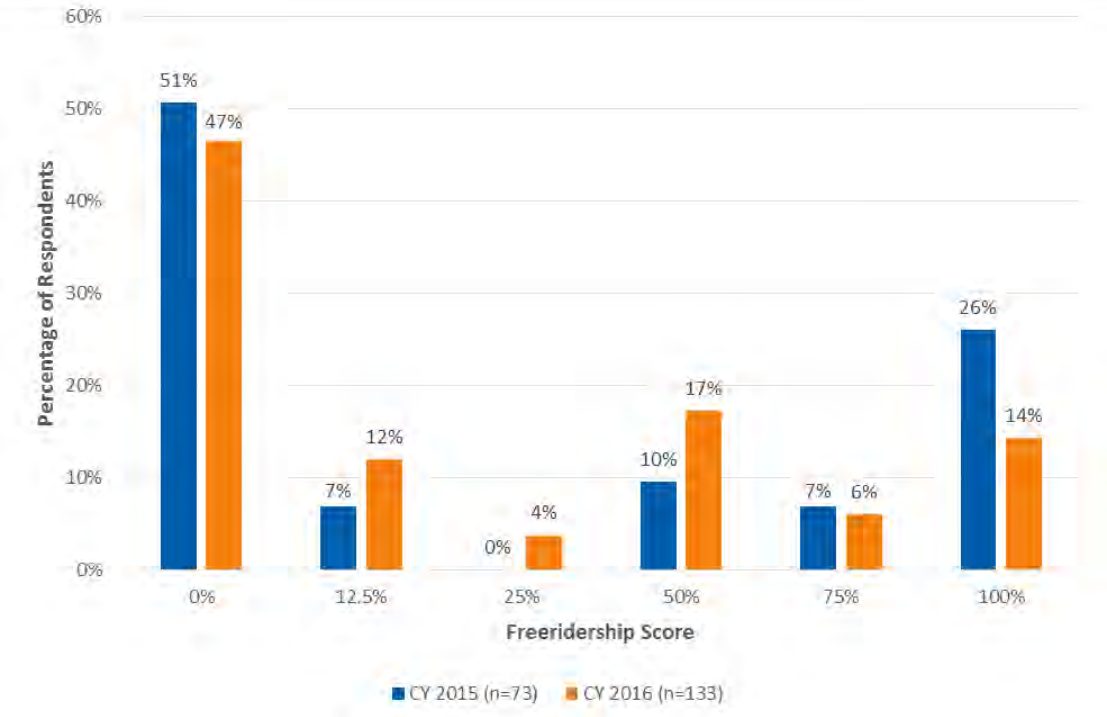
The Evaluation Team used the self-report survey method to determine the Renewable Rewards Program's freeridership level for CY 2016 from 24 GSHP customers and 133 solar PV customers. Figure 4 shows the distribution of GSHP participants' freeridership scores. Approximately 46% of GSHP respondents were estimated as full freeriders and 25% were estimated as 75% freeriders.

Figure 4. Distribution of CY 2016 Self-Reported GSHP Freeridership Scores (n=24)



Overall weighted freeridership for solar PV participants decreased from CY 2015 to CY 2016, mostly because of a 12% decrease in the number of solar PV survey respondents who indicated full freeridership (100% freeridership) in CY 2016, as shown in Figure 5.

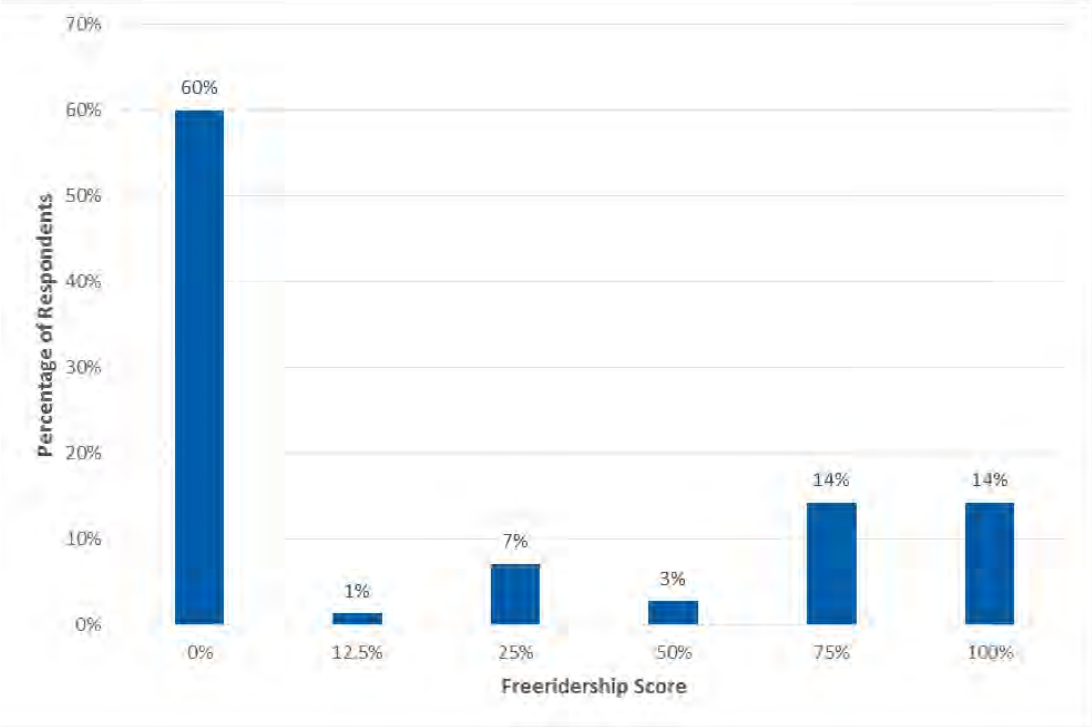
Figure 5. Distribution of CY 2015 and CY 2016 Self-Reported Solar PV Freeridership Scores



Smart Thermostat Pilot Freeridership

As shown in Figure 6, the Evaluation Team analyzed individual freeridership scores by examining their distributions. Sixty percent of respondents did not indicate any level of freeridership. Approximately 8% of respondents reported a low freeridership level (12.5% to 25%) and 17% of respondents reported moderate freeridership (50% to 75%). The Evaluation Team estimated that 14% of respondents were full freeriders.

Figure 6. Distribution of Smart Thermostat Participant Freeridership Scoring Combinations



Source: Wisconsin Focus on Energy CY 2016 Smart Thermostat Pilot Participant Telephone Survey

Twenty-four percentage points of the overall 29% freeridership estimate are derived from 19 of the 70 respondents. The following are details for these 19 respondents:

- Four respondents were estimated as 100% freeriders because they had already purchased their thermostat before learning about the Pilot.
- Six respondents were estimated as 100% freeriders because they already had plans to purchase the thermostat before learning about the Pilot and would have purchased the same thermostat at the same time in absence of the Pilot.
- Nine respondents were estimated as 75% freeriders because they already had plans to purchase the thermostat before learning about the Pilot and would have purchased the same thermostat within the same year in absence of the Pilot

Spillover

Spillover results when customers invest in additional efficiency measures or make additional energy-efficient behavior choices beyond those rebated through the Program. A spillover ratio estimate of 6% derived from participant survey responses from the CY 2015 Residential Rewards Program was used for CY 2016 HVAC measures not included in the standard market practice analysis. Appendix J of the *Focus on Energy CY 2015 Evaluation Report* provides more detail about the results and the methodologies used in the CY 2015 Residential Rewards spillover analysis.

Participants from the CY 2016 Renewable Rewards Program reported that the Program was highly influential in their purchase and installation of the measures listed in Table 39.

Table 39. CY 2016 Reported Spillover Measures—Renewable Rewards

Measure	Quantity	Total MMBtu Savings[1]
Air Sealing	2	1.58
Electric Storage Water Heater	3	1.05
ENERGY STAR Clothes Washer	9	6.36
ENERGY STAR Refrigerator	8	3.11
Gas Furnace	1	4.28
Gas Tank-Less Water Heater	2	18.60
Ground Source Heat Pump	2	34.81
Insulation	7	15.77
Wind System	1	10.23
Total	**n/a**	**95.79**

[1] The Evaluation Team used MMBtu to weight the responses across participants for both electric and natural gas savings.

One participant from the CY 2016 Smart Thermostat Pilot reported that the Pilot was highly influential in their purchase and installation of an efficient gas furnace.

Table 40. CY 2016 Reported Spillover Measures—Smart Thermostat Pilot

Measure	Quantity	Total MMBtu Savings[1]
Gas Furnace	1	4.28

[1] The Evaluation Team used MMBtu to weight the responses across participants for both electric and gas savings.

Using data from the participant surveys, the Evaluation Team estimated spillover at 6% of the Residential Reward's evaluated gross savings, 3% of the Renewable Rewards evaluated gross savings, and 1% of the Smart Thermostat Pilot evaluated gross savings (Table 41).

Table 41. CY 2016 Participant Spillover Estimate

Program Component	Participant Spillover MMBtu Savings	CY 2016 Verified Gross MMBtu Savings	Percentage of Participant Spillover
HVAC Path (Residential Rewards)	N/A	N/A	6%[1]
Renewable Rewards	95.79	3,507.81	3%
Smart Thermostat Pilot	4.28	668.55	1%

[1] CY 2015 Residential Rewards NTG results were applied to HVAC path measures not included in the standard market practice analysis because no surveys were conducted with non-standard market practice HVAC path measure participants in CY 2016.

CY 2016 Verified Net Savings Results

To calculate the Home Performance with ENERGY STAR Program NTG ratios, the Evaluation Team weighted the results of the whole home path billing analysis, standard market practice analysis, modeling software calibration, and surveys (self-reported freeridership and spillover) by energy savings. This yielded an overall NTG ratio estimate of 83% for the Home Performance with ENERGY STAR Program. Table 42 shows total net-of-freeridership savings, participant spillover savings, total net savings in MMBtu by Program component, and the overall NTG ratio for the Program.

Table 42. CY 2016 Program Annual Net Savings and NTG Ratio

Program Component	Net-of-Freeridership Savings (MMBtu)	Participant Spillover (MMBtu)	Total Annual Net Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Program NTG Ratio
HVAC - Standard Track	76,386	4,887	81,272	81,447	100%
HVAC - IQT	19,702	0	19,702	19,702	100%
Whole Home - Standard Track	n/a	n/a	22,204	40,980	54%
Whole Home - IQT	n/a	n/a	11,637	17,346	67%
Renewable Rewards	11,833	502	12,335	17,749	69%
Total	**107,921**	**5,389**	**147,151**	**177,224**	**83%**

Table 43 shows the annual net energy impacts (kWh, kW, and therms) by Program component. The Evaluation Team attributed these savings net of what would have occurred without the Program. Table 44 through Table 46 show annual net energy impacts by measure type for each Program component.

Table 43. CY 2016 Home Performance with ENERGY STAR Program Annual Net Savings by Program Component

Program Component	Annual Net		
	kWh	kW	therms
HVAC - Standard Track	6,291,018	1,625	598,075
HVAC – IQT	389,242	92	183,741
Whole Home - Standard Track	1,418,839	1,174	173,627
Whole Home - IQT	333,717	84	104,987
Renewable Rewards	3,615,302	1,302	0
Total Annual	**12,048,118**	**4,278**	**1,060,429**

Table 44. CY 2016 Whole Home Path Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
Whole Home - Standard Track	Adjustment Measure	262	708	0
Whole Home - Standard Track	CFL	37,072	3	0
Whole Home - Standard Track	Faucet Aerator	3,744	1	146
Whole Home - Standard Track	Insulation	1,406	2	475
Whole Home - Standard Track	LED	3,796	0	0
Whole Home - Standard Track	Pipe Insulation	206	0	3
Whole Home - Standard Track	Project Completion	1,366,503	458	172,172
Whole Home - Standard Track	Showerhead	5,992	0	290
Whole Home - Standard Track	Water Heater	-329	0	527
Whole Home - Standard Track	Water Heater Temperature Turndown	189	0	12
Whole Home - Standard Track Total Annual		**1,418,839**	**1,174**	**173,627**
Whole Home - IQT	Adjustment Measure	0	-37	0
Whole Home - IQT	CFL	14,348	1	0
Whole Home - IQT	Faucet Aerator	2,512	1	122
Whole Home - IQT	LED	1,567	0	0
Whole Home - IQT	Pipe Insulation	209	0	6
Whole Home - IQT	Project Completion	311,426	120	103,564
Whole Home - IQT	Showerhead	4,194	0	169
Whole Home - IQT	Water Heater	-730	0	1,118
Whole Home - IQT	Water Heater Temperature Turndown	192	0	8
Whole Home - IQT Total Annual		**333,717**	**84**	**104,987**
Whole Home Total Annual		**1,752,556**	**1,258**	**278,613**

Table 45. CY 2016 HVAC Path Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
HVAC - Standard Track	Adjustment Measure	60	0	39
HVAC - Standard Track	Air Source Heat Pump	10,282	3	0
HVAC - Standard Track	Boiler	0	0	17,422
HVAC - Standard Track	Ductless Mini-Split Heat Pump	9,187	-4	0
HVAC - Standard Track	ECM	46,218	9	0
HVAC - Standard Track	Furnace and A/C	942,509	608	117,342
HVAC - Standard Track	Furnace with ECM	5,280,547	1,005	457,214
HVAC - Standard Track	Smart Thermostat	2,216	4	2,956
HVAC - Standard Track	Water Heater	0	0	3,102
HVAC - Standard Track Total Annual		**6,291,018**	**1,625**	**598,075**
HVAC - IQT	Boiler	0	0	2,240
HVAC - IQT	Furnace	0	0	22,253
HVAC - IQT	Furnace and A/C	51,282	27	18,909
HVAC - IQT	Furnace with ECM	337,695	64	139,712
HVAC - IQT	Smart Thermostat	265	0	348
HVAC - IQT	Water Heater	0	0	279
HVAC - IQT Total Annual		**389,242**	**92**	**183,741**
HVAC Total Annual		**6,680,260**	**1,718**	**781,815**

Table 46. CY 2016 Renewable Rewards Annual Net Savings by Measure Type

Program Component	Measure	Annual Net		
		kWh	kW	therms
Renewable Rewards	Ground Source Heat Pump	142,123	28	0
Renewable Rewards	Solar PV	3,473,179	1,274	0
Renewable Rewards Total Annual		**3,615,302**	**1,302**	**0**

Table 47 shows the lifecycle net energy impacts (kWh, kW, and therms) by program component, and Table 48 through Table 50 show lifecycle net energy impacts by measure type for each program component.

Table 47. CY 2016 Home Performance with ENERGY STAR Program Lifecycle Net Savings by Program Component

Program Component	Lifecycle Net		
	kWh	kW	therms
HVAC - Standard Track	144,317,949	1,625	13,515,910
HVAC – IQT	8,948,128	92	4,216,523
Whole Home - Standard Track	29,167,542	1,174	3,745,590
Whole Home - IQT	7,086,646	84	2,245,382
Renewable Rewards	89,063,961	1,302	0
Total Lifecycle	**278,584,226**	**4,278**	**23,723,404**

Table 48. CY 2016 Whole Home Path Lifecycle Net Savings by Measure Type

Program Component	Measure	Lifecycle Net		
		kWh	kW	therms
Whole Home - Standard Track	Adjustment Measure	5,992	708	0
Whole Home - Standard Track	CFL	221,402	3	0
Whole Home - Standard Track	Faucet Aerator	42,835	1	2,924
Whole Home - Standard Track	Insulation	28,118	2	9,504
Whole Home - Standard Track	LED	75,924	0	0
Whole Home - Standard Track	Pipe Insulation	3,086	0	30
Whole Home - Standard Track	Project Completion	28,732,176	458	3,723,616
Whole Home - Standard Track	Showerhead	59,922	0	2,899
Whole Home - Standard Track	Water Heater	-4,752	0	6,429
Whole Home - Standard Track	Water Heater Temperature Turndown	2,838	0	188
Whole Home - Standard Track Total Lifecycle		**29,167,542**	**1,174**	**3,745,590**
Whole Home - IQT	Adjustment Measure	0	-37	0
Whole Home - IQT	CFL	85,718	1	0
Whole Home - IQT	Faucet Aerator	28,588	1	2,439
Whole Home - IQT	LED	31,347	0	0
Whole Home - IQT	Pipe Insulation	3,135	0	58
Whole Home - IQT	Project Completion	6,903,993	120	2,227,608
Whole Home - IQT	Showerhead	41,935	0	1,686
Whole Home - IQT	Water Heater	-10,953	0	13,464
Whole Home - IQT	Water Heater Temperature Turndown	2,883	0	126
Whole Home - IQT Total Lifecycle		**7,086,646**	**84**	**2,245,382**
Whole Home Total Lifecycle		**36,254,188**	**1,258**	**5,990,972**

Table 49. CY 2016 HVAC Path Lifecycle Net Savings by Measure Type

Program Component	Measure	Lifecycle Net		
		kWh	kW	therms
HVAC - Standard Track	Adjustment Measure	1,368	0	894
HVAC - Standard Track	Air Source Heat Pump	185,070	3	0
HVAC - Standard Track	Boiler	0	0	348,447
HVAC - Standard Track	Ductless Mini-split Heat Pump	165,370	-4	0
HVAC - Standard Track	ECM	831,916	9	0
HVAC - Standard Track	Furnace and A/C	21,659,507	608	2,662,730
HVAC - Standard Track	Furnace with ECM	121,452,557	1,005	10,427,754
HVAC - Standard Track	Smart Thermostat	22,162	4	29,562
HVAC - Standard Track	Water Heater	0	0	46,523
HVAC - Standard Track Total Lifecycle		**144,317,949**	**1,625**	**13,515,910**
HVAC - IQT	Boiler	0	0	44,800
HVAC - IQT	Furnace	0	0	512,347
HVAC - IQT	Furnace and A/C	1,178,496	27	435,501
HVAC - IQT	Furnace with ECM	7,766,985	64	3,216,214
HVAC - IQT	Smart Thermostat	2,647	0	3,476
HVAC - IQT	Water Heater	0	0	4,185
HVAC - IQT Total Lifecycle		**8,948,128**	**92**	**4,216,523**
HVAC Total Lifecycle		**153,266,077**	**1,718**	**17,732,433**

Table 50. CY 2016 Renewable Rewards Lifecycle Net Savings by Measure Type

Program Component	Measure	Lifecycle Net		
		kWh	kW	therms
Renewable Rewards	Ground Source Heat Pump	2,558,213	28	0
Renewable Rewards	Solar PV	86,505,748	1,274	0
Renewable Rewards Total Lifecycle		**89,063,961**	**1,302**	**0**

Table 51 shows total net-of-freeridership savings, participant spillover savings, total net savings in MMBtu, and the overall NTG ratio for the Smart Thermostat Pilot.

Table 51. CY 2016 Smart Thermostat Pilot Annual Net Savings and NTG Ratio

Program Component	Net-of-Freeridership Savings (MMBtu)	Participant Spillover (MMBtu)	Total Annual Net Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Program NTG Ratio
Smart Thermostat Pilot	17,211	242	17,454	24,241	72%

Table 52 shows the annual net energy impacts (kWh, kW, and therms) by measure type for the Pilot. The Evaluation Team attributed these savings net of what would have occurred without the Pilot.

Table 52. CY 2016 Smart Thermostat Pilot Annual Net Savings by Measure Type

Measure	Annual Net		
	kWh	kW	therms
Smart Thermostat	1,633,268	2,613	118,808

Table 53 shows the lifecycle net energy impacts (kWh, kW, and therms) by measure type for the Pilot.

Table 53. CY 2016 Smart Thermostat Pilot Lifecycle Net Savings by Measure Type

Measure	Lifecycle Net		
	kWh	kW	therms
Smart Thermostat	16,332,682	2,613	1,188,081

Process Evaluation

The Evaluation Team focused its process evaluation on these key research tasks for the Home Performance with ENERGY STAR Program:

- Document Program design and implementation
- Assess effectiveness of Trade Ally relationships with the Program and the outcome of Program changes on Trade Ally participation and satisfaction
- Assess effectiveness of the Program implementation and marketing approach, including identifying possible barriers to participation for Trade Allies and participants
- Measure customer awareness and satisfaction with the Smart Thermostat Pilot, equipment, and installation process
- Assess customers' overall Program satisfaction

Program Design, Delivery, and Goals

The Evaluation Team drew from interviews, surveys, and Program materials to document the Program's design and implementation process in CY 2016.

Program Design

The program consists of whole home, HVAC, and renewables paths.

Whole Home and HVAC Paths

Through the Program, participants interested in building shell improvements (the whole home path) receive an energy assessment of their home from a participating Trade Ally certified by the Building Performance Institute (BPI) in building science and energy assessment. The Trade Ally who performs the assessment gives the customer a written report with details about how the participant's home uses energy and recommendations for specific building shell or HVAC improvements. Participants who decide to move forward with one or more of the suggested improvements have access to incentives.

Participants who want HVAC upgrades, but who are not interested in building shell improvements, can work directly with an HVAC Trade Ally to receive incentives for eligible heating and cooling equipment. HVAC measures alone do not require a home energy assessment.

The Program offers two tiers of participation for both whole home and HVAC measures. The standard track is available to all Focus on Energy customers who own residential properties with three units or less. The Program added a bonus incentive in CY 2016 for standard track participants who install dual-path projects (whole home and HVAC measures).

The income-qualified track, which offers higher incentives and a subsidized energy assessment, is available only to the subset of households with an income at or below 80% of the state median income.

Table 54 provides details on eligibility and incentives for whole home measures and Table 55 provides detail on HVAC measures.

Table 54. CY 2016 Eligibility and Incentives: Whole Home Measures

Program Features	Standard Track	Income-Qualified Track
Income Qualification	None	Household income of 80% or less of State Median Income
Assessment Type	Comprehensive (must include blower door and combustion safety tests)	Comprehensive (must include blower door and combustion safety tests)
Assessment Cost	Market rate (average cost $200-$400)	$50 co-pay (Trade Allies reimbursed $150 by Program)[1]
Eligible Major Measures	Air sealing Attic insulation Exterior wall insulation Interior wall insulation Sill box insulation	Air sealing Attic Insulation Exterior wall insulation Interior wall insulation Sill box insulation
Incentives[1, 2]	10% to 19% reduced energy use: $850 20% to 29% reduced energy use: $1,250 30%+ reduced energy use: $2,000 Bonus: $250 for installing both whole home and HVAC measures	10% to 19% reduced energy use: $1,000 20% to 29% reduced energy use: $1,500 30%+ reduced energy use: $2,250 [No bonus]

[1] We Energies offered Trade Allies an additional $150 to complete a full assessment for income-qualified participants and paid income-qualified participants the remainder of the project cost after the Focus on Energy rebates were applied. This offer was available only through select Trade Allies identified by We Energies and was targeted to high energy users.

[2] Xcel Energy offered an additional incentive equal to 80% of the Focus on Energy rebate for customers who used Xcel Energy services for space heating, with the total incentive (Program incentive plus Xcel Energy incentive) not to exceed 90% of the project cost. For customers installing both whole home and HVAC measures, Xcel Energy offered an additional bonus of $200.

Table 55. CY 2016 Eligibility and Incentives: HVAC Measures

Eligibility	Standard Track	Income-Qualified Track
Income Qualification	None	Household Income of 80% or Less of State Median Income
Measures	**Incentive**	
Propane multistage furnace with ECM, 90%+ AFUE	$100	$300
Natural gas furnace, 95%+ AFUE	n/a	$350
Natural gas multistage furnace with ECM, 95%+ AFUE	$125	$525
Natural gas multistage furnace with ECM and 95%+ AFUE installed with a 16+ SEER air conditioner	$250	$750
Modulating natural gas boiler with outdoor reset control, 95%+ AFUE	$400	$550
Modulating combination natural gas boiler with integrated domestic hot water and outdoor reset control, 95%+ AFUE	$500	$675
Indirect water heater (installed at the same time as qualified boiler)	$100	$150
Air source heat pump 16+ SEER and 8.4+ HSPF (propane, oil or electric furnace only; cannot be a mini-split or ductless system)	$300	$300
ECM replacement	$100	$100
Ductless/mini-split heat pump for electric resistance heated home, 25+ SEER and 9.0+ HSPF (only for homes heated solely with electric resistance heat)	$500	$500

Renewables Path

The Program also offers incentives for geothermal systems and solar PV installations. Renewable incentives are available to both residential and small business customers and are not stratified by income. Table 56 provides detail on renewable energy measures.[17]

[17] In addition to the rebates for solar PV and geothermal systems available through the Home Performance with ENERGY STAR Program, Focus on Energy offered the Renewable Loan Program in 2016, which supported participation in the renewable path of the Home Performance with ENERGY STAR Program by reducing the interest rate on the amount of collateral needed for a loan. A detailed description and evaluation is available in the Renewable Loan Program chapter. In October 2016, the Public Service Commission of Wisconsin ordered that the Renewable Loan Program not be continued in 2017, but that the rebates offered through Home Performance with ENERGY STAR should continue. Therefore, the rebates will be available in 2017 but without the additional incentive offered by the Renewable Loan Program.

Table 56. CY 2016 Eligibility and Incentives: Renewable Energy Measures

Measure	Incentive
Geothermal Heat Pump	$650
Solar Electric System	$600 per KW_{DC} rated capacity[1]

[1] $300 minimum incentive, $2,400 maximum incentive.

Smart Thermostat Pilot

From August 1, 2015, through June 30, 2016, the Program offered a rebate for smart thermostats as a pilot measure, available in We Energies and WPS territory. Customers could purchase a smart thermostat from a retail outlet or from a Trade Ally. The goal of the Pilot was to gauge the market appetite for this measure and determine potential energy savings. The Program Implementer reported that marketing efforts were so successful that as of January 1, 2016, it cancelled all marketing activities and reduced the incentive per smart thermostat from $100 to $75.

Program Management and Delivery Structure

CB&I, the Program Administrator, oversees Program performance and retained CLEAResult as the Program Implementer. The Program Implementer delivers the program to the market, which includes managing Program-specific marketing and outreach, reviewing home energy assessment results, data tracking and application processing, and managing the participating Trade Ally network.

Trade Allies are the primary delivery channel for all Program paths. HVAC and renewable Trade Allies may participate without registering, but whole home Trade Allies must be registered in order to offer Program incentives to their customers.

Program delivery varies depending on the type of measure. In the HVAC path, Trade Allies install eligible measures then may or may not assist customers to complete and submit the application. Unlike the renewables path, the HVAC and whole home paths do not require Trade Allies to reserve the incentive amount prior to installation.

For whole home projects, the Trade Ally must complete a comprehensive energy assessment before installing any measures. During or after the energy assessment, the Trade Ally enters household data into Snugg Pro software to model home energy consumption and identify the energy savings from eligible measures. The Trade Ally provides the homeowner the assessment report results, as well as recommended improvements and incentives available based on the tier of energy savings. After installing the eligible measures, the Trade Ally completes post-installation testing and updates the model to identify the actual measures installed and the level of savings the project achieved. The modelling information submitted through Snugg Pro triggers the project review and incentive payment; there is no application form. In some cases, the Trade Ally may not have a certified energy auditor on staff and will work with an outside provider, who may or may not also be a registered Trade Ally with the Program.

For renewable projects, Trade Allies assist customers in making an online reservation before beginning a project. Once the incentive funds are reserved, the Trade Ally completes the project and helps the

participant submit the online incentive application. Although the Program does not require an initial reservation of funds, customers that do not submit a reservation risk funds running out before they receive their incentive.

Program Changes

The Program Administrator and the Program Implementer restructured the Program target market, services, budget, and goals for CY 2016. Most significantly, the Program Administrator integrated the HVAC incentives and renewable energy incentives, previously available through the Residential and Enhanced Rewards programs and the Smart Thermostat Pilot, into the Home Performance with ENERGY STAR Program.

Focus on Energy adopted these Program design changes in CY 2016:

- Added a $250 bonus for projects that installed both HVAC and building shell measures
- Adopted changes to the whole home path within the Program, including these:
  - Eliminated direct install measures
  - Initiated a $50 co-pay requirement for the assessment for income-qualified customers, who previously received this service for free
  - Changed the requirements for the income-qualified track assessment to include a blower door test in all cases (and to match standard track requirements)
  - Adopted Snugg Pro as the Program energy modeling software, replacing emHome
  - Restructured whole home incentives so that they are based on total energy saved, rather than project cost
- Adopted changes to the HVAC path with the Program, including these:
  - Reduced incentives for lower efficiency measures
  - Increased incentives for some higher efficiency measures
  - Added the ductless mini split as an eligible measure
  - Eliminated attic insulation measure previously offered through the Residential Rewards Program

The Program Administrator expected that merging the HVAC path into the whole home path would result in more dual-path projects over time. In addition, the Program Implementer could more easily integrate marketing for both the whole home and HVAC paths and more easily implement the bonus incentive for projects involving measures in both paths. Administratively, combining the budgets and Trade Ally network management for these paths has simplified budgeting and tracking.

The Program Administrator also changed several features of the whole home path in response to feedback from Trade Allies. The Program Administrator eliminated direct install measures because many Trade Allies reported the measures were a liability to install, inconvenient, and a nuisance to homeowners. Trade Allies had previously complained that the free income-qualified track assessment

encouraged too many "tire kickers" who were not serious about making improvements to their home; subsequently, the Program Implementer required a $50 co-pay for income-qualified track assessments. In addition, the assessment for an income-qualified participant no longer permits Trade Allies to skip blower door testing, which has alleviated confusion among both Trade Allies and participants.

According to the Program Administrator, the Program achieved more of its savings earlier in the year than anticipated. Participation in air conditioner replacements exceeded forecasts, as did the number of whole home retrofits achieving 30% or higher energy savings. Although the Program did not set a specific target for dual-path projects, 20 customers installed both HVAC and whole home measures in CY 2016, and an additional 248 customers who had installed one type of measure in CY 2015 returned to install the other type in CY 2016.

The Program Administrator reported that the Program reached its target for business renewable systems and, therefore, closed incentives to that market early in the year. Residential incentives remained available for almost the full calendar year and were fully expended in mid-December. According to the Program Administrator, part of the success of the renewables path was that, although the incentive was capped at $2,400, the Program still received full savings credit for systems larger than 4 kW. In effect, the cost per kilowatt for these larger projects was lower than for smaller projects. Incentives for the whole home and HVAC paths were available for the full year.

Program Goals

Although the Program nearly met its electric savings goal, and met its demand savings and therms savings goals, participation in the HVAC and whole home paths was lower in CY 2016 than in CY 2015. HVAC participation declined by 6% and whole home participation declined by 33%. In addition, not all of the whole home projects completed in CY 2016 were completed under the savings-based incentive model. Thirty-two percent of the CY 2016 whole home participants started their project under the CY 2015 Program model and, therefore, received cost-based incentives rather than the new savings-based incentives. Although participation declined overall, the proportion of income-qualified participants in the HVAC and whole home paths stayed relatively constant. Income-qualified participants made up 5% of total HVAC participation in CY 2016, compared to 7% in CY 2015. Income-qualified track projects represented 31% of all whole home projects in 2016, compared to 27% of projects in 2015.

Unlike the HVAC and whole home paths, renewables participation increased by 14% from CY 2015 to CY 2016. Business participation increased by 28% and residential participation increased by 13%.

The changes in participation from CY 2015 to CY 2016 are shown in Table 57.

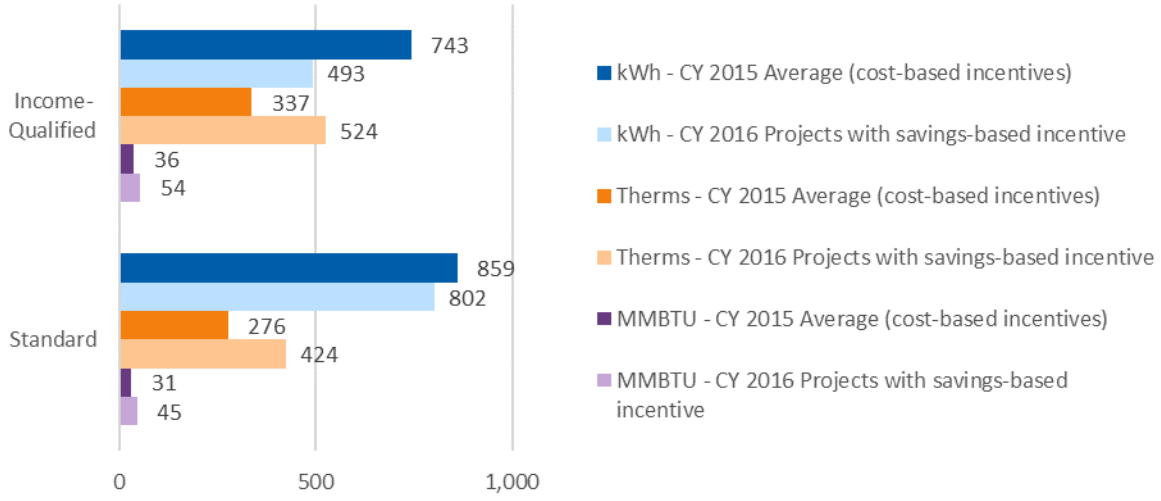
Table 57. Changes in Participation by Path from CY 2015 to CY 2016

Program	CY 2016	CY 2015	Percent Change
HVAC Total	**18,579**	**19,673**	**-6%**
Standard Track	17,563	18,279	-4%
IQT	1,016	1,394	-27%
Whole Home Total	**1,434**	**2,125**	**-33%**
Standard Track	993	1,536	-35%
IQT	441	589	-25%
Renewable Rewards Total	**546**	**478**	**14%**
Residential	514	453	13%
Business	32	25	28%

To determine if the new incentive structure was having a positive impact on energy savings per project, the Evaluation Team compared the average *ex ante* gross annual savings per project for projects completed under the new savings-based incentive structure with the average savings per project for projects completed under the cost-based incentive structure.

Figure 7 shows that the average electric savings per project decreased for both standard track and income-qualified track projects (7% and 34%, respectively). However, the average gas savings per project increased by 53% for standard track homes and 55% for income-qualified track homes. Total MMBtu savings increased for both groups: 48% for standard path projects and 49% for income-qualified projects.

Figure 7. Average Savings Per Whole Home Project (*Ex Ante* Gross Annual Savings)



Source: SPECTRUM Tracking Data

Key Performance Indicators

For CY 2016, the Program Administrator required the Program Implementer to track progress against several key performance indicators (KPIs) as shown in Table 58. Given the substantial changes to the Program design, the Program Administrator indicated that CY 2016 was intended to be a baseline year. The Program Administrator set quantitative targets for CY 2017 based on CY 2016 performance.

Table 58. Home Performance with ENERGY STAR CY 2016 KPIs

KPI	Metric	CY 2016 Results	CY 2016 Result Source
Equitable distribution of participation across Wisconsin	Percentage increase or decrease of projects in a county compared to previous year(s)	Average change in projects per county: Whole Home: -23% HVAC: -15%	SPECTRUM tracking data
	Number of projects in a county compared to previous year(s)		
Review existing processes and engage in process improvements when possible to reduce and/or maintain the Days Incentive Outstanding average	Average Days Incentive Outstanding per program and path	Average calendar days from date application received to date incentive paid: Whole Home: 40 days HVAC: 31 days Renewables (Res): 75 days[1] Renewables (Comm): 94 days[1]	SPECTRUM tracking data
	Number of applications offered online (over previous year)	Four new applications added: Solar PV reservation Solar PV application Geothermal reservation Geothermal application	Reported by Program Implementer
Engage Trade Allies through Focus on Energy-sponsored events and trainings	Number of Trade Allies attending Better Buildings Better Business Conference (B4C)	80 (estimated) Trade Allies attended the B4C	Reported by Program Implementer
	Percent increase in registered Trade Allies over previous year(s)	32%	Reported by Program Implementer
	Number of Trade Allies earning recognition from outside Focus on Energy (Century Club, TA of the year, etc.) over previous year	Seven Trade Allies received Century Club award	Reported by Program Implementer
	Number of Trade Allies with completed projects in multiple paths	34	Reported by Program Implementer

KPI	Metric	CY 2016 Results	CY 2016 Result Source
Entering collected data (assessments) into SPECTRUM to make the data available to all Focus on Energy stakeholders	Number of messages (e-mail or direct mail) sent per year (Reach Back Campaign)	Email: 3,835 Direct Mail: 5,053	Reported by Program Implementer
	Percent of customers who move forward with an improvement after Reach Back message (within three months)	Not reported (data not available)	n/a
Presenting new and/or innovative program designs and/or measures and/or revisions to existing measures that will lead to cost-effective savings	Number of submissions for pilots	Four pilot ideas submitted	Reported by Program Implementer
	Number of recommendations to Program Administrator for Program improvements	Ongoing weekly	Reported by Program Implementer
	Number of recommendations for new or modified measures	Three measures recommended: Ductless mini-split heat pumps Heat pump water heaters Water heater with project completion	Reported by Program Implementer

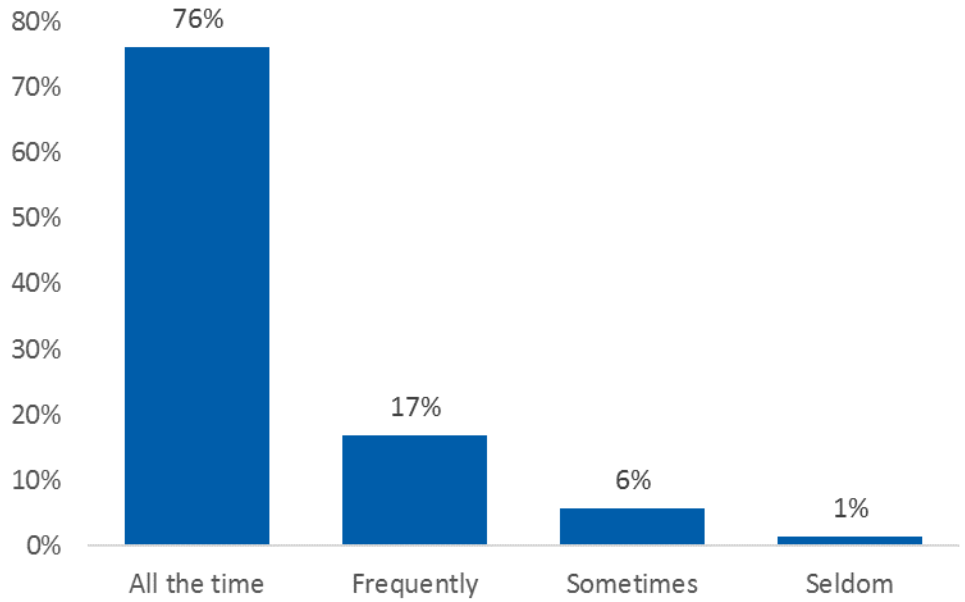
[1]These numbers represent the average days form the when the completed application was received to when the final application was processed. For renewable projects, the application was received in advance of the project in order to reserve funds.

Marketing and Outreach

The primary channel for Program delivery is the Trade Ally network. The Trade Ally online survey found that the majority (76%) of participating Trade Allies recommended the Program to all of their customers, as shown in Figure 8. Trade Allies showed a similar response pattern to this question regardless of their trade. Of the four Trade Allies that indicated they sometimes or seldom promote the Program, two stated they were not confident of Program details or who was eligible. The other two Trade Allies said that the incentives were not worth the hassle of the application.

To support Trade Ally marketing efforts in CY 2016, the Program Implementer designed several new brochures and topical flyers for Trade Allies to use, all of which include a blank space where Trade Allies can add their contact information. The topical flyers addressed subjects such as ice dams, HVAC incentives, whole home incentives, smart thermostat benefits and incentives, and energy assessments. Because of low uptake in previous years, and the Program Administrator taking on the task, the Program Implementer did not offer cooperative marketing (cost-sharing for printing and direct mail) in CY 2016.

Figure 8. Frequency of Promoting Focus on Energy



Source: Home Performance with ENERGY STAR Trade Ally Online Survey. Question B1: "How often do you promote Focus on Energy programs to customers?" (n=71)

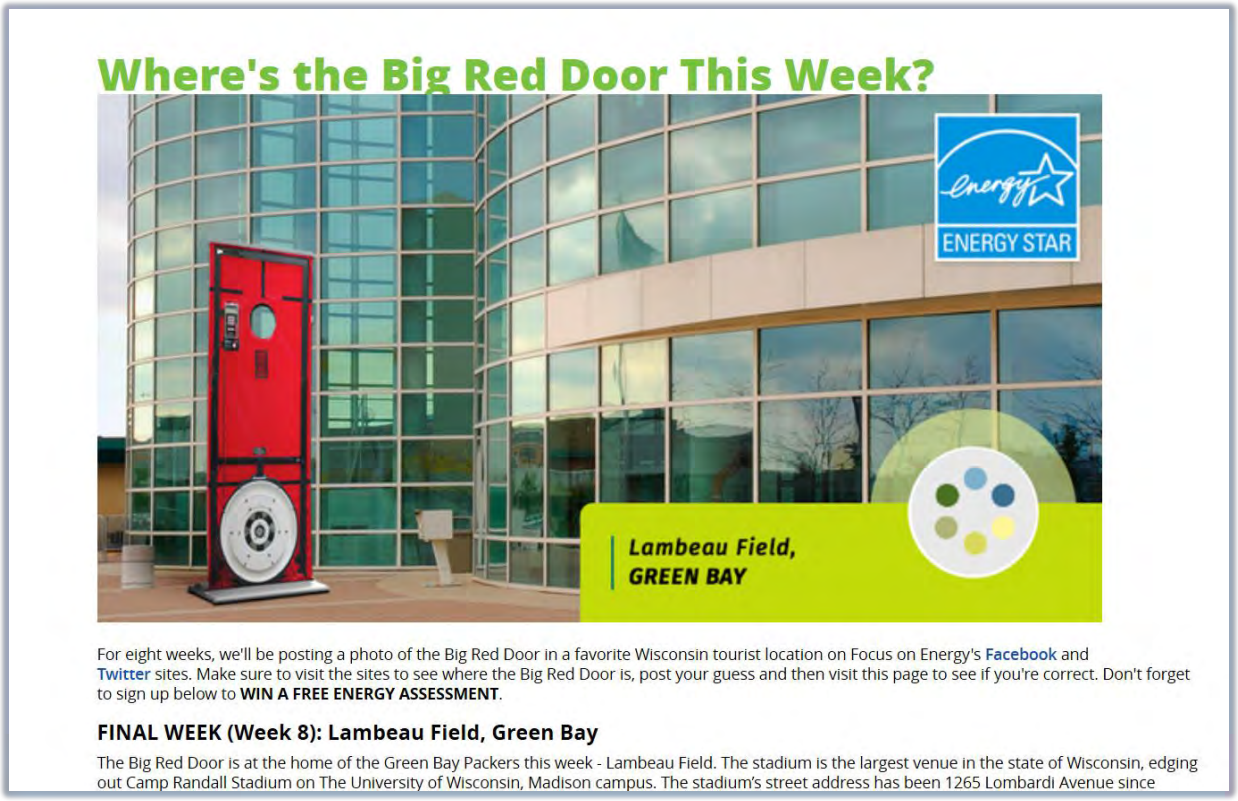
The Program Implementer conducted marketing directly to customers. Most of this activity was done in collaboration with utilities, which sent direct mail, bill inserts, and e-mail blasts. The Program Implementer also used Google AdWords search displays and banner advertising to direct potential participants to the Focus on Energy website. Although the Program manual describes two unique customer profiles for the Program, one pursuing standard track incentives and one pursuing income-qualified track incentives, the Program Implementer reported marketing efforts were not tailored to any specific market segment. According to the Program Implementer, some nonprofit and community organizations around the region marketed the Program to income-qualified groups.

To encourage dual-path projects, the Program Implementer executed a "reach-back" marketing campaign, in which the Program Implementer worked with the Program Administrator to send direct mail and e-mail blasts about HVAC improvements to previous participants in the Home Performance with ENERGY STAR Program and to promote whole home improvements to previous HVAC participants. The campaign began late in the second quarter of CY 2016. By the end of the calendar year, approximately 1% of the customers who participated in either the HVAC or whole home paths in CY 2015 also participated in CY 2016.

The Program Implementer also implemented a campaign called the "Big Red Door" to generate buzz around the concept of a blower door test. This campaign, launched in the fall of 2016 during the prime season for insulation and air sealing, was designed to combine an interesting presentation of a blower door test with local identity. The Big Red Door, a blower door, was moved to different locations around the state and promoted at each location through social media channels and on the Focus on Energy

website. The campaign asked people to guess where the Big Red Door would appear next and to register to win a free energy assessment through the Program. Figure 9 presents an advertisement for the final week of the Big Red Door campaign on the Focus on Energy website. The Program Implementer reported that 83,826 individual Facebook users clicked on the Big Red Door Facebook site. Of those users, homeowners represented the largest segment. The campaign received 68 entries for a free energy assessment.

Figure 9. "Big Red Door" Campaign Advertisement



Source: Focus on Energy website https://focusonenergy.com/residential/reddoor/contest

Focus on Energy Website

In addition to conducting proactive marketing, the Program Implementer informs customers about the Program through the Program website, which has a Home Performance with ENERGY STAR-branded page that directs customers to each of three separate pages that discuss the HVAC, whole home, or renewable incentives in more detail.

In interviews, seven of 13 Trade Allies who commented on the Focus on Energy website provided a positive review. All seven consider the website to be useful to them, and six refer customers to the website to answer questions about other services or the Program in general. Three Trade Allies said the website has improved from previous years and content is easier to find.

However, some Trade Allies said that the website was too complicated for customers. Five HVAC Trade Allies said they download forms on the customer's behalf instead of sending the customer to the website, and two said they themselves sometimes had trouble finding the right forms. Four HVAC Trade Allies requested that a link to the application be added to the "main" page. (The Evaluation Team found that there are links to the applications and forms throughout the Focus on Energy website, including as a menu option on a fixed bar at the top of the web page. However, these links require the user to scroll through related text and sometimes click on an additional link to get to the application.)

Two whole home Trade Allies said their company has not always appeared in the list of available Trade Allies by zip code. In one case, the company did not appear even when searching a zip code within 15 miles of the company address. The company notified the Program Implementer once it realized the issue, and the Program Implementer corrected the problem. In another case, the company worked in large areas of the state, but did not appear as an option for zip codes more than 15 miles from their headquarters. This Trade Ally pointed out that in some zip codes, even though they were between 20 and 25 miles away, they were the closest Trade Ally. Finally, one Trade Ally reported that the firm's customers often do not speak English, and, therefore, the website is not useful to them.

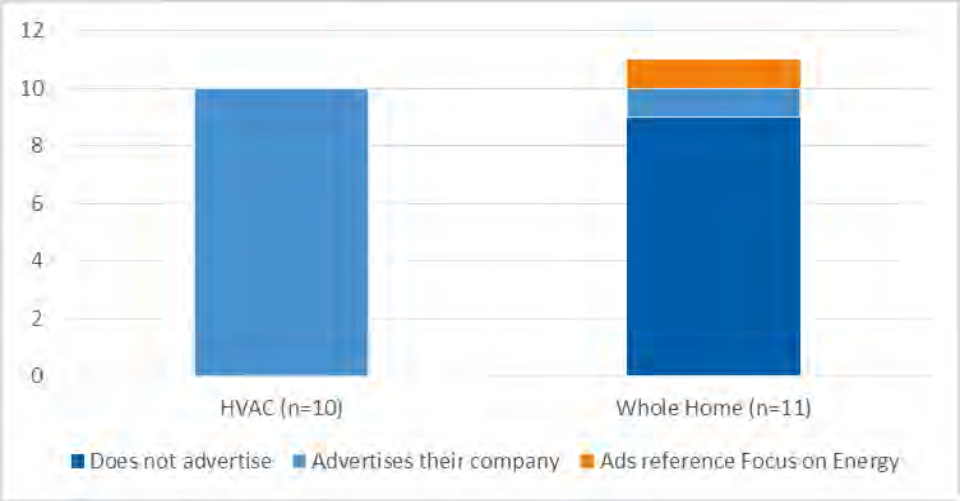
Trade Ally Marketing

Interviews with Trade Allies indicated that HVAC Trade Allies and whole home Trade Allies had different attitudes toward marketing generally and in regard to promoting the Program. Figure 10 shows the HVAC and whole home Trade Allies who reported actively advertising their own company and mentioning Focus on Energy in their ads. Figure 11 shows the HVAC and whole home Trade Allies who have a website and who mention Focus on Energy on that website.[18]

Both figures show that HVAC Trade Allies are more likely to promote their own company but are less likely to mention their involvement with Focus on Energy.

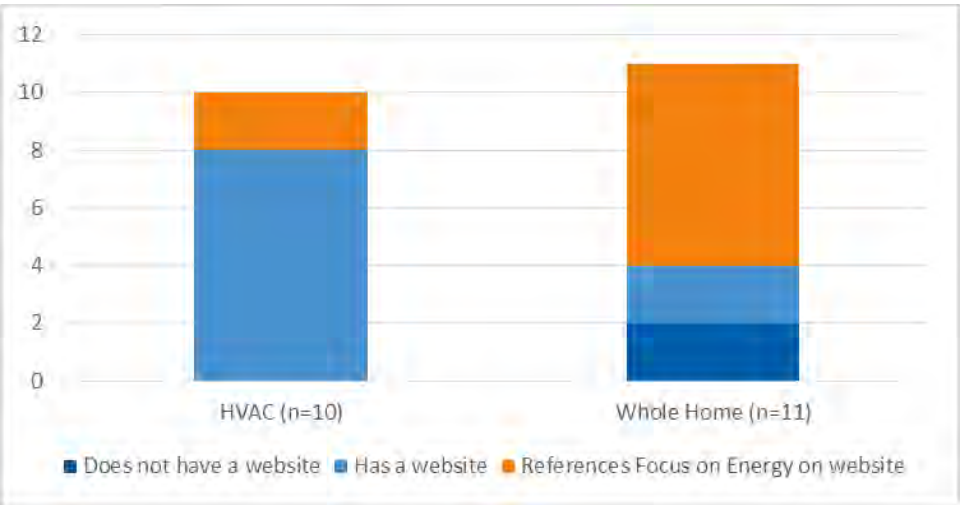
[18] One whole home Trade Ally who said his website was under construction has a Facebook page and was counted as having a website.

Figure 10. Trade Ally Advertising by Path



Source: Trade Ally interviews, CY 2016

Figure 11. Trade Ally Website Activity by Path



Source: Trade Ally interviews, CY 2016

Seven of the 10 HVAC Trade Allies the Evaluation Team interviewed advertised through television or radio spots, online ads, social media, direct mail, home shows, or other proactive methods. However, none of these companies mentioned Focus on Energy rebates or the Program in their advertising, and only two of these companies mentioned the Program on their websites. A third company's website used a third-party service to provide a rebate look-up by zip code. The service did identify the We Energies rebates in Milwaukee for some models but did not mention Focus on Energy or the Program.

The 11 whole home Trade Allies the Evaluation Team interviewed encompassed a wider range of business models, from companies that provided only energy assessments to home remodeling companies that offered a wide range of services. These companies' approaches to marketing were similarly varied, but for seven of these companies, the Program played a more significant role than for

HVAC companies. Five whole home Trade Allies said Focus on Energy was an important lead generator for their business.

Focus on Energy print materials were more popular with Trade Allies than were online ads or links. Four of the 10 HVAC Trade Allies said they use Program flyers and brochures at events such as home shows and during sales calls. Seven of the 11 whole home companies reported using the Focus on Energy brochures during sales calls and at events. Of the other four whole home companies, one was not aware the materials were available, one said the company's clients were mostly Spanish speakers, and one said he knew the Program well and could just describe it to customers.

Trade Allies recommended the following improvements to Program materials:

- Design special brochures for Xcel Energy and We Energies territories, noting the additional incentives from those utilities
- Create materials in Spanish, and possibly other languages, for non-English speakers

Messaging

Eight of nine HVAC Trade Ally staff that the Evaluation Team interviewed either did not know what messaging their company generally used or did not directly answer the question. One HVAC Trade Ally said his company focused on cost because that was "the bottom line for most people." The Evaluation Team reviewed the websites for the HVAC Trade Allies interviewed and found that themes related to trustworthiness (including images of the owner, customer testimonials, years in business, quality service, industry awards, and workmanship guarantees) were the most common messaging, present on all 10 HVAC websites. Six websites also mentioned home comfort, and three mentioned affordability, rebates, or special deals.

The three whole home Trade Allies that responded to this question reported that comfort was the primary message. As one Trade Ally said: "Quoting $2,000 to $6,000 worth of work on the basis of saving $10 a month is not very convincing. But when you offer to give people back a room in their house, they get a lot more interested." A review of eight whole home Trade Ally websites found that professional skill and saving money and energy were the most frequently mentioned messages. Both of these messages were found on six websites. Five websites mentioned improved home comfort or fixing drafty rooms.

Three whole home Trade Allies expressed frustration that the Program Implementer's marketing ads often focus on a single measure or on the available incentives rather than on the concept of managing a house as a system and making a long-term investment in the home. These Trade Allies said the Focus on Energy ads give customers the idea that they only have to pay for a single measure or do not have to pay for anything at all. As a result, these ads make it more difficult for Trade Allies to convince people to invest in multiple-measure projects. For example, customers are frustrated when they learn that to achieve the 30% rebate, it is necessary to do more than just install attic insulation.

Cross Promotion

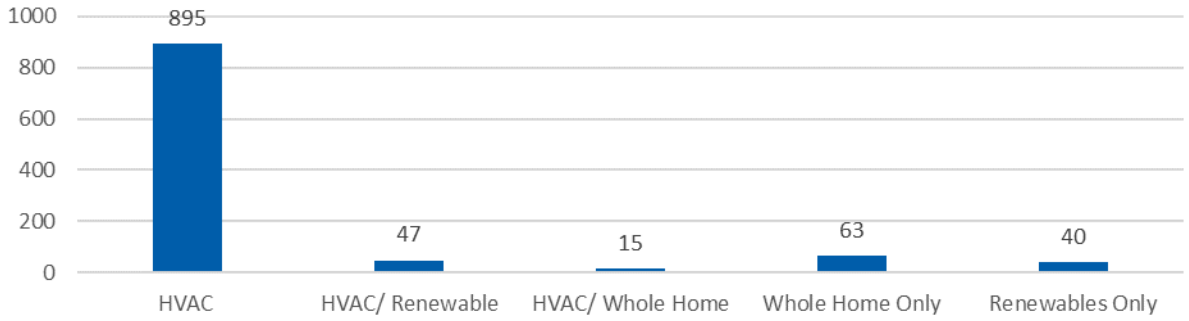
Few Trade Allies reported promoting dual-path projects in CY 2016. Eight of 10 HVAC Trade Allies reported they did not discuss whole home offerings with customers because it was outside their area of expertise or simply "not what we do." One HVAC Trade Ally referred customers to another contractor who offers insulation services. Another Trade Ally, one who was nominated to receive free BPI training, planned to incorporate energy assessments as a core part of the company's business.

Of the whole home Trade Allies, four of six who perform assessments and install insulation and air sealing indicated they referred customers to a participating HVAC contractor. The three whole home Trade Allies who perform insulation and air sealing only said that they relied on the energy auditor to discuss HVAC issues with customers.

Trade Ally Experience

The Program Implementer manages the Trade Ally network, including recruiting and training, managing communication, and performing quality assurance checks on workmanship. Trade Allies register for the Program as either HVAC, whole home, or renewable contractors. By midyear CY 2016, 1,060 Trade Allies were participating in the Program (Figure 12). Sixty-two HVAC Trade Allies offered multiple services—47 offered both HVAC and solar PV and 15 offered HVAC and whole home. No Trade Allies offered both whole home and renewable services, and no Trade Allies offered all three services.

Figure 12. Registered Trade Allies at Midyear CY 2016, by Trade Type[1]



[1]The total number shown in this table is based on midyear data and does not include 149 Trade Allies that participated later in CY 2016.

Recruitment

Eight of 10 HVAC Trade Allies reported they participate in the Program because it helps them upsell customers to more expensive (higher profit margin), higher-efficiency equipment. One said the company participated to keep up with competitors and to get referrals off the website. One was not sure why the company participated and did not consider the incentive to have much effect on customers. Nine of the 10 HVAC Trade Allies interviewed said the Program's simple design fit well into their business model, although the Program accounted for only a small part of their business (13%, on average). One HVAC Trade Ally noted that the Program made it possible to sell customers a higher-efficiency model than they otherwise would have purchased, but that these customers would probably have made a purchase

regardless of whether the Program existed. Another HVAC Trade Ally reportedly would not sell furnaces less than 95% efficient anyway but that the Program helped customers purchase a two-stage or even more efficient furnace.

Because there is a greater variety of business models for whole home Trade Allies, use of the Program varies as well. One whole home Trade Ally said less than 1% of his workflow used the Program; the average response from other whole home Trade Allies was 24%. Whole home Trade Allies also described the Program's impact on their business in different ways. Four Trade Allies said the Program helped them develop the home performance side of their business (distinct from other services such as roofing, new home construction, home inspections, and government contracting for the Weatherization Assistance Program).

According to the Program Administrator, the Program Implementer recruited few new Trade Allies. Because Focus on Energy has actively promoted whole home and HVAC measures for so many years, most Trade Allies are already aware of the Program. The Program Implementer said that while the Program has sufficient Trade Allies to meet its overall energy savings goals, it could meet targets more comfortably with additional whole home Trade Allies. However, the Program Implementer estimated that although there are 300 to 400 contractors that offer insulation services in the state, only approximately 80 of these have the skills and interest to participate in the Program. The major obstacles to participation are lack of BPI-certified Building Analysts (required to perform energy assessments and pre- and post-testing through the Program) and a lack of willingness to comply with Program requirements. The Program Implementer said its representatives do attempt to interest nonparticipating weatherization contractors to join the Program, but since it represents a major shift in business model for most of these companies, their efforts are slow to produce results. SPECTRUM data showed some Trade Allies dropping out and some joining the Program in CY 2016, for a total of 63 active Trade Allies in CY 2016, about the same number as the previous year.

Not all of the participating Trade Allies are registered; the Program allows HVAC Trade Allies to offer incentives to customers without registering. Registered Trade Allies are listed on the Focus on Energy website, have the option of offering the incentive as an instant discount to the customer, and can collect the incentive themselves. According to the Program Administrator, prior to CY 2016, few Trade Allies considered these benefits worth the effort of registering with the Program. The Program Administrator reported that typically about 90% of HVAC incentives are sent to the customer and are not offered as an instant discount.

To encourage more HVAC Trade Allies to engage with the Program, the Program Administrator made increasing registration of HVAC Trade Allies a contractual requirement for the Program Implementer, and it will continue to make Trade Ally registration a priority in CY 2017. The Program Implementer increased the number of registered Trade Allies by nearly a third in CY 2016, registering 292 HVAC Trade Allies who had not previously registered with the Program.

In CY 2016, the number of participating Trade Allies in each path stayed the same or increased slightly. However, many of the new Trade Allies in one path already participated in a different path. Overall, SPECTRUM showed a total of 1,209 participating Trade Allies (unique Trade Ally IDs) across the three paths over the course of the year, down slightly from 1,235 in CY 2015.

Communication and Training

To manage the Trade Ally network, the Program Implementer assigns outreach coordinators by region and by path. The Program Implementer assigns each outreach coordinator an energy savings target, and outreach coordinators are responsible for managing their group of Trade Allies to meet the target. They are also responsible for developing relationships with all Trade Allies in their area, keeping them informed, and answering their questions.

As in previous years, the Program Implementer offered one-on-one support to Trade Allies at each Trade Ally's place of business over the course of the year, on an as-needed basis. These one-on-one meetings serve to keep Trade Allies aware of updates to the Program and reinforce existing Program policies and procedures. The Program Implementer also offered formal group training on the Program as well as on technical topics related to the Program. In the beginning of 2016, the Program Implementers offered training to review new Program rules. Throughout the year, the Program has sponsored a number of technical and sales training sessions on various subjects, such as air sealing and Snugg Pro operation. In interviews, both HVAC and whole home Trade Allies reported they were generally well-informed about Program operations. All Trade Allies demonstrated a good understanding of the Program rules and processes affecting their own trade.

To drive the market toward dual-path installations, the Program Implementer nominated 10 HVAC Trade Allies to receive energy audit training through BPI, paid for by Focus on Energy. The Program Implementer's outreach staff chose Trade Allies they knew were progressive, entrepreneurial companies with enough resources to experiment with a new business model. In exchange for the training, each company agreed to actively promote energy assessments as part of their regular sales calls, with a goal of 15 assessments each by the end of the year. By the end of CY 2016, the Program Implementer reported that 13 employees from 10 companies had attended training, and the companies had completed a total of six assessments.

Three of the 10 HVAC contractors interviewed had attended some formal group training in CY 2016, including one who attended the BPI training funded by Focus on Energy. Four of the 11 whole home Trade Allies attended training on Program changes, air sealing, Snugg Pro, and other topics. Six whole home Trade Allies attended the Better Buildings, Better Business conference. All HVAC Trade Allies said training was adequate but had little additional feedback. Six whole home Trade Allies viewed Program training as sufficient. Two whole home Trade Allies reported that increases in the cost of training over time and the inconvenient location of classroom training around the state made it difficult for them to attend.

When asked what other training or support they would like to receive, HVAC Trade Allies did not have any suggestions. Whole home Trade Allies requested these training opportunities:

- On-site insulation installation training
- Training in Spanish for non-English-speaking Trade Ally staff
- BPI Energy Auditor training and certification
- Combustion safety training
- Marketing assistance

Application Processing and Payment

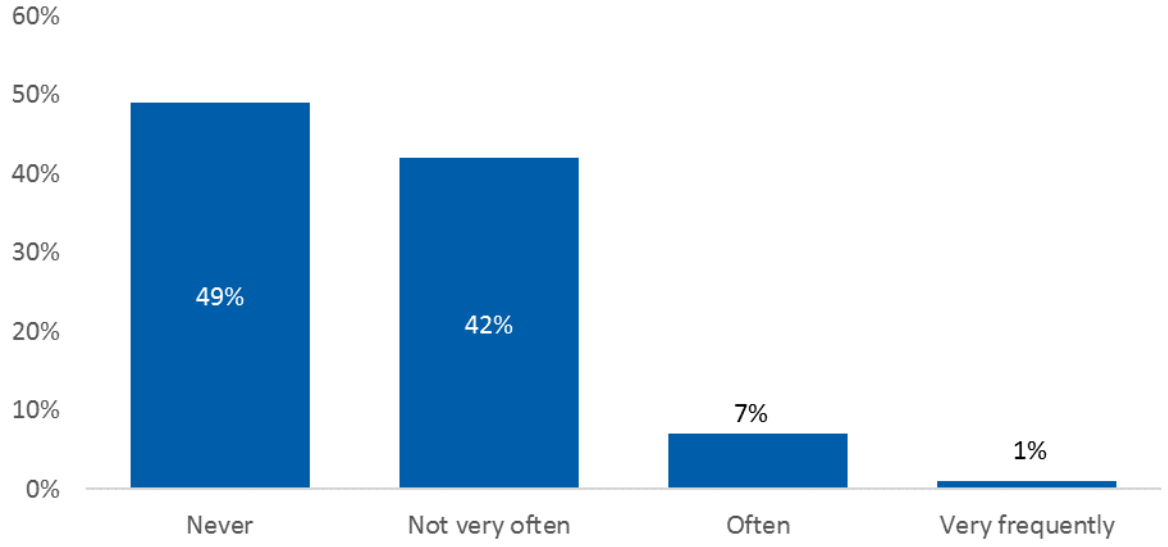
The Evaluation Team asked Trade Allies about the application process both through phone interviews and the online survey. HVAC Trade Allies had few concerns about the application itself or the process to apply for incentives. Three HVAC Trade Allies submitted the application on behalf of their customers and received the check themselves. Four others did not submit the application but completed all or part of the application on behalf of their customers.

Four of the eight whole home Trade Allies that work with Snugg Pro reported that the data requirements of the Program, which are entered by the Trade Ally through Snugg Pro rather than through a typical application form, were a significant burden. One Trade Ally said that even though Snugg Pro was an improvement over emHome, the data requirements were still very difficult to manage, in part because of the new incentive structure. For example, if the completed project resulted in higher savings than the Trade Ally anticipated based on the pre-test, the Trade Ally had to recalculate and revise the project information provided with the initial assessment. Two whole home Trade Allies reported that a project application was often returned to them because details of equipment specifications or pricing did not meet Program requirements.

Although, as noted above, whole home Trade Allies reported the data requirement was burdensome, most Trade Allies reported that the application process flowed smoothly. The Evaluation Team found that only 8% of Trade Allies regularly encountered problems with the application process (Figure 13).

Of the whole home Trade Allies interviewed, only those who offer insulation installation services (nine Trade Allies) receive an incentive check from Focus on Energy. Six of these reported they were generally satisfied with the time to receive the incentive check from Focus on Energy, and five estimated a typical turnaround time within three to five weeks. However, two of these six noted the check could occasionally take much longer to arrive—up to 16 weeks. Of the three Trade Allies who were not satisfied, two were not sure how long incentives checks typically took to arrive. The other noted that checks habitually took months to arrive, which put a substantial strain on his cash flow.

Figure 13. Frequency of Problems with the Application Process



Source: Home Performance with ENREGY STAR Trade Ally Online Survey 2016, Question C2: "How frequently do you run into challenges with the incentive application process?" (n=71)

Barriers to Participation

HVAC Trade Allies said there were no major barriers to participating in the Program for them or their customers. Whole home Trade Allies, on the other hand, reported several obstacles:

- Finding skilled staff able to perform assessments and installation to meet Program standards (two Trade Allies)
- Managing the heavy labor requirement of performing the assessments and entering all of the assessment, project, and cost data into Snugg Pro, and general "paperwork" (four Trade Allies)
- Explaining to customers why they do not know their exact incentive amount until the work is completed (four Trade Allies)

Two Trade Allies reported they had trouble finding qualified technicians. One said it was difficult to keep a BPI-certified auditor on staff because of seasonality in workflow, and the other reported it was difficult to find technicians to properly install insulation. Four whole home Trade Allies said the complexity of the Program made it difficult to train staff to manage data entry and explain the Program to customers. Finally, four contractors mentioned it was difficult to use the new incentive structure as a sales tool because they could not know for certain which incentive the customer was going to receive until the work was completed.

According to the Program Implementer, the incentive is determined based on the initial assessment. The incentive could go up after the work is complete, if the work provided more savings than expected, but it does not go down if the work provided less savings than expected. It was not clear to the Evaluation Team why Trade Allies considered this a significant hurdle to their business.

In fact, the Evaluation Team notes that there is some potential for Trade Allies to abuse the system by manipulating blower door results to show more savings potential than really exists and because the Program will pay the promised incentive regardless of actual savings. However, the Evaluation Team found no evidence of this kind of manipulation. The Program Administrator reported that in the Program Implementer's project reviews it watches for any pattern that would indicate fraud.

Trade Ally Response to Program Changes

HVAC and whole home Trade Allies responded differently to the CY 2016 Program changes. Other than decreases in some rebate amounts, few Program changes had a direct or significant impact on HVAC Trade Allies. With the exception of the HVAC Trade Ally pursuing BPI training, HVAC Trade Allies did not expect to adjust any aspect of their business model in response to recent Program changes.

On the other hand, all 11 whole home Trade Allies the Evaluation Team interviewed were aware of Program changes, and all reported the changes had an impact on their business. Table 59 presents key Program changes and Trade Allies' reactions to those changes.

Table 59. Whole Home Trade Ally Responses to Key Program Design Changes

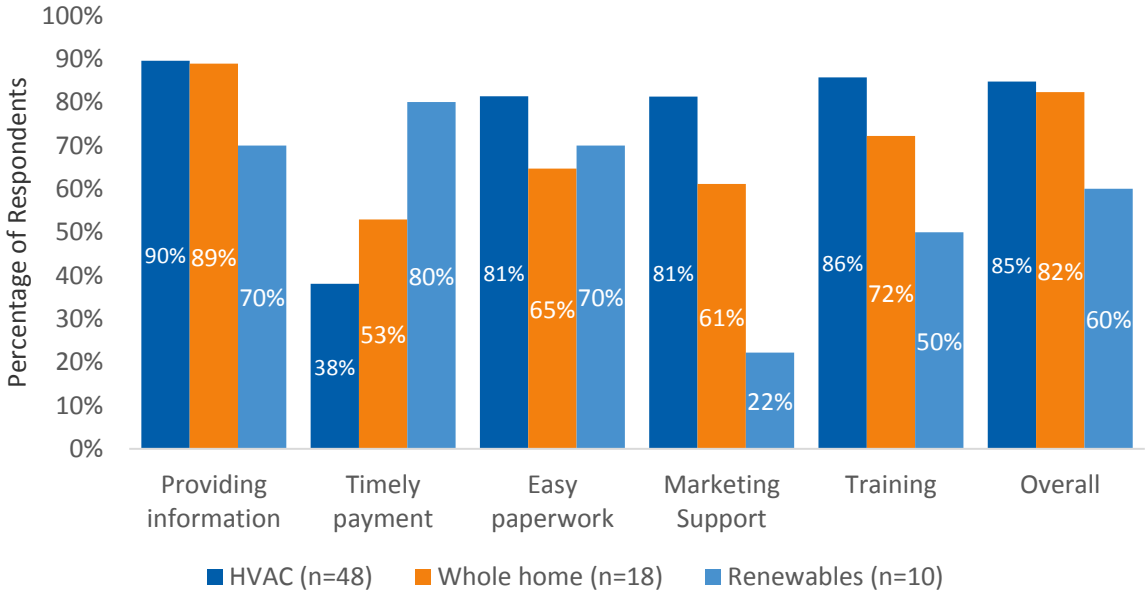
Design Change	Trade Ally Response
Snugg Pro	Five of eight Trade Allies who perform energy assessments reported Snugg Pro was an improvement over the emHome software, and it was easier and faster to use. The remaining three were installation contractors and had no experience using Snugg Pro.
Savings-Based Incentive Structure	Three Trade Allies said the incentive structure made sales conversations with customers awkward because the Trade Ally could not guarantee the exact amount of the incentive prior to completing the work. However, one Trade Ally preferred the new incentive structure because it offers three set values (one for each level of savings) rather than a percentage of project cost.
$250 HVAC/Whole Home Project Bonus	No HVAC Trade Allies mentioned the bonus to their customers, though one planned to start. Two whole home Trade Allies said they mention the bonus to customers, but none reported they had a customer take advantage of the bonus.
$50 Co-Pay for Income-Qualified Track Assessment	Two Trade Allies said the co-pay made it easier for them to work with income-qualified customers.

Trade Ally Satisfaction

Figure 14 presents Trade Ally satisfaction with different components of Program design and operations and the Program overall by trade. Both HVAC and whole home Trade Allies were most likely to be satisfied with the Program Implementer's ability to provide information and least likely to be satisfied with the Program Implementer's ability to issue timely payments. There is no statistically significant

difference between the HVAC and whole home responses for any of the program components, with the exception of marketing support. Overall, the majority of both groups were satisfied with the Program.[19]

Figure 14. Trade Allies Very or Somewhat Satisfied with Program Components, by Trade



Source: Home Performance with ENERGY STAR Trade Ally Online Survey.
Question C1: "How is Focus on Energy doing when it comes to the following: […]?"
Figure shows percentage of respondents indicating *very satisfied* or *somewhat satisfied*.

The renewables Trade Ally respondents were primarily solar PV installers. Responses from these Trade Allies were statistically different from HVAC Trade Allies concerning timely payments, marketing support, and training.[20] Survey comments indicated that renewable Trade Allies' dissatisfaction with some components was related to their belief that the Program Administrator was investing less in the renewable path than in the other paths, and that Focus on Energy was not committed to continuing it.

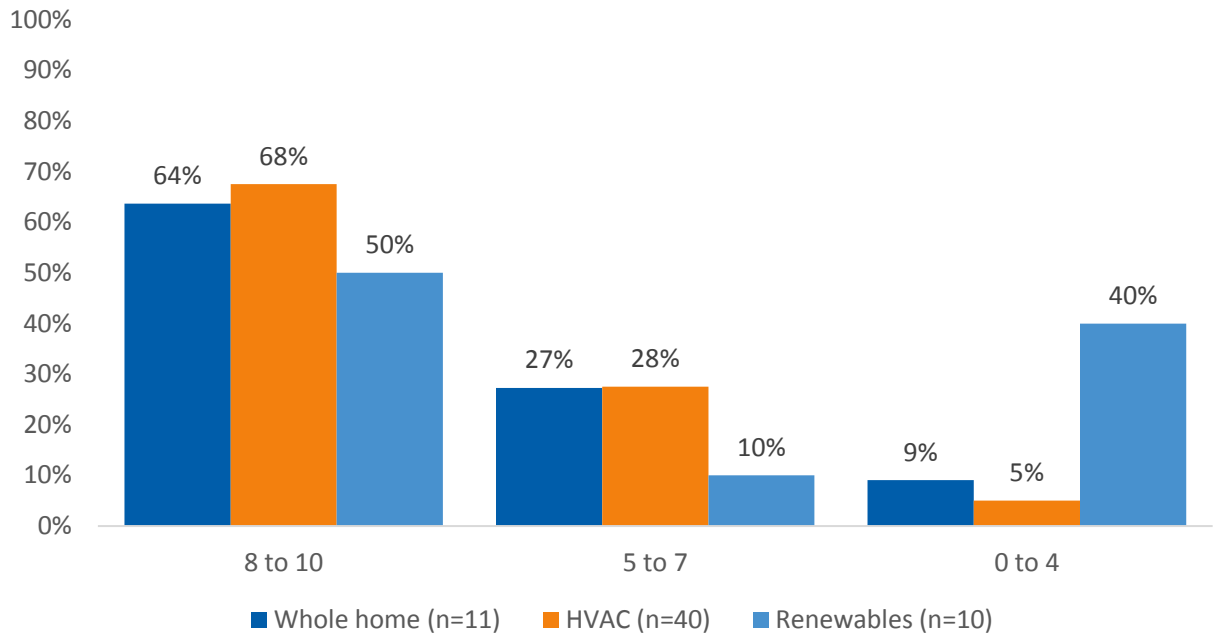
The interviews and online survey asked Trade Allies about their satisfaction with the Program overall in two ways. The first question asked Trade Allies to rate the Program overall on a four-point scale (*very satisfied, somewhat satisfied, not too satisfied*, or *not at all satisfied*). The second question asked Trade Allies to rate the Program overall on a scale from 0 to 10, where 0 is *very dissatisfied* and 10 is *very satisfied*. This question is less directly comparable to the results for individual components but provides more detail on the range of contractor satisfaction with the Program. The results, shown in Figure 15, correspond to the results in Figure 14 in that HVAC and whole home Trade Allies have similar average scores, with the majority of Trade Allies rating the Program an 8 or higher. Half of renewable Trade

[19] $p < 0.05$ using a binomial t-test.

[20] $p < 0.05$ using a binomial t-test.

Allies also ranked the Program from 8 to 10. However, unlike the other HVAC and whole home Trade Allies, four of 10 renewable Trade Allies rated their satisfaction with the Program as a 4 or below.

Figure 15. Trade Ally Satisfaction with the Home Performance with ENERGY STAR Program



Source: Home Performance with ENERGY STAR Trade Ally Online Survey 2016.
Question C4: "On a 10-point scale where 0 means "not at all satisfied" and 10 means "extremely satisfied," how satisfied are you with Focus on Energy overall?"

Customer Experience

Annual Results from Ongoing Customer Satisfaction Survey

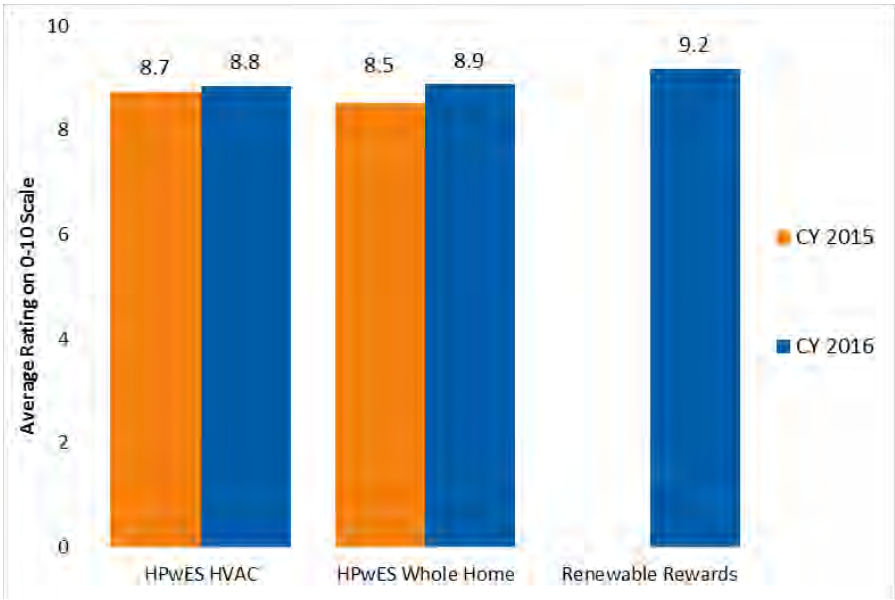
Throughout CY 2016, the Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Home Performance with ENERGY STAR Program.[21] Respondents answered questions related to satisfaction and likelihood on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 the lowest.

Figure 16 shows the overall satisfaction ratings for the CY 2016 components and comparable CY 2015 Programs. The CY 2016 Home Performance with ENERGY STAR whole home component is compared to the CY 2015 Home Performance with ENERGY STAR Program, and the current Home Performance with ENERGY STAR HVAC component is compared to last year's Residential Rewards and Enhanced Rewards Programs. The Renewable Rewards Program does not have a predecessor for comparison. Both of the

[21] The Evaluation Team found that some surveys did not include identifying information to allow it to match survey responses to program participation dates. Survey responses without participation dates were included in the year-end total, but not the quarterly breakdown.

CY 2016 Home Performance with ENERGY STAR Program components received higher ratings from participants than the CY 2015 versions of this Program.

Figure 16. CY 2016 Overall Satisfaction with Home Performance with ENERGY STAR



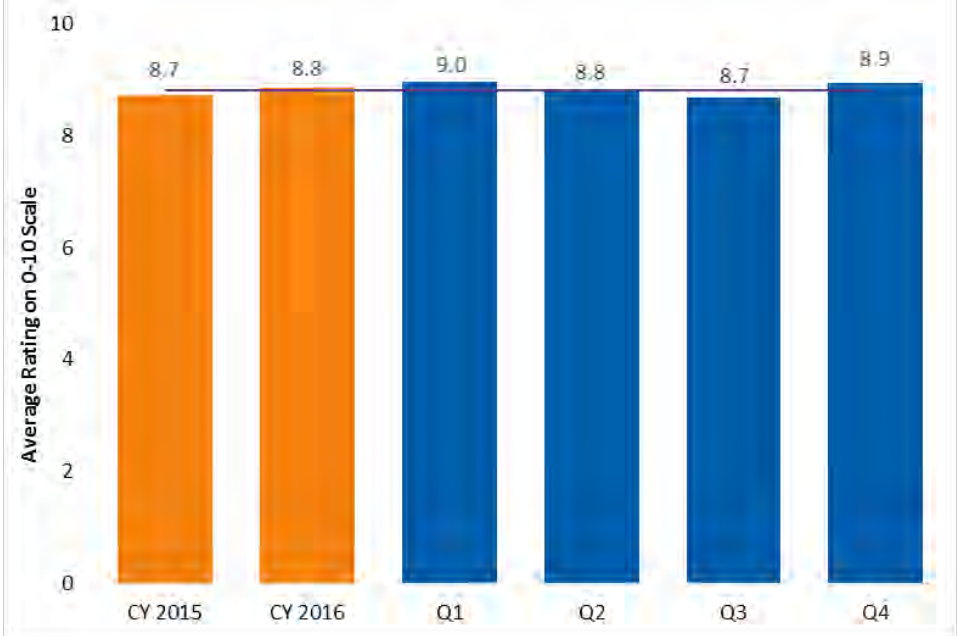
Source: Home Performance with ENERGY STAR HVAC Program, Home Performance with ENERGY STAR Whole Home Program, and Renewable Rewards Participant Satisfaction Surveys Question: "Overall, how satisfied are you with the program?" (Residential/Enhanced Rewards CY 2015 n=542, Home Performance with ENERGY STAR HVAC CY 2016 n=597, Home Performance with ENERGY STAR CY 2015 n=352, Home Performance with ENERGY STAR Whole Home CY 2016 n=471, Renewable Rewards CY 2016 n=148)

The subsections that follow detail the complete results of these three customer satisfaction surveys by quarter for CY 2016, and compared to the previous year's CY 2015 Programs.

Home Performance with ENERGY STAR—HVAC

Figure 17 shows CY 2016 HVAC participants gave the Home Performance with ENERGY STAR Program an overall satisfaction rating of 8.8. These ratings were statistically equivalent to the portfolio baseline of 8.8 (indicated by the purple line) for the year and in every quarter, and were not significantly different from the Residential Rewards and Enhanced Rewards Programs of CY 2015. [22]

Figure 17. CY 2016 Overall Satisfaction with the Program—HVAC Component



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "Overall, how satisfied are you with the program?" (Residential/Enhanced Rewards CY 2015 n=542, CY 2016 n=597, Q1 n=91, Q2 n=175, Q3 n=148, Q4 n=167). The portfolio baseline (8.8) is indicated by a purple line.

[22] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015–2018 quadrennium).

As shown in Figure 18, the average rating for Program participant satisfaction with the upgrades was 9.3, a statistically significant increase from the CY 2015 Programs. [23]

Figure 18. CY 2016 Satisfaction with Program Upgrades—HVAC Component

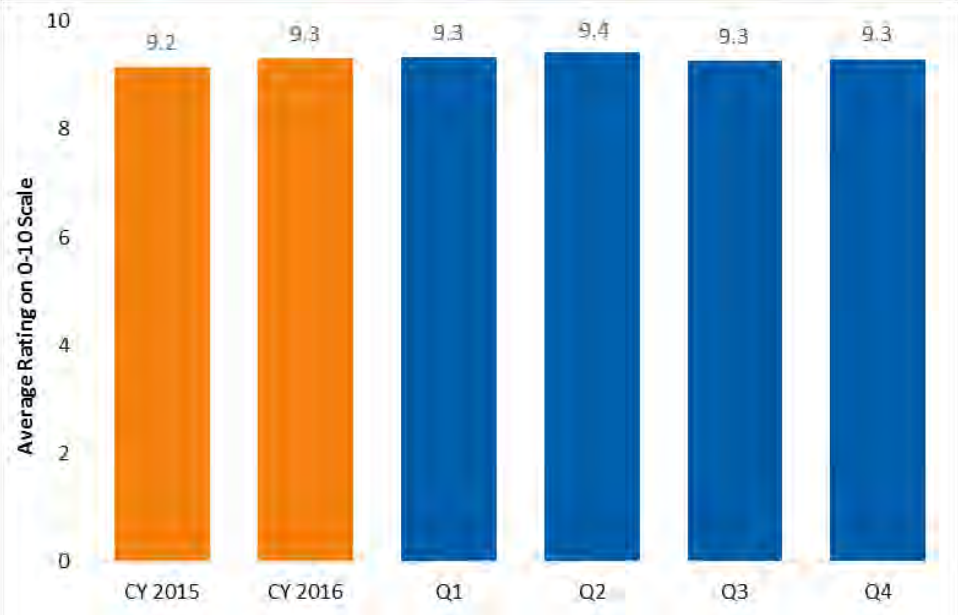


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient improvement(s) that were completed?" (Residential/Enhanced Rewards CY 2015 n=521, CY 2016 n=580, Q1 n=85, Q2 n=175, Q3 n=142, Q4 n=162)

[23] $p < 0.05$ for CY 2016 compared to CY 2015, and for Q2 compared to CY 2015, using binomial t-tests. Ratings from other quarters were not statistically significantly different from CY 2015.

Participants gave their contractors high satisfaction ratings, averaging 9.3 for the CY 2016 Program (Figure 19), which was a statistically significant increase from the CY 2015 Program. [24]

Figure 19. CY 2016 Satisfaction with Program Contractors—HVAC Component

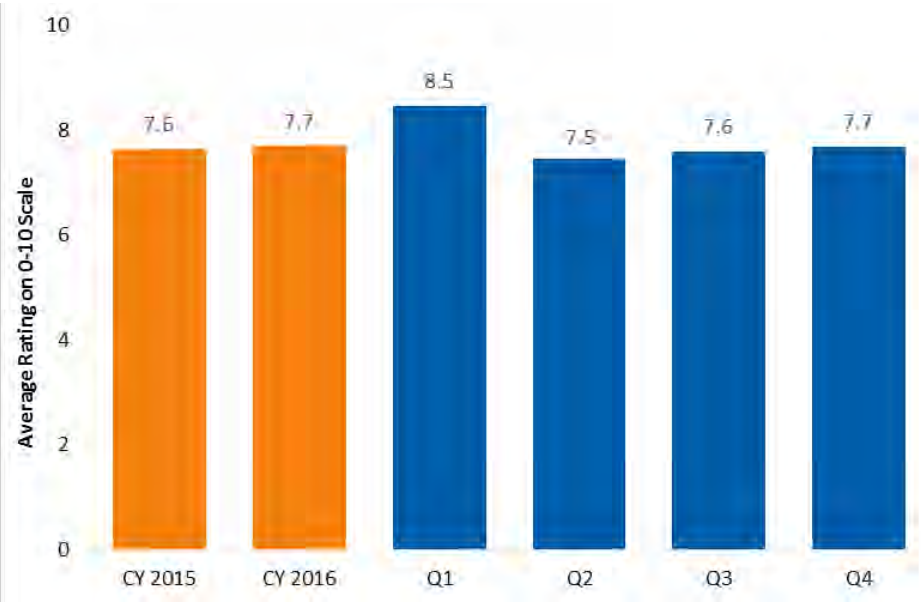


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "How satisfied are you with the contractor (Trade Ally) that performed the energy efficient improvement(s)?" (Residential/Enhanced Rewards CY 2015 n=524, CY 2016 n=594, Q1 n=90, Q2 n=176, Q3 n=146, Q4 n=166)

[24] $p < 0.10$ for CY 2016 compared to CY 2015, and $p < 0.05$ for Q2 compared to CY 2015, using binomial t-tests. Ratings from other quarters were not statistically significantly different from CY 2015.

Respondents gave an average rating of 7.7 for their satisfaction with the amount of incentive they received (Figure 20), which was equivalent to the CY 2015 Programs. However, Q1 ratings for the incentive were significantly higher than the previous year.[25]

Figure 20. CY 2016 Satisfaction with Program Incentive—HVAC Component



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "How satisfied are you with the amount of incentive you received?"
(Residential/Enhanced Rewards CY 2015 n=537, CY 2016 n=605, Q1 n=89, Q2 n=182, Q3 n=149, Q4 n=169)

[25] $p < 0.05$ for Q2 compared to CY 2015 using binomial t-test. Ratings from other quarters and for CY 2016 overall were not statistically significantly different from CY 2015.

Figure 21 shows the average rating for the likelihood that respondents will initiate another energy efficiency project in the next 12 months was 4.9 in CY 2016, a statistically significant decline from the CY 2015 Programs. However, this rating did go up in Q4 to become statistically equivalent to CY 2015 ratings.[26]

Figure 21. CY 2016 Likelihood of Initiating Energy Efficiency Improvements—HVAC Component

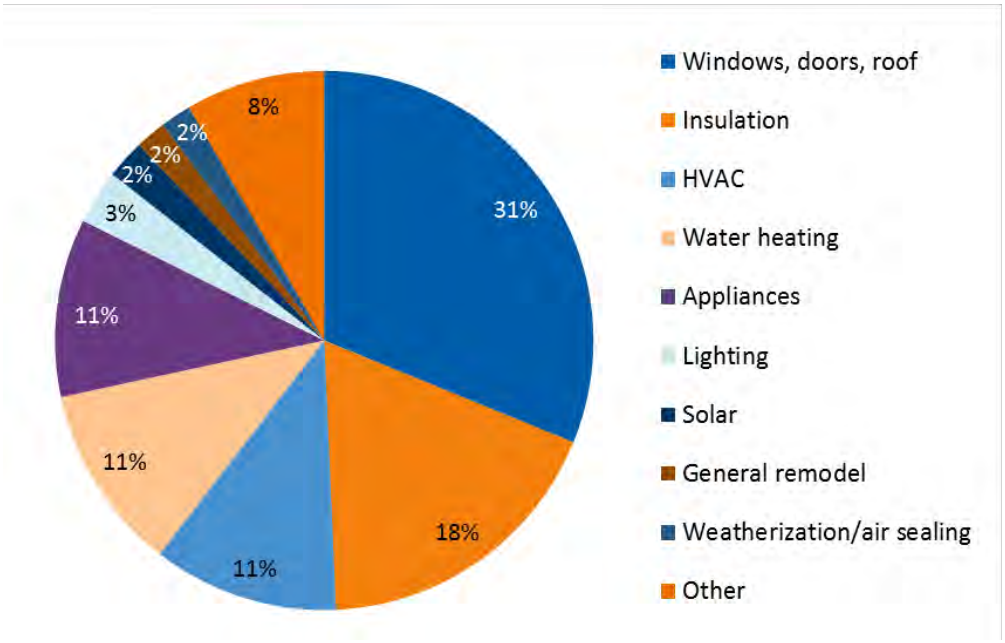


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "How likely are you to initiate another energy efficiency improvement in the next 12 months?" (Residential/Enhanced Rewards CY 2015 n=439, CY 2016 n=474, Q1 n=76, Q2 n=126, Q3 n=116, Q4 n=141)

[26] $p < 0.05$ for CY 2016 compared to CY 2015, and for Q1, Q2, and Q3 compared to CY 2015, using binomial t-tests. Ratings from Q4 were not statistically significantly different from CY 2015.

The Evaluation Team also asked participants what improvements they were considering. Of the 622 participants who responded to the survey, 180 (29%) provided specific examples, which the Evaluation Team coded into a total of 215 mentions shown in Figure 22. Nearly a third of the projects mentioned involve windows and doors and roofs (31%), followed by insulation (18%), HVAC, water heating, and appliance upgrades (11% each). The most common appliances mentioned were dishwashers, refrigerators, ranges, dryers, and water softeners. Eight percent of mentions were classified "other," a category that included appliance recycling and upgrading siding.

Figure 22. CY 2016 Intentions for Future Improvements—HVAC Component

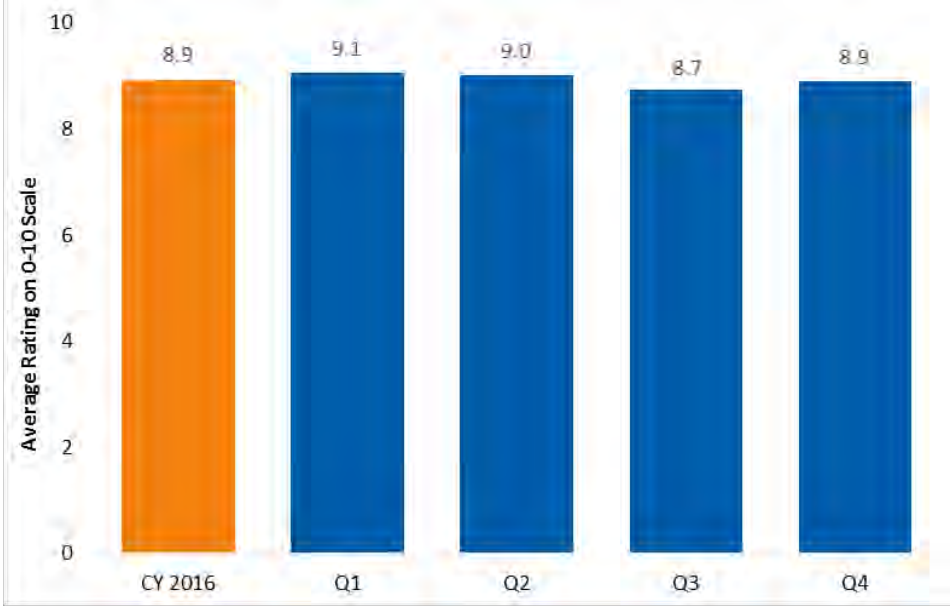


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey
Question: "What improvements do you plan to complete over the next 12 months, if applicable?"
(Total mentions: n=215)

Figure 23 shows that respondents' rating for the likelihood that they would recommend this Program to other customers was 8.9.[27] Using these survey data, the Evaluation Team calculated a net promoter score (NPS) based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The HVAC component NPS is +65, based on 75% of participants identifying as promoters and 5% identifying as detractors.

[27] Customers who responded that they "already have" recommended the Program are counted in mean ratings as a rating of 10 (most likely).

Figure 23. CY 2016 Likelihood of Recommending the Program—HVAC Component

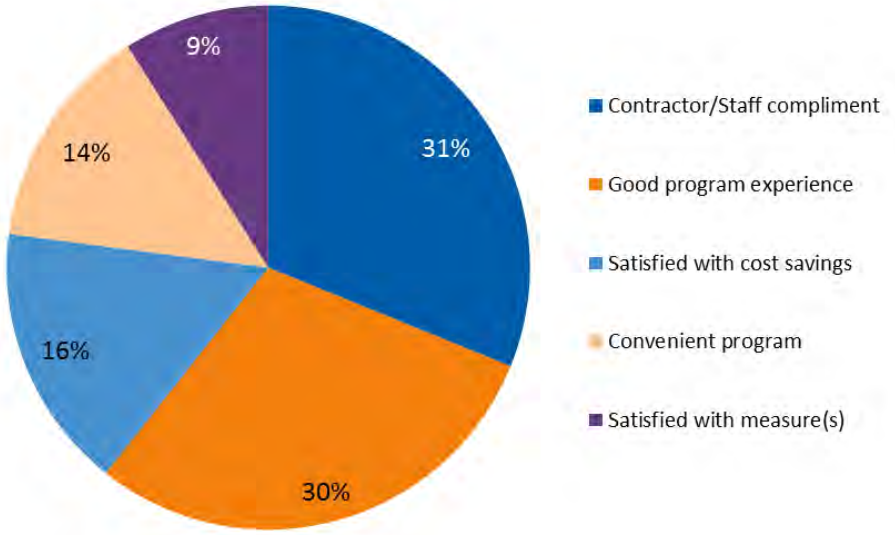


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey
Question: "How likely is it that you would recommend this program to others?" (CY 2016 n=596, Q1 n=86, Q2 n=178, Q3 n=147, Q4 n=168)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 622 participants who responded to the survey, 151 (24%) provided open-ended feedback, which the Evaluation Team coded into a total of 204 mentions. Of these mentions, 122 were positive or complimentary comments (60%) and 82 were suggestions for improvement (40%).

The positive responses are shown in Figure 24, with 31% complimenting the contractor or Focus on Energy staff and 30% reflecting a generally positive experience. Compared to the CY 2015 Programs, mentions of convenience were down (from 30% to 14%) while contractor compliments were up (from 15% to 31%), while the remaining categories were relatively stable.

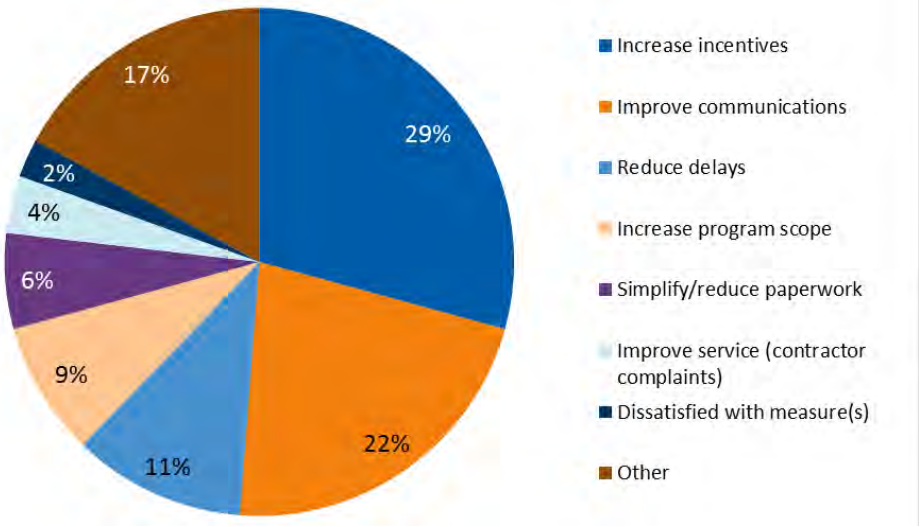
Figure 24. CY 2016 Positive Comments about the Program—HVAC Component



Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total positive mentions n=122)

Suggestions for improvement are shown in Figure 25. The three most common suggestions were increasing incentives (29%), improving communications (22%), and reducing delays (11%). Suggestions about improving communications fell into three general categories: miscommunications about applications, incentive amounts and equipment eligibility, and suggestions to increase promotion for the Program.

Figure 25. CY 2016 Suggestions for Improving the Program—HVAC Component

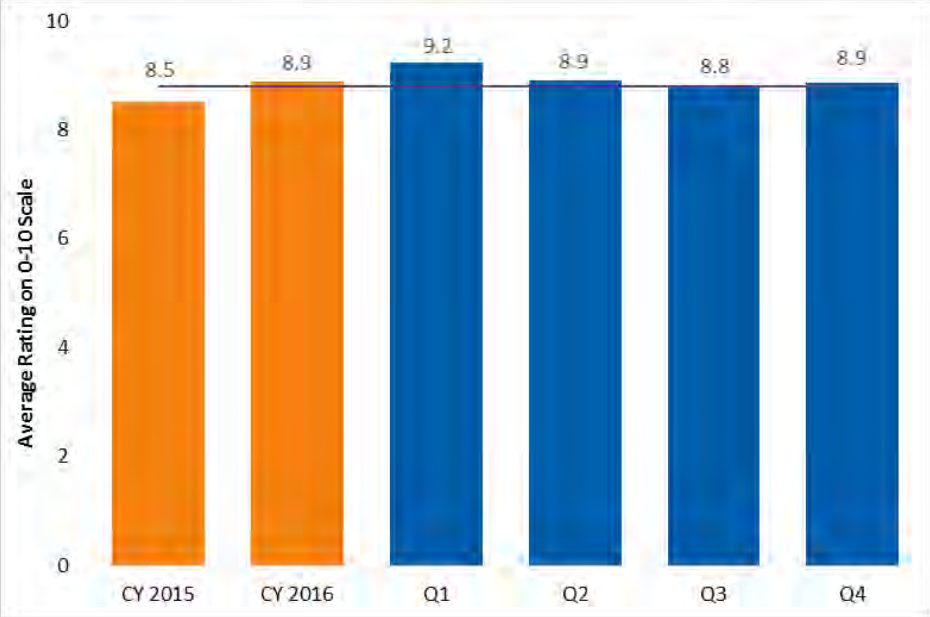


Source: Home Performance with ENERGY STAR HVAC Program Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions: n=82)

Home Performance with ENERGY STAR—Whole Home

Figure 26 shows that whole home participants gave the Home Performance with ENERGY STAR Program an overall satisfaction rating of 8.9. These ratings were statistically equivalent to the portfolio baseline of 8.8, and were significantly higher than the CY 2015 Home Performance with ENERGY STAR Program.[28]

Figure 26. CY 2016 Overall Satisfaction with the Program—Whole Home Component

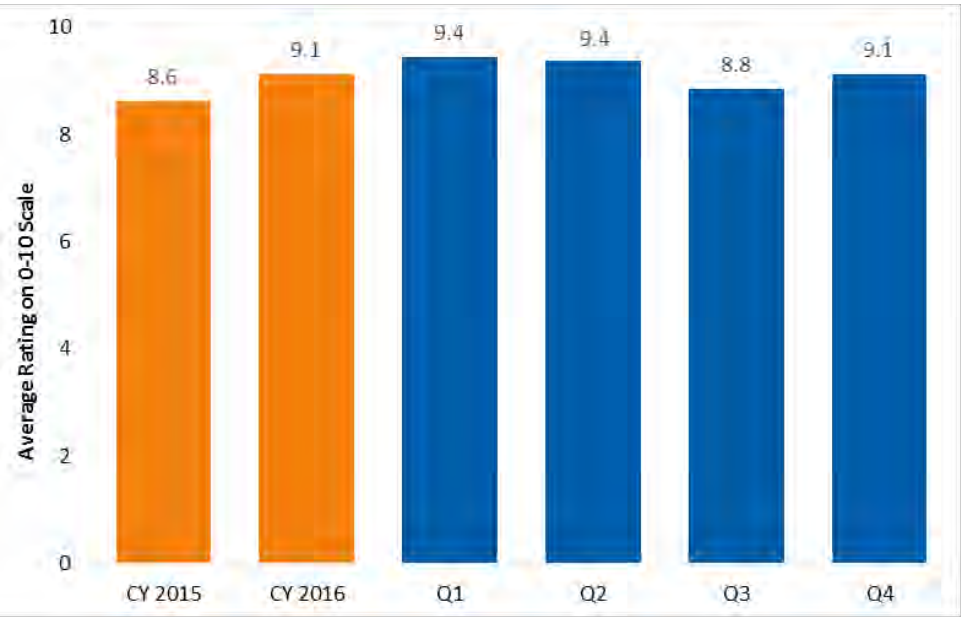


Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "Overall, how satisfied are you with the program?" (Home Performance with ENERGY STAR CY 2015 n=352, CY 2016 n=471, Q1 n=25, Q2 n=58, Q3 n=112, Q4 n=272). The portfolio baseline (8.8) is indicated by a purple line.

[28] $p < 0.05$ using binomial t-test.

As shown in Figure 27, Program participants gave an average rating of 9.1 for their satisfaction with the upgrades they received, a statistically significant improvement from the CY 2015 Program. [29]

Figure 27. CY 2016 Satisfaction with Program Upgrades—Whole Home Component

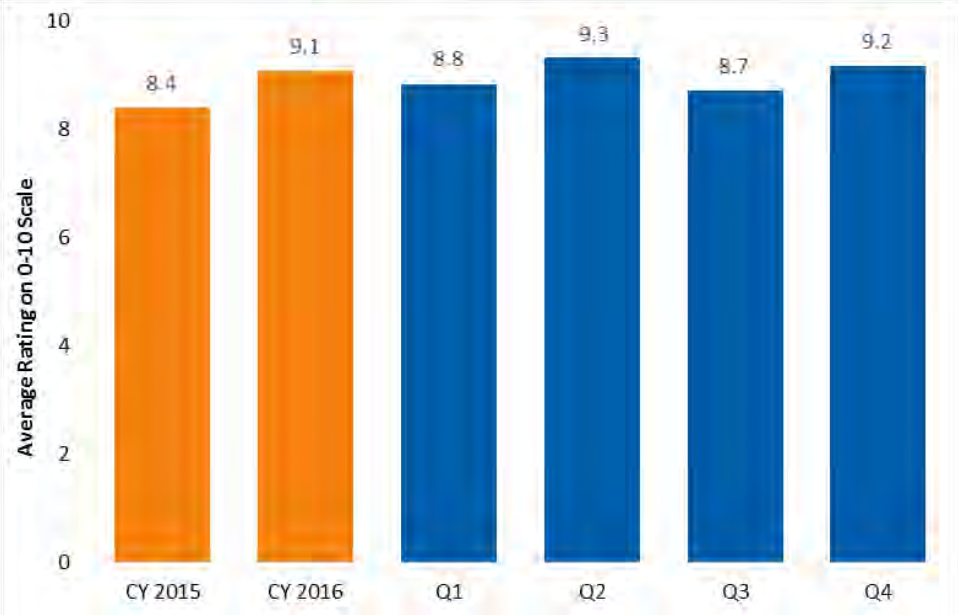


Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient improvement(s) that were completed?" (Home Performance with ENERGY STAR CY 2015 n=315, CY 2016 n=445, Q1 n=23, Q2 n=52, Q3 n=104, Q4 n=260)

[29] $p < 0.05$ for CY 2016 compared to CY 2015, and for Q1, Q2, and Q4 compared to CY 2015, using binomial t-tests. Ratings from Q3 were not statistically significantly different from CY 2015.

Participants gave the contractors who provided services for them an average satisfaction rating of 9.1 for CY 2016 (Figure 28), which was a statistically significant improvement over the CY 2015 Program.[30]

Figure 28. CY 2016 Satisfaction with Contractor for the Program—Whole Home Component



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "How satisfied are you with the contractor (Trade Ally) that performed the energy efficient improvement(s)?" (Home Performance with ENERGY STAR CY 2015 n=350, CY 2016 n=471, Q1 n=24, Q2 n=57, Q3 n=111, Q4 n=274)

[30] $p < 0.05$ for CY 2016 compared to CY 2015, and for Q2 and Q4 compared to CY 2015, using binomial t-tests. Ratings from Q1 and Q3 were not statistically significantly different from CY 2015.

Respondents gave an average rating of 8.0 for their satisfaction with the amount of incentive they received (Figure 29), a statistically significant decrease from the CY 2015 Program ratings. This decline was driven by particularly low ratings during the third and fourth quarters. [31]

Figure 29. CY 2016 Satisfaction with the Program Incentive—Whole Home Component



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "How satisfied are you with the amount of incentive you received?"
(Home Performance with ENERGY STAR CY 2015 n=338, CY 2016 n=467, Q1 n=25, Q2 n=57, Q3 n=108, Q4 n=271)

[31] $p < 0.05$ for CY 2016 compared to CY 2015, and for Q3 and Q4 compared to CY 2015, using binomial t-tests. Ratings from Q1 and Q2 were not statistically significantly different from CY 2015.

Figure 30 shows that respondents' rating for the likelihood that they will initiate another energy efficiency project in the next 12 months averaged 5.7, which was statistically equivalent to 5.3 for the CY 2015 Program.[32]

Figure 30. CY 2016 Likelihood of Initiating Energy Efficiency Improvement—Whole Home Component

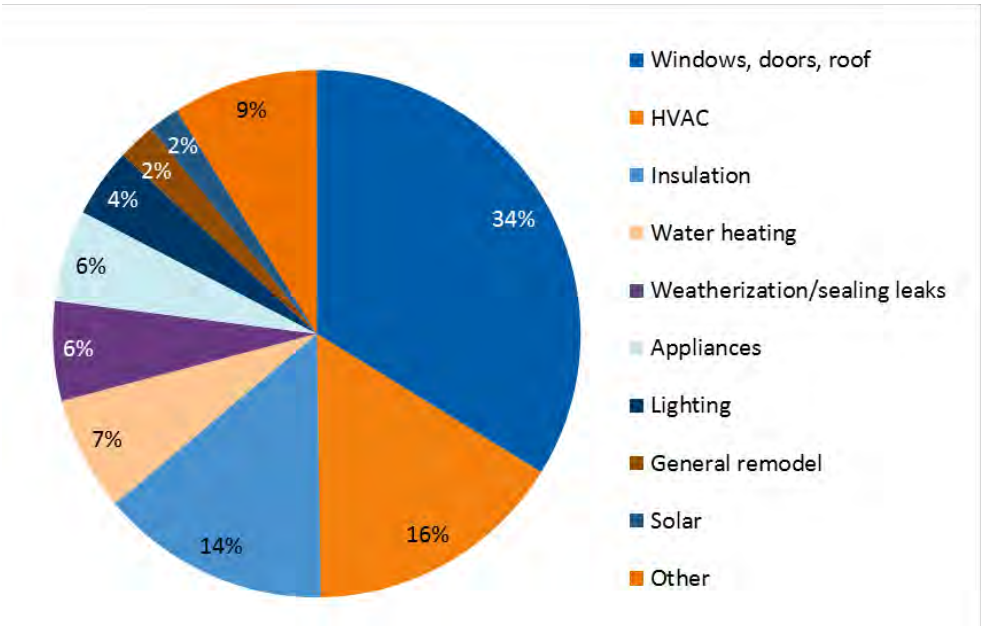


Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "How likely are you to initiate another energy efficiency improvement in the next 12 months?"
(Home Performance with ENERGY STAR CY 2015 n=291, CY 2016 n=385, Q1 n=21, Q2 n=46, Q3 n=96, Q4 n=216)

[32] $p < 0.10$ for Q3 compared to CY 2015 using binomial t-test. Ratings for CY 2016 overall and all other quarters were not statistically significantly different from CY 2015.

The Evaluation Team also asked participants what improvements they were considering. Of the 487 participants who responded to the survey, 168 (or 34%) provided specific examples, which the Evaluation Team coded into a total of 213 mentions shown in Figure 31. A third of the projects mentioned involve windows and doors and roofs (34%), followed by HVAC upgrades (16%) and insulation (14%). Nine percent of mentions were classified "other," a category that included appliance recycling, upgrading siding, and projects involving chimneys and wood stoves.

Figure 31. CY 2016 Intentions for Future Improvements—Whole Home Component



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey
Question: "What improvements do you plan to complete over the next 12 months, if applicable?"
(Total mentions: n=213)

Figure 32 shows that the respondents' rating for the likelihood that they would recommend this Program to others was 9.2.[33] Using these survey data, the Evaluation Team calculated an NPS based on customers' likelihood to recommend the Program. For the whole home component of the Home Performance with ENERGY STAR Program, the NPS is +69, based on 77% of participants identifying as promoters and 8% identifying as detractors.

Figure 32. CY 2016 Likelihood of Recommending the Program—Whole Home Component



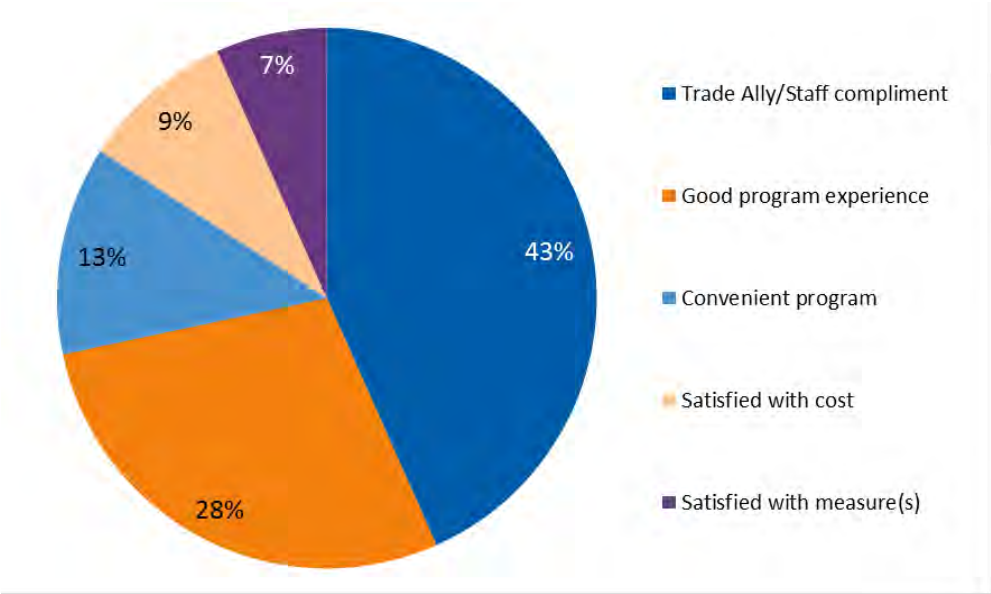
Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey
Question: "How likely is it that you would recommend this program to others?" (CY 2016 n=476, Q1 n=25, Q2 n=57, Q3 n=114, Q4 n=274)

During the customer satisfaction surveys, the Evaluation Team also asked participants if they had any comments or suggestions for improving the program. Of the 487 participants who responded to the survey, 152 (31%) provided open-ended feedback, which the Evaluation Team coded into a total of 214 mentions. Of these mentions, 120 (56%) were positive or complimentary comments, and 94 (44%) were suggestions for improvement.

[33] Customers who responded that they "already have" recommended the Program are counted in mean ratings as a rating of 10 (most likely).

The positive responses are shown in Figure 33, with most comments reflecting compliments for Focus on Energy staff and Trade Allies (43%) and a generally positive experience (28%).

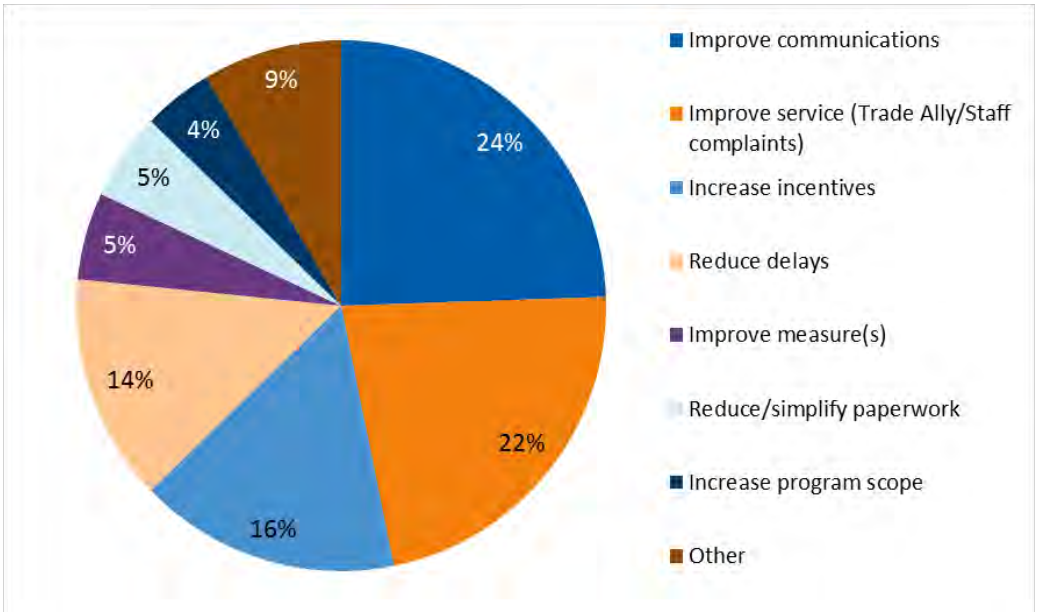
Figure 33. CY 2016 Positive Comments about the Program



Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total positive mentions n=120)

Suggestions for improvement are shown in Figure 34; the most common suggestions were to improve communications (24%), improve service (22%), increase incentive amounts (16%), and reduce delays (14%). Compared to the CY 2015 Program, improving service was mentioned more often (up from 11%) while the other categories were relatively stable. Suggestions about improving communications typically focused on confusion about changing incentive levels or increasing outreach and marketing to make customers aware of the Program. Issues with customer service were also often related to incentive changes: staff who could not be reached or did not return calls and Trade Allies who did not adequately clarify incentive levels.

Figure 34. CY 2016 Suggestions for Improving the Program

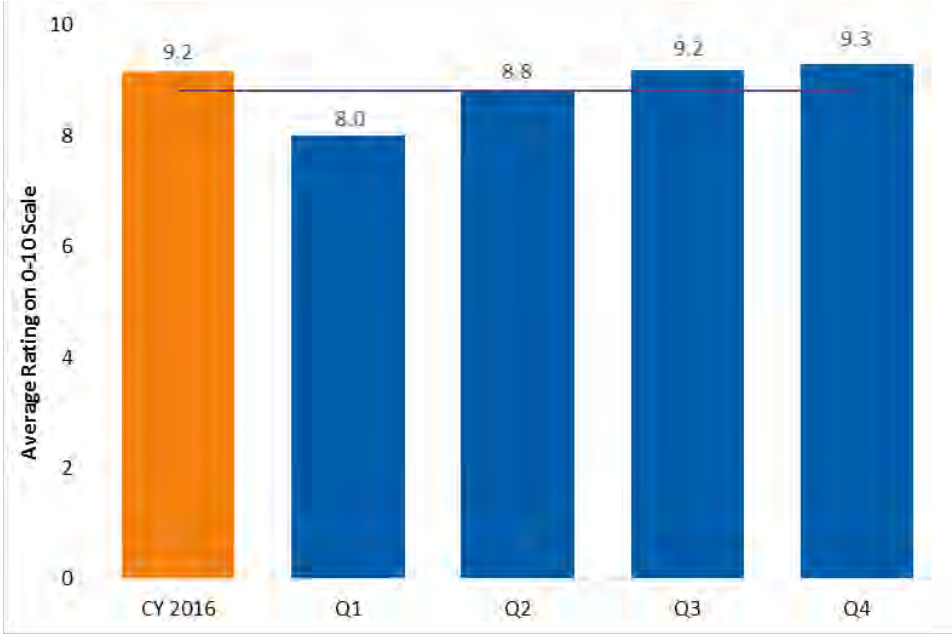


Source: Home Performance with ENERGY STAR Whole Home Program Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions."
(Total suggestions for improvement mentions: n=94)

Home Performance with ENERGY STAR-Renewable Rewards

Figure 35 shows that the average overall Home Performance with ENERGY STAR Program satisfaction rating among CY 2016 Renewable Rewards participants was 9.2, which was statistically significantly higher than the portfolio baseline of 8.8 (indicated by the purple line).

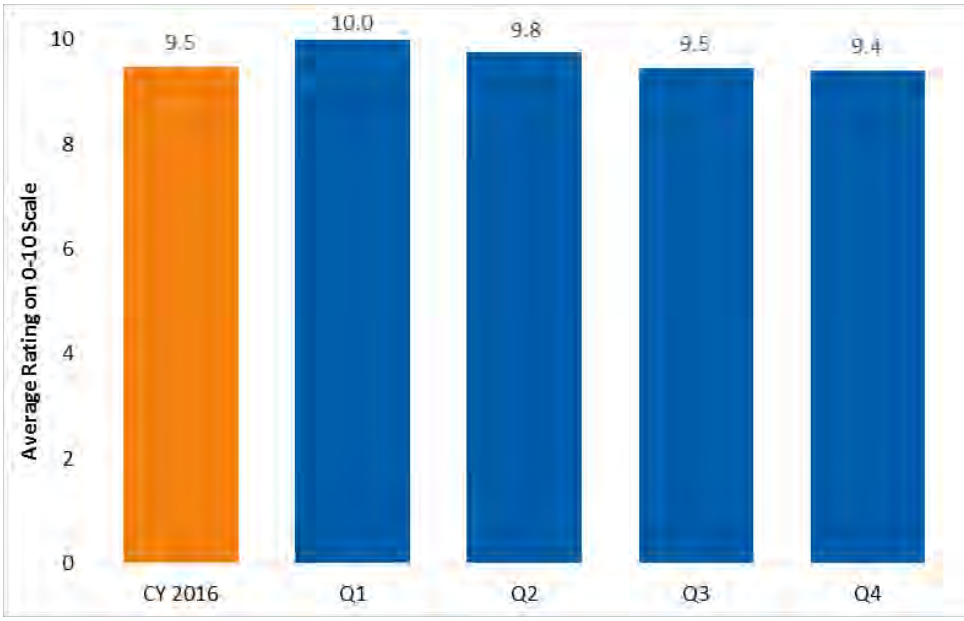
Figure 35. CY 2016 Overall Satisfaction with the Program-Renewable Rewards



Source: Renewable Rewards Program Participant Satisfaction Survey Question. "Overall, how satisfied are you with the program?" (CY 2016 n=148, Q1 n=6, Q2 n=17, Q3 n=47, Q4 n=76).
The portfolio baseline (8.8) is indicated by a purple line.

As shown in Figure 36, Program participants' average rating for satisfaction with their equipment very high at 9.5.

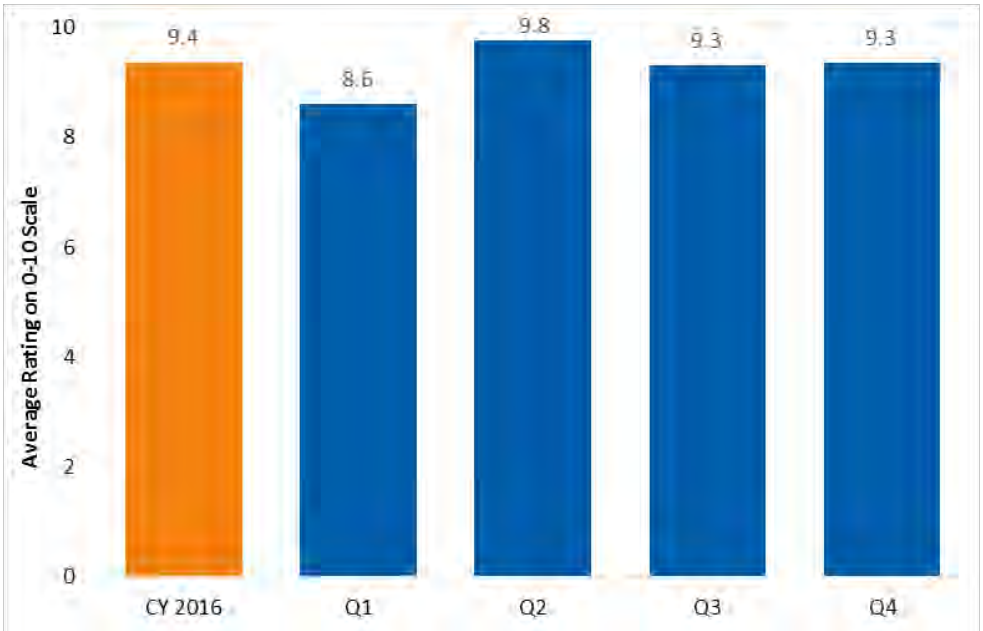
Figure 36. CY 2016 Satisfaction with Program Upgrades-Renewable Rewards



Source: Renewable Rewards Program Participant Satisfaction Survey Question. "How satisfied are you with the energy-efficient upgrades you received?" (CY 2016 n=144, Q1 n=4, Q2 n=17, Q3 n=48, Q4 n=73)

Participants also gave their contractors high satisfaction ratings, averaging 9.4 for the CY 2016 Program (Figure 37).

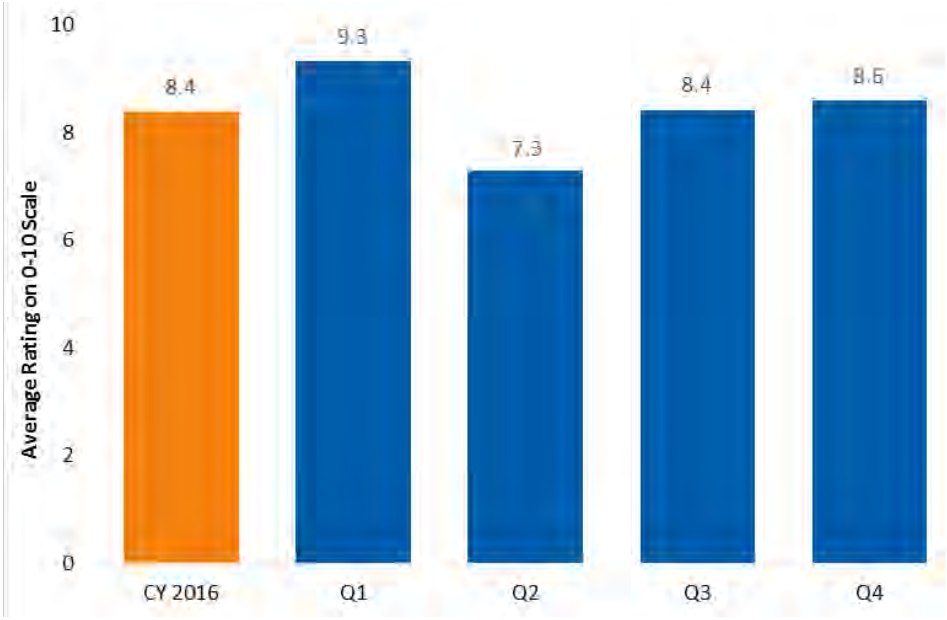
Figure 37. CY 2016 Satisfaction with Program Contractors-Renewable Rewards



Source: Renewable Rewards Program Participant Satisfaction Survey Question. "How satisfied are you with the contractor that provided the service?" (CY 2016 n=144, Q1 n=5, Q2 n=17, Q3 n=48, Q4 n=73)

Respondents gave an average rating of 8.4 for their satisfaction with the amount of incentive they received (Figure 38). This aspect of the Program received the lowest average satisfaction rating overall.

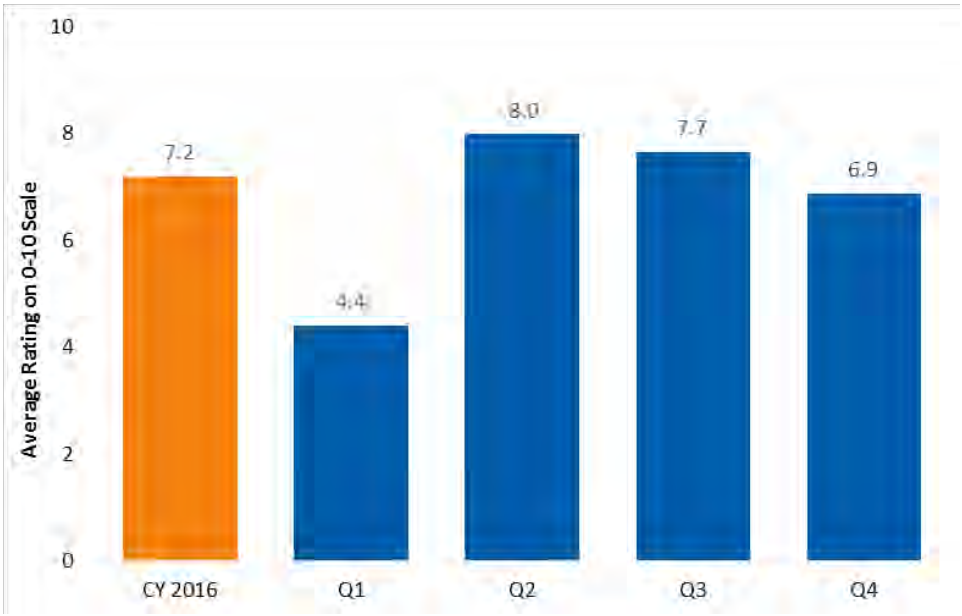
Figure 38. CY 2016 Satisfaction with Program Incentive-Renewable Rewards



Source: Renewable Rewards Program Participant Satisfaction Survey Question.
"How satisfied are you with the amount of the cash incentive you received?"
(CY 2016 n=149, Q1 n=6, Q2 n=17, Q3 n=47, Q4 n=77)

Figure 39 shows the average rating for the likelihood that respondents will initiate another energy efficiency project in the next 12 months was 7.2.

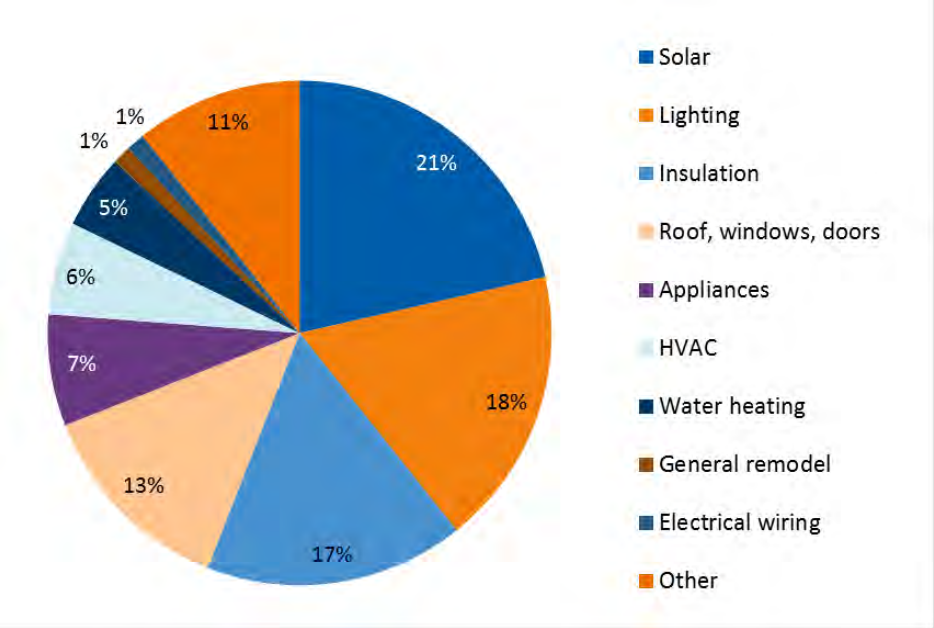
Figure 39. CY 2016 Likelihood of Initiating Energy Efficiency Improvement-Renewable Rewards



Source: Renewable Rewards Program Participant Satisfaction Survey Question.
"How likely are you to initiate another energy efficiency improvement in the next 12 months?"
(CY 2016 n=134, Q1 n=5, Q2 n=17, Q3 n=46, Q4 n=64)

The Evaluation Team also asked participants what improvements they were considering. Of the 153 participants who responded to the survey, 65 (42%) provided specific examples, which the Evaluation Team coded into a total of 84 mentions shown in Figure 40. Four categories combined to account for a large majority of these mentions: solar (21%), lighting measures (18%), insulation (17%), and roofs, windows and doors (13%).

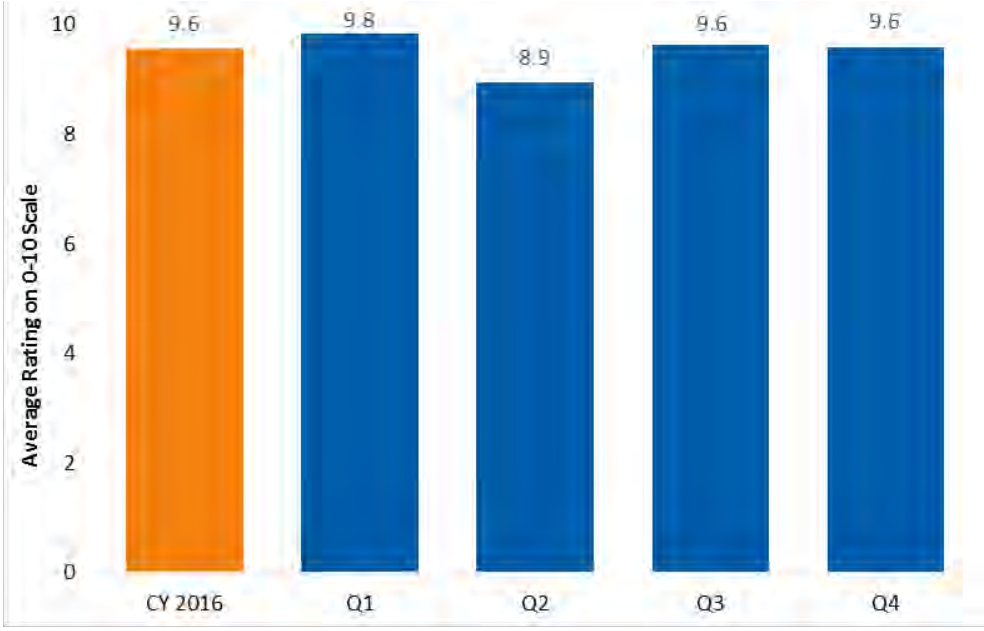
Figure 40. CY 2016 Intentions for Future Improvements-Renewable Rewards



Source: Renewable Rewards Program Participant Satisfaction Survey Question. "What improvements do you plan to complete over the next 12 months, if applicable?" (Total mentions n=84)

Figure 41 shows that respondents gave a rating of 9.6 for the likelihood they would recommend this Program to other businesses.[34] Using these survey data, the Evaluation Team calculated an NPS based on customers' likelihood to recommend the Program. The Renewable Rewards Program's NPS was +85 and was derived from 87% of participants identifying as promoters and 2% identifying as detractors.

Figure 41. CY 2016 Likelihood of Recommending the Program-Renewable Rewards



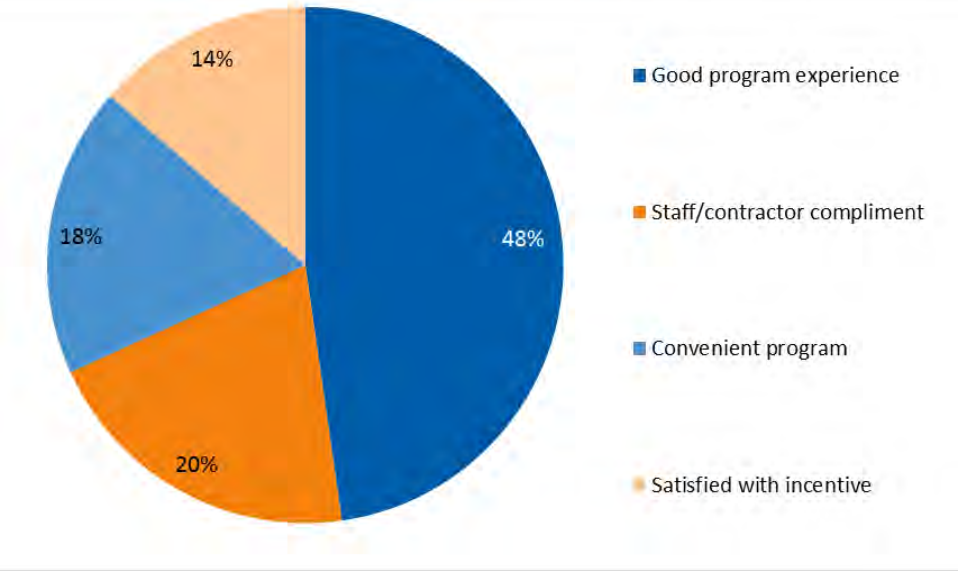
Source: Renewable Rewards Program Participant Satisfaction Survey Question. "How likely is it that you would recommend this program to other small businesses?" (CY 2016 n=150, Q1 n=6, Q2 n=16, Q3 n=49, Q4 n=77)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 153 participants who responded to the survey, 68 (44%) provided open-ended feedback, which the Evaluation Team coded into a total of 94 mentions. Of these, 44 were positive or complimentary comments (47%), and 50 were suggestions for improvement (53%).

The positive responses are shown in Figure 42, with 48% reflecting a generally positive experience. More specific comments were split between those reflecting praise for Trade Allies (20%), the convenience of the Program (18%), and satisfaction with the incentive (14%).

[34] Customers who responded that they "already have" recommended the Program were counted in mean ratings as a rating of 10 (most likely).

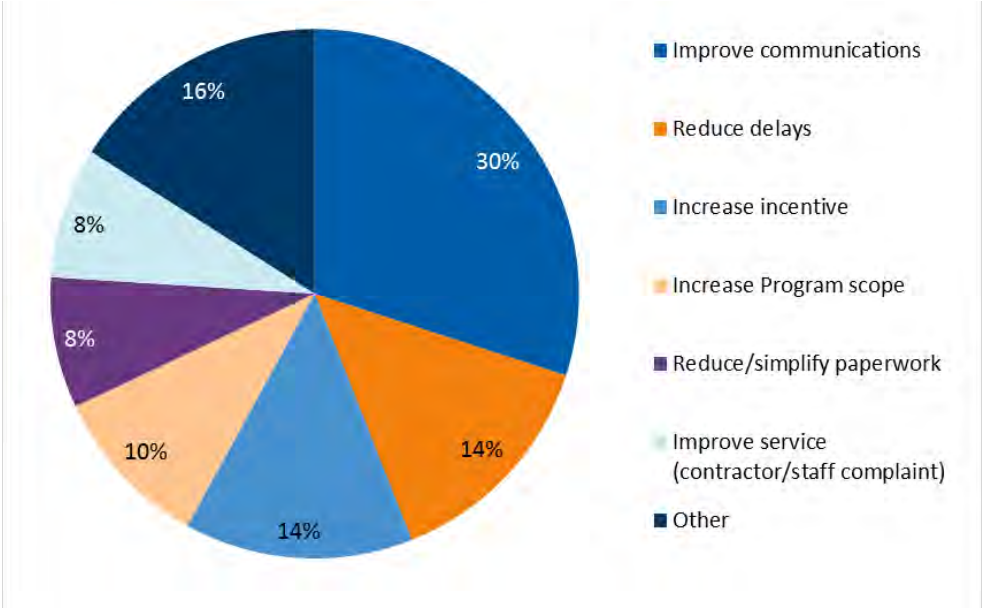
Figure 42. CY 2016 Positive Comments about the Program-Renewable Rewards



Source: Renewable Rewards Program Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total positive mentions n=44)

Suggestions for improving the Program are shown in Figure 43. The most common suggestions involved improving communications about the Program (30%), followed by reducing delays (14%), increasing incentive amounts (14%), and expanding the scope of the program (10%).

Figure 43. CY 2016 Suggestions for Improving the Program-Renewable Rewards



Source: Renewable Rewards Program Customer Satisfaction Survey Question. "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions n=50)

Over half of the suggestions for improving communications stemmed from the Renewable Energy Loan Fund. Other communications-related suggestions related to resolving issues with applications and greater promotion for the Program. Suggestions for increasing the scope of the Program most frequently reflected a general desire to expand the use of renewable energy, though they did not reference specific equipment. Other more-specific suggestions related to expanding the Trade Ally network and including multifamily housing in the Program. The suggestions categorized as "other" included several references to a perception that utilities and governments are not doing enough to support renewable energy, and one participant mentioned the shortfall in Focus on Energy funding for the Program.

Renewable Rewards Customer Experience

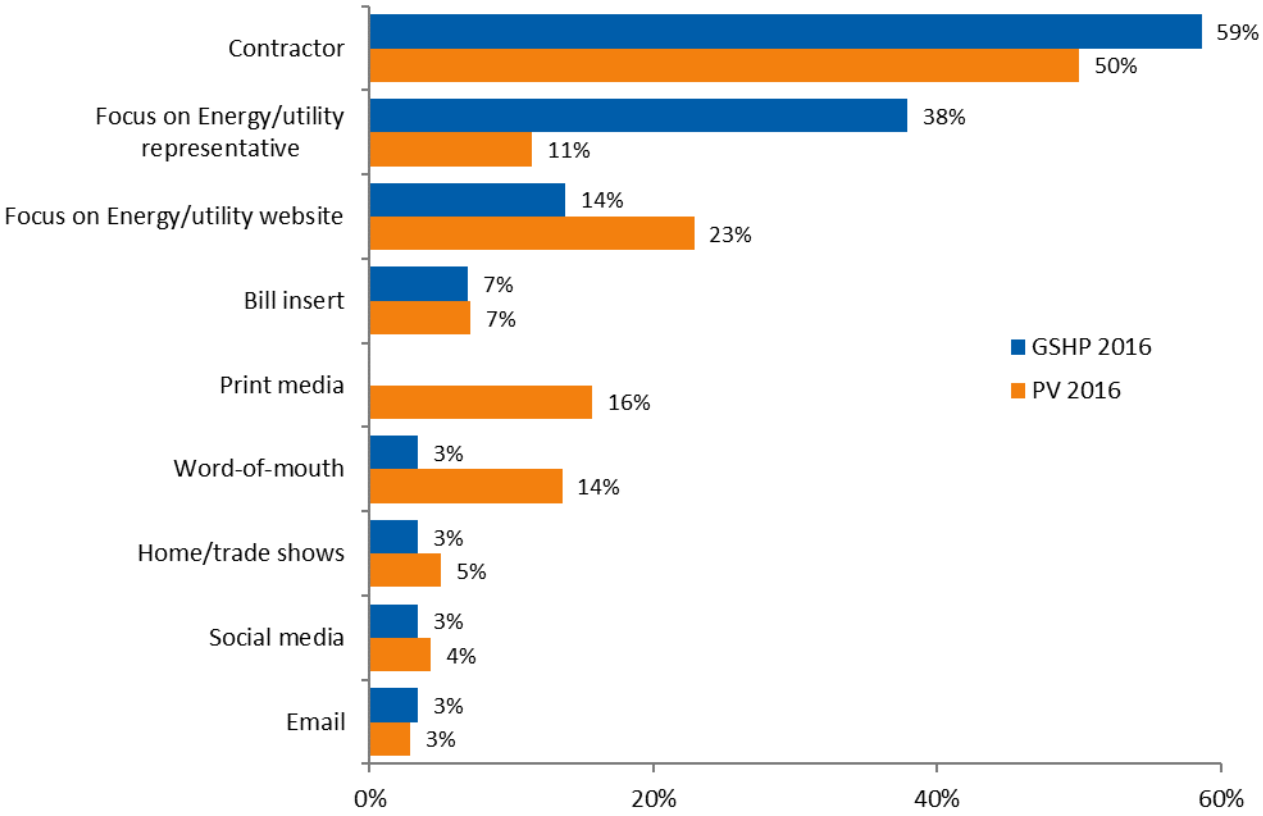
The Evaluation Team fielded surveys and received responses from 29 GSHP participants and 142 PV participants to assess Program awareness, reasons for participation, project financing, system maintenance, and demographics.[35] The Evaluation Team compared results from the 2015 and 2016 PV surveys where appropriate. The 2016 GSHP participant survey was not compared with any other data.

Renewable Rewards Program Awareness

In CY 2016, GSHP participants reported having most recently heard about the Renewable Rewards Program through their contractor (59%, 17 of 29), a Focus on Energy or utility representative (38%), and the Focus on Energy or utility website (14%). For PV participants, the most frequently reported methods were through their contractor (50%, 71 of 142), the Focus on Energy or utility website (23%), and print media (16%). Figure 44 shows how participants most recently heard about the Program.

[35] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped questions, did not know answers to questions, or did not qualify to answer questions based on previous answers or other known data about the participant.

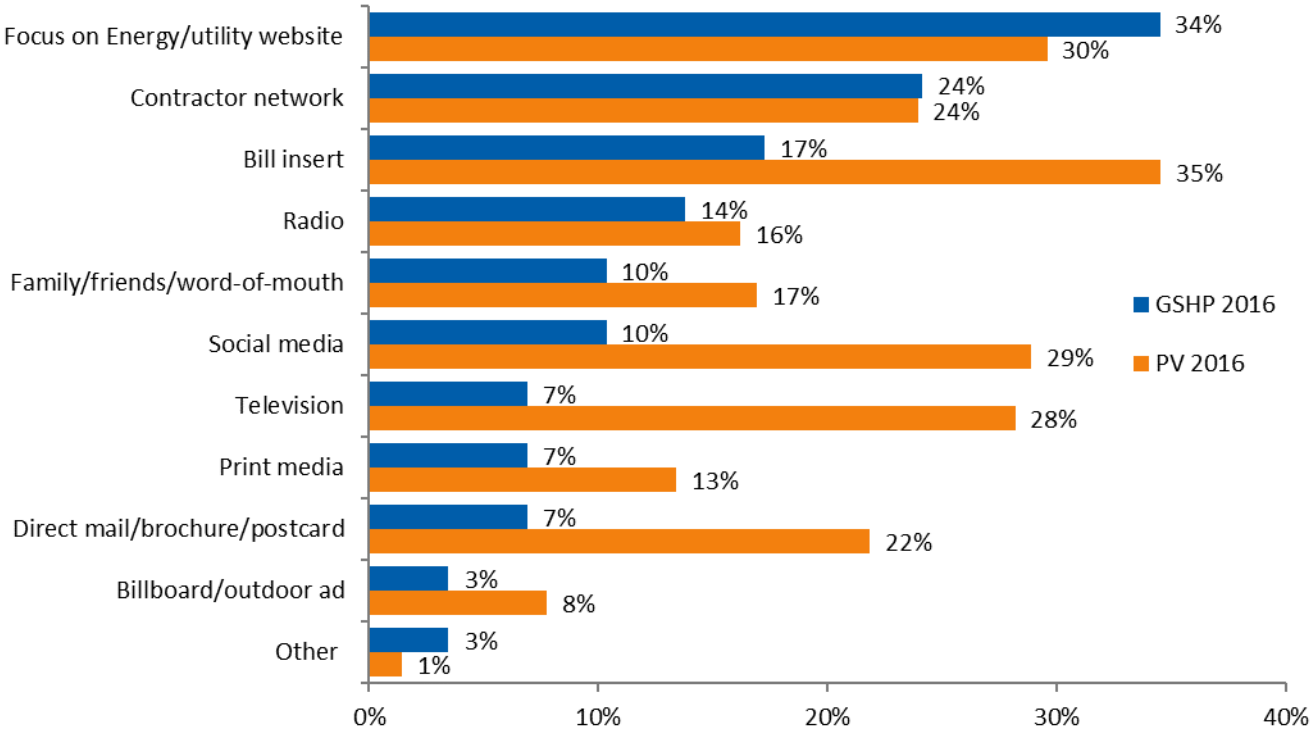
Figure 44. 2016 Customer Sources for Renewable Rewards Program Awareness



Source: CY 2016 Renewable Rewards Participant Survey Question A2. "Where did you most recently hear about Focus on Energy's Renewable Energy Program?" (nGSHP = 29, nPV= 142) Multiple responses allowed.

Participants also reported their preferred methods of receiving information about energy efficiency programs from Focus on Energy. Top responses from both participant groups were the Focus on Energy or utility website (34%, 10 of 29 GSHP participants and 30%, 43 of 142 PV participants), a contractor (24% GSHP and 24% PV), and bill inserts (17% GSHP and 35% PV). Figure 45 shows the responses for participants' preferred method of receiving Program information from Focus on Energy.

Figure 45. Preferred Method of Receiving Program Information from Focus on Energy



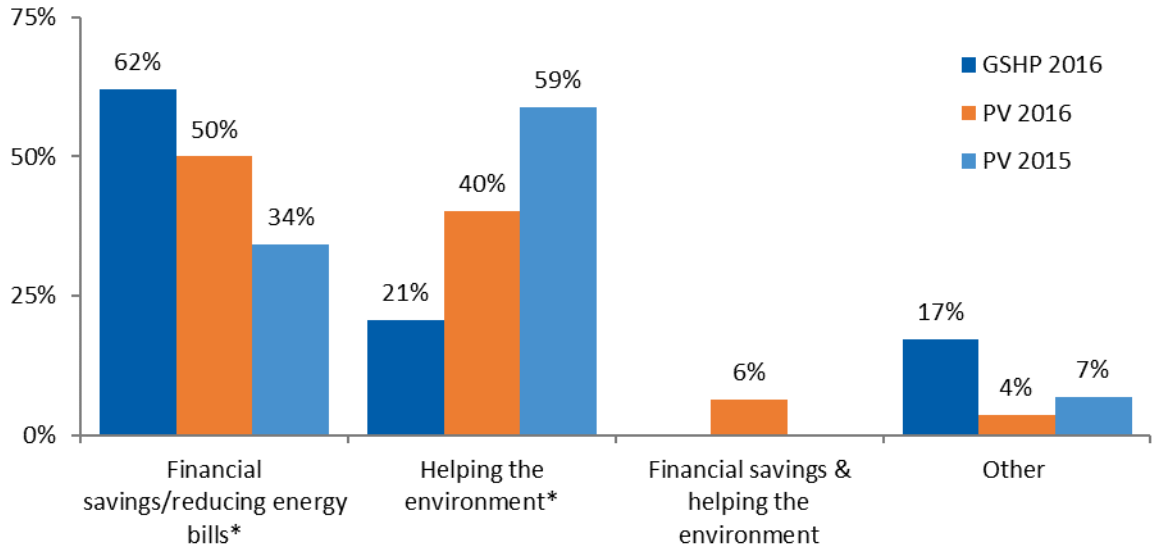
Source: CY 2016 Renewable Rewards Participant Survey Question A4. "What do you think is the best way for Focus on Energy to inform the public about energy efficiency programs?" (nGSHP = 29, nPV= 142) Multiple responses allowed.

Renewable Rewards Program Reasons for Participation

The Evaluation Team inquired about customers' motivation for participating in the Renewable Rewards Program. As shown in Figure 46, half of CY 2016 PV participants did so for financial savings or to reduce energy bills, while 40% installed a PV system to help the environment. Those percentages have significantly shifted from CY 2015, when 34% of PV participants indicated financial savings as a primary motivator and 59% indicated helping the environment. Other responses included the motivation to seek energy independence, make an investment, or improve the resale value of the home.

Sixty-two percent of CY 2016 participants who received a GSHP were motivated for financial reasons, while 21% reported doing so to help the environment. Other motivations to install GSHPs included the need to upgrade or replace an existing system.

Figure 46. Renewable Rewards Program Customer Reasons for Participation

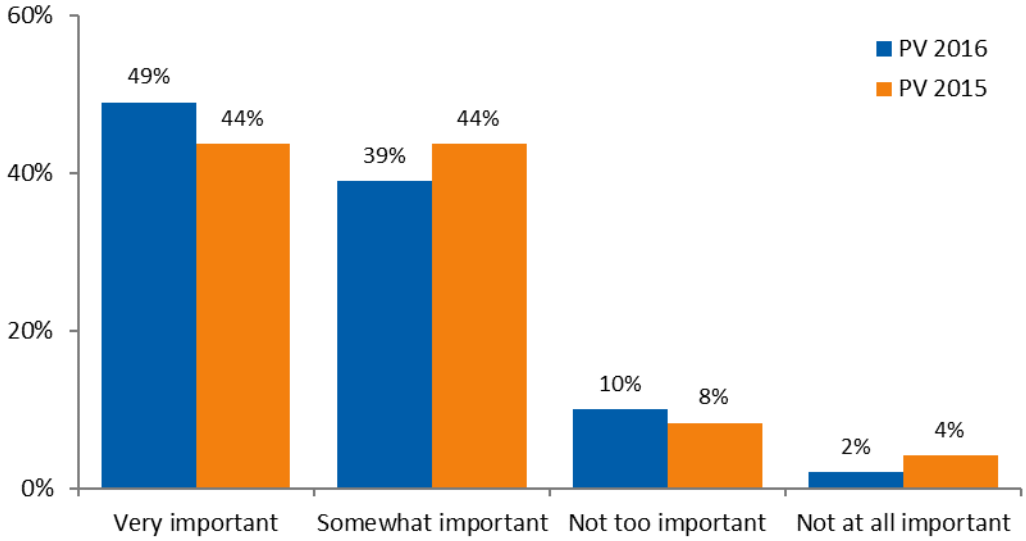


Sources: CY 2016 Renewable Reward Participant Survey Question A1. "What was your primary motivation for installing a ground-source heat pump?" (n=29). CY 2016 Renewable Rewards Participant Survey Question A1. "What was your primary motivation for installing a solar PV system?" (n=142). CY 2015 Renewable Rewards Participant Survey Question B1. "What was your primary motivation for installing a solar PV system?" (n=73). *Significance difference of <0.05 with 95% confidence between CY 2015 and CY 2016 solar PV participants.

Renewable Rewards Program Financing

The Renewable Rewards Program incentive was an important factor influencing many customers' decision to install PV system. As shown in Figure 47, almost half (49%, 49 of 100) of CY 2016 PV respondents cited the cash-back reward as *very important* and 39% cited it as *somewhat important* in their decision-making process. These results are similar to CY 2015.

Figure 47. Importance of Renewable Rewards Incentive in Customer Decision to Install Solar Electric



Source: CY 2016 Renewable Rewards Participant Survey Question B9. "Please tell me how important the Focus on Energy Cash-back Reward was in your decision to install your PV system. Would you say it was …?" (n=100) CY 2015 Renewable Rewards Participant Survey Question F9. "Please tell me how important the Focus on Energy Cash-back Reward was in your decision to install your PV system. Would you say it was …?" (n=48)

After initial installation of a solar PV system, nine customers reported installing an additional renewable energy system. Of those nine, seven installed additional solar, one installed a GSHP, and another installed a small wind system. As shown in Table 60, in both CY 2015 and CY 2016 respondents most frequently reported that they were likely to install additional solar PV capacity compared to other renewable energy installations. The reported likelihood of installing additional solar PV increased by 30% from CY 2015 (25%) to CY 2016 (55%). Responses for other plans to install renewable energy changed minimally from CY 2015 to CY 2016.

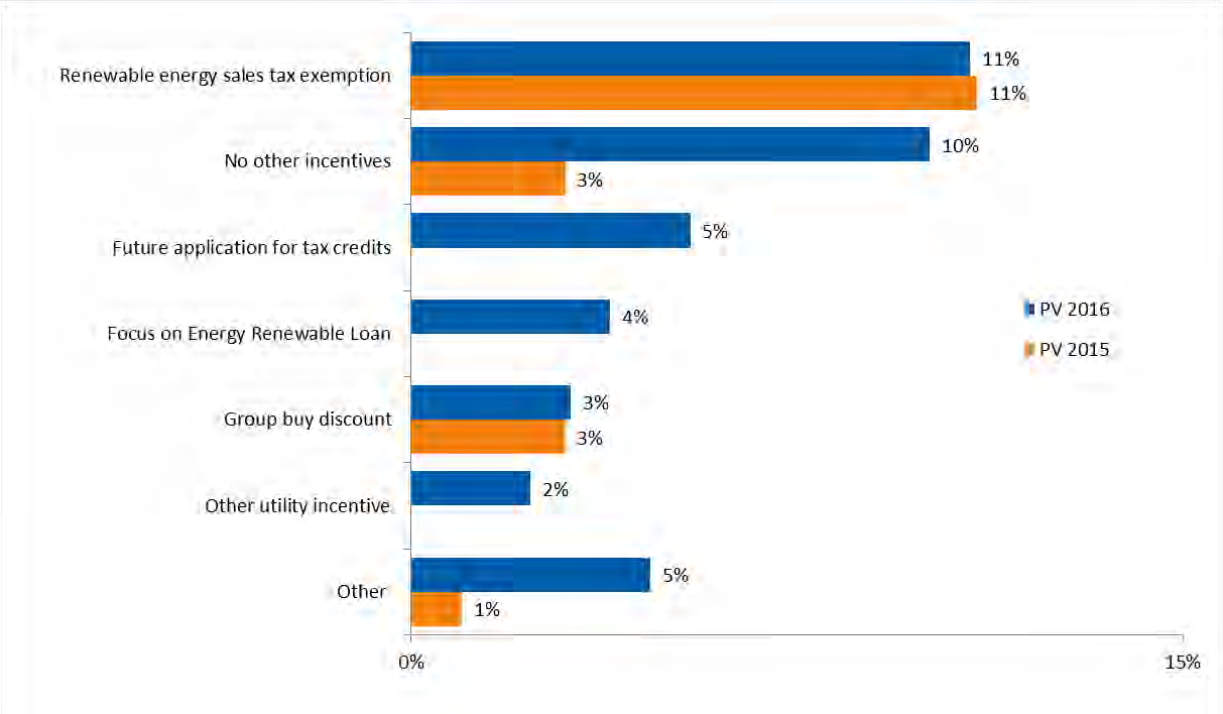
Table 60. Participant Renewable Energy Installation Plans in the Next Five Years[1]

Renewable Technology	CY 2016				CY 2015			
	Very likely	Some-what likely	Not too likely	Very unlikely	Very likely	Some-what likely	Not too likely	Very unlikely
Additional solar PV	20%	35%	23%	22%	11%	14%	12%	64%
Small wind	1%	12%	25%	62%	6%	12%	6%	76%
Solar hot water	3%	19%	20%	58%	2%	15%	15%	68%
Small hydroelectric	0%	2%	15%	83%	0%	0%	6%	94%
Other (please specify)	9%	7%	16%	67%	43%	43%	0%	14%

[1] Source: CY 2015 Renewable Rewards Participant Survey Question G11. "Do you intend to install any more renewable energy technology at your home? How likely are you to install each of the following technologies within the next five years?" (n=66) CY 2016 Renewable Rewards Participant Survey Question C7. "Do you intend to install any more renewable energy technology at your home? How likely are you to install each of the following technologies within the next five years?" (n=89)

The Evaluation Team also asked a series of questions to understand how customers financed their PV systems. First, the Evaluation Team aimed to identify additional incentives pursued by participants (beyond the Renewable Rewards Program cash-back incentive). All of the participants received their respective investment tax credit, with nonresidential participants receiving the federal investment tax credit and the residential participants receiving the Residential Renewable Energy Tax Credit. Aside from the investment tax credits, a few participants (11%) reported receiving renewable energy sales tax exemptions, as shown in Figure 48. The figure also shows that 10% of CY 2016 participants received no other tax incentives compared to 3% in CY 2015.

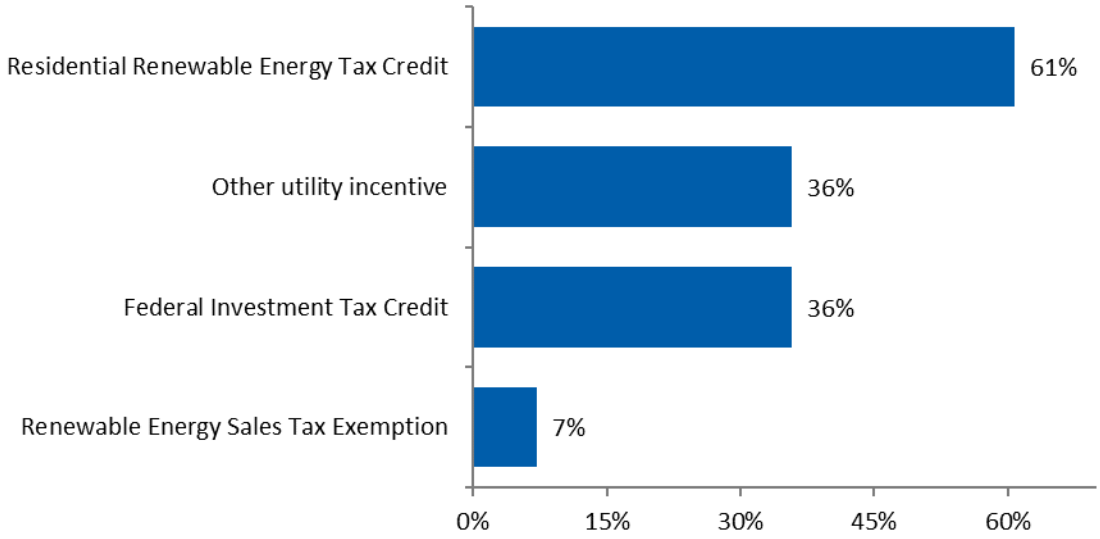
Figure 48. Additional Financial Incentives Received by PV Renewable Rewards Recipients



Source: CY 2015 Renewable Rewards Participant Survey Question D1. "There are a variety of incentives available for solar PV system owners. Other than the Renewable Rewards program that you already indicated you received, which of the following other incentives did you also receive?" (n=71). CY 2016 Renewable Rewards Participant Survey Question D1. "There are a variety of incentives available for solar PV system owners. Other than the Renewable Rewards program that you already indicated you received, which of the following other incentives did you also receive?" (n=168). Multiple responses allowed.

As shown in Figure 49, almost two-third (61%, n=28) of CY 2016 GSHP participants reported receiving the Residential Renewable Energy Tax Credit, while 36% received a utility incentive and 36% received a federal investment tax credit. Seven percent of respondents reported receiving a renewable energy sales tax exemption for an installation.

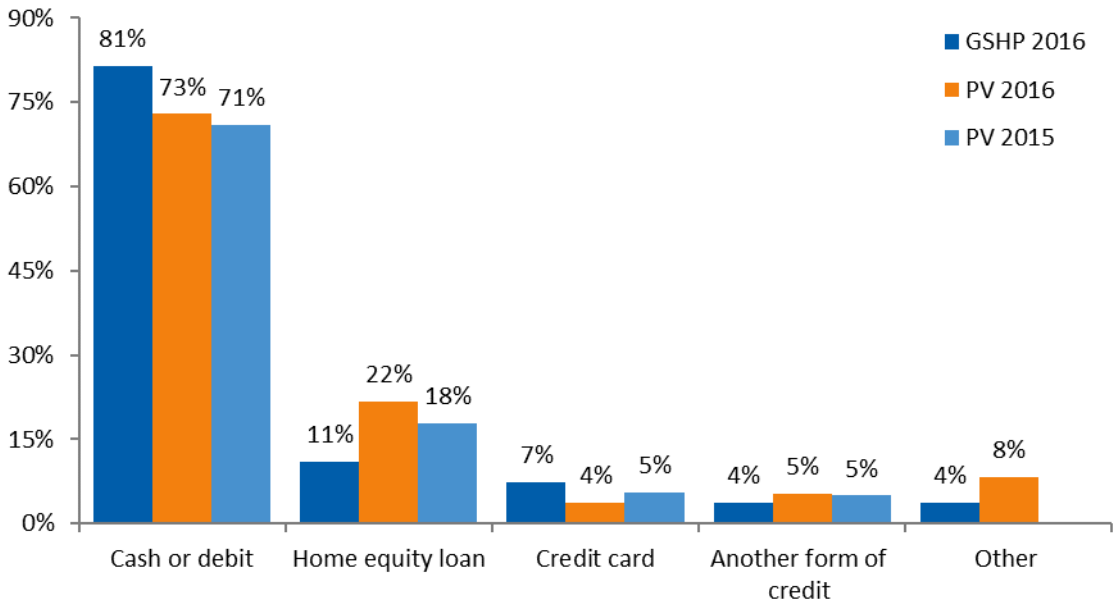
Figure 49. Additional Financial Incentives Received by GSHP Renewable Rewards Recipients



CY 2016 Renewable Rewards Participant Survey Question E1. "There are a variety of incentives available for ground-source heat pump owners. Other than the Focus on Energy Program incentive that you received, which of the following other incentives did you also receive? (Select all that apply)?" (n=39) Multiple responses allowed.

For system costs not covered by the Renewable Rewards Program cash-back reward or another incentive, survey respondents reported primarily using cash or debit to finance the remaining costs of their GSHPs or PV systems. In CY 2016, 81% of GSHP (22 of 27) respondents and 73% of PV respondents (97 of 133) reported using cash or debit to finance out-of-pocket expenses. Another 11% of GSHP participants and 22% of PV participants reported using a home equity loan. Figure 50 shows how CY 2016 respondents funded out-of-pocket expenses and also compares PV only to CY 2015.

Figure 50. How Renewable Rewards Recipients Funded Out-of-Pocket Expenses



Source: CY 2016 GSHP Renewable Rewards Participant Survey. Question E2. "Please explain how you paid for your portion of the ground-source heat pump costs. Did you pay for it with…?" (n=27) CY 2016 PV Renewable Rewards Participant Survey Question D2. "Please explain how you paid for your portion of the PV system costs. Did you pay for it with…?" (n=133). CY 2015 PV Renewable Rewards Participant Survey Question D2. "Please explain how you paid for your portion of the PV system costs. Did you pay for it with…?" (n=73) Multiple responses allowed.

Renewable Rewards Program Maintenance

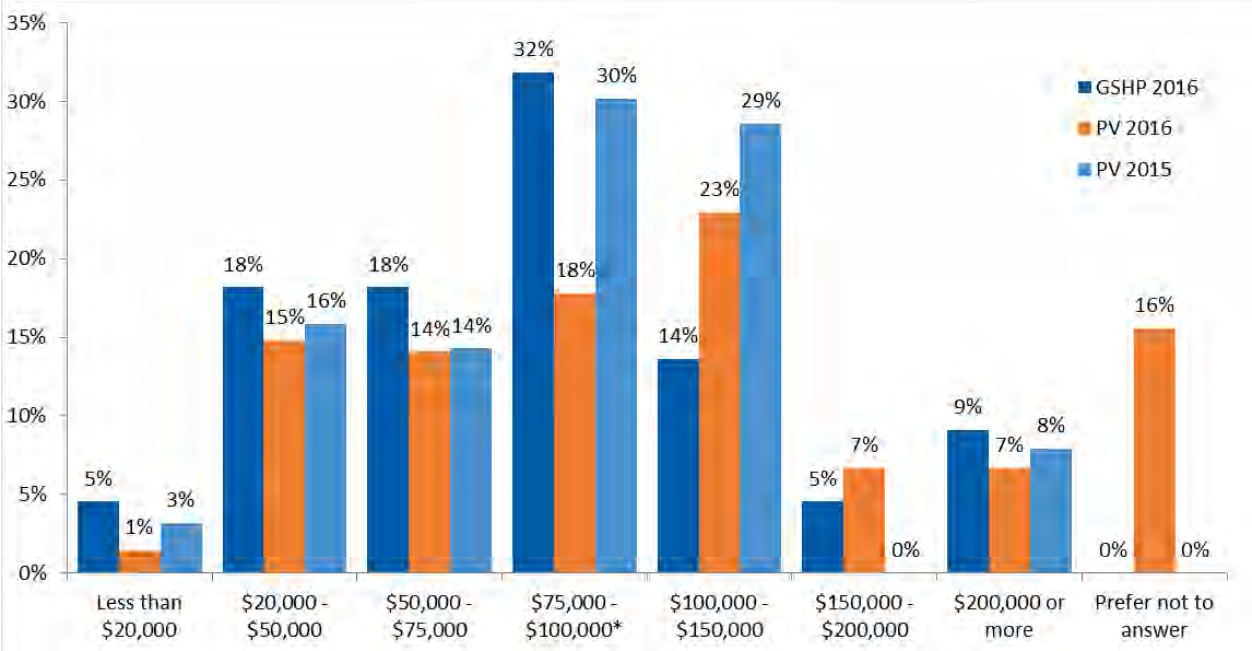
In CY 2016, 20 respondents (15%, 20 of 133) reported unscheduled maintenance or downtime on their PV system since it was installed. Of these, five reported issues with monitoring systems, four with their string inverter, and three with their microinverter. These results were similar to those reported in CY 2015, when seven respondents (10%, 7 of 73) reported unscheduled maintenance or downtime. Seventeen of these 20 participants specified the amount of time. Downtime ranged from a few hours to two months, with a mean downtime of 14 days and a median of seven days.

Renewable Rewards Program Participant Demographics

The Evaluation Team collected demographic data on participants' home type, income, age, and educational level. Survey results in CY 2016 were consistent with CY 2015. In CY 2016, all survey respondents reported owning their homes as reported in CY 2015. The vast majority (93% of PV participants and 100% of GSHP participants) reported living in single-family homes. Participants' education levels ranged from high school graduate to graduate degree, with approximately 65% of PV participants (compared to 52% PV respondents in CY 2015) and 59% of CY 2016 GSHP participants holding bachelor's degrees or higher. More than 50% of all participants reported their age as 55 or older, similar to results reported in CY 2015.

Total household income for each participant group is shown in Figure 51. The median reported household income for all recipients in CY 2016 was $75,000 to $100,000, compared to the Wisconsin median household income of $53,357.[36] Moreover, there was a significant difference found between CY 2016 and CY 2015 PV participants, with more CY 2015 participants making $75,000 to $100,000.

Figure 51. Total Household Income before Taxes



Source: CY 2016 Renewable Rewards Participant Survey Question G6. "Which category best describes your total household income in 2016 before taxes?" (n_{GSHP}= 27, n_{PV16}= 135, n_{PV15}= 73)

*Significance difference <0.05 for 95% confidence between PV 2015 and 2016.

Smart Thermostat Pilot Customer Experience

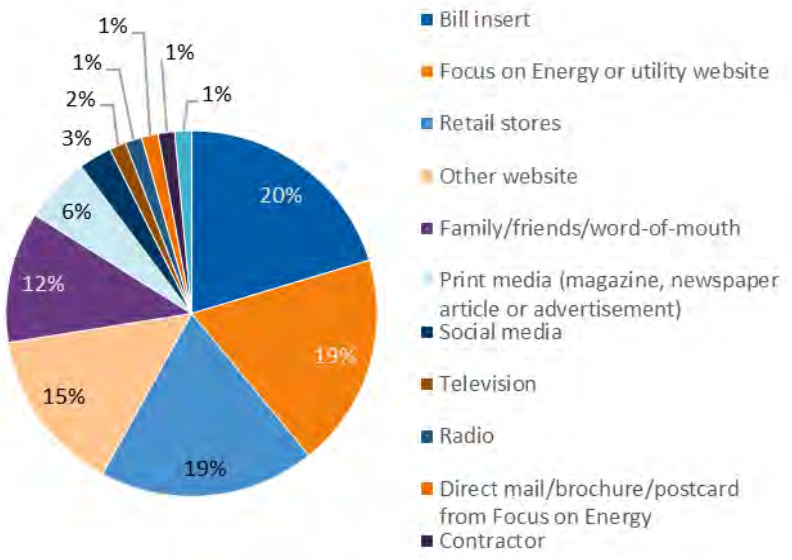
The Evaluation Team conducted telephone surveys with 70 Smart Thermostat Pilot participants to discuss Pilot awareness and customer experience. The following sections provide a summary of their responses.

Smart Thermostat Pilot Participant Awareness

Surveyed participants became aware of the Pilot through a variety of channels, as shown in Figure 52. About one-fifth of respondents said they learned about the Pilot through bill inserts, the Focus on Energy or utility website, or retail stores. Slightly fewer respondents heard about the Pilot through another website (15%, with four of seven respondents finding the Reward through a general internet search for smart thermostat information) or through word-of-mouth (12%). Respondents rarely cited print media, social media, television, radio, direct mail, or contractors.

[36] U.S. Census Bureau. "QuickFacts Wisconsin." Accessed March 2017: https://www.census.gov/quickfacts/table/INC110215/55

Figure 52. Customer Sources for Smart Thermostat Pilot Awareness



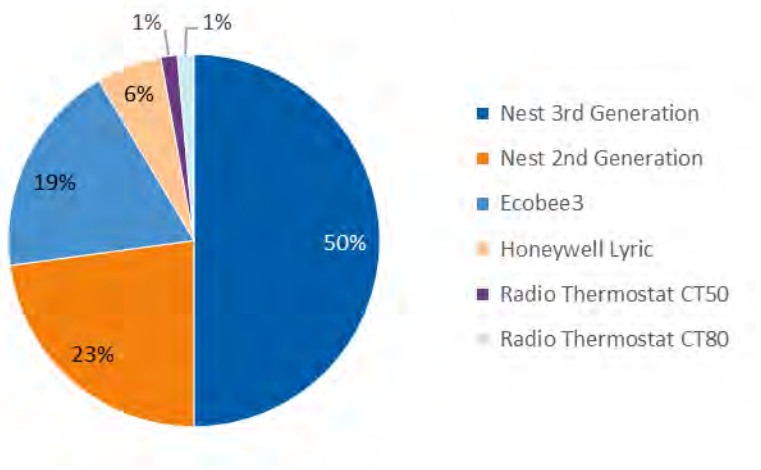
Source: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016. Question B1: "Where did you hear about Focus on Energy's Reward for smart thermostats?" (n=69).

Smart Thermostat Pilot Participant Satisfaction

A key objective of the survey was to gauge customer satisfaction with the Pilot, the equipment, and the ease of thermostat installation and use. Overall, participant satisfaction with the Pilot was very high—nearly all participants reported that they were *very satisfied* with the application process (94%). Six percent of respondents were *somewhat satisfied*, while no respondents reported they were *not too satisfied* or *not at all satisfied*.

All 70 respondents reported that their thermostats were installed at the time of the survey. Figure 53 shows the types of thermostats that participants purchased. Nest thermostats were the most common type of thermostat installed, with half of participants installing the Nest 3rd Generation thermostats and an additional 23% installing the Nest 2nd Generation thermostats.

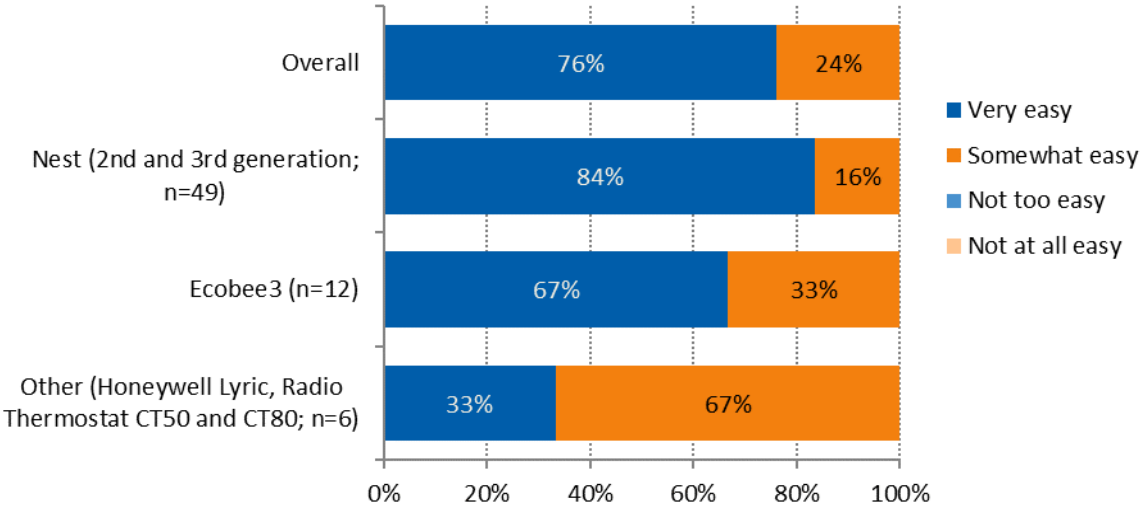
Figure 53. Smart Thermostat Pilot Type of Thermostat Purchased



Source: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016. Question C1: "What kind of thermostat did you purchase? Was it a/an…?" (n=70).

Nearly all of the respondents had installed the thermostat themselves (96%), and only 4% used a Trade Ally. Figure 54 shows the relative ease of the installation process according to those who installed the thermostats themselves. Overall, 76% reported that the installation was *very easy*, 24% said that it was *somewhat easy*, and no respondents said that it was *not too easy* or *not at all easy*. Although the sample was not designed to detect differences between thermostat types, survey responses suggested that the Nest thermostats were somewhat easier to install than other types of thermostats that participants had purchased. No respondents who had installed thermostats themselves said it was necessary to hire a contractor.

Figure 54. Smart Thermostat Pilot Ease of Thermostat Installation

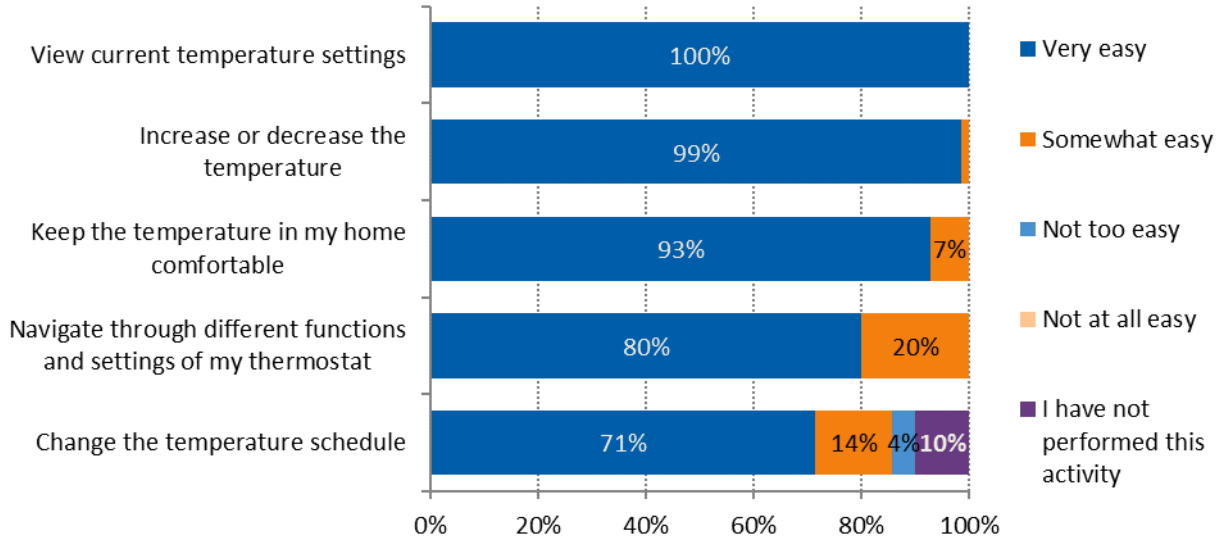


Sources: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016. Question C8: "Thinking about just the installation of your [MEASURE NAME] thermostat and not about how the thermostat works, how easy was the smart thermostat to install? Would you say it was…?" (n=67; asked of respondents who indicated that they or someone in their household had installed the thermostat) and Question C1: "What kind of thermostat did you purchase? Was it a/an…?" (n=70).

Overall, respondents had a high level of satisfaction with their new thermostats. Nearly all of the respondents were *very satisfied* with the thermostat (91%) and the remainder were *somewhat satisfied* (9%); no respondents said that they were *not too satisfied* or *not at all satisfied*. Comparing thermostat satisfaction by thermostat type did not suggest any differences.

Figure 55 details the level of ease of performing different thermostat functions and participants reported that their thermostats were easy to use for the range of normal tasks. All or nearly all respondents said that their thermostats were very easy to use for viewing current temperature settings and for increasing or decreasing the temperature. Similarly, 93% said that it was very easy to keep the temperature in their homes comfortable. Most (80%) said that it was very easy to navigate through different functions and settings, and slightly fewer (71%) said that it was very easy to change the temperature schedule. Responses were similar across thermostat types.

Figure 55. Smart Thermostat Pilot Ease of Thermostat Use



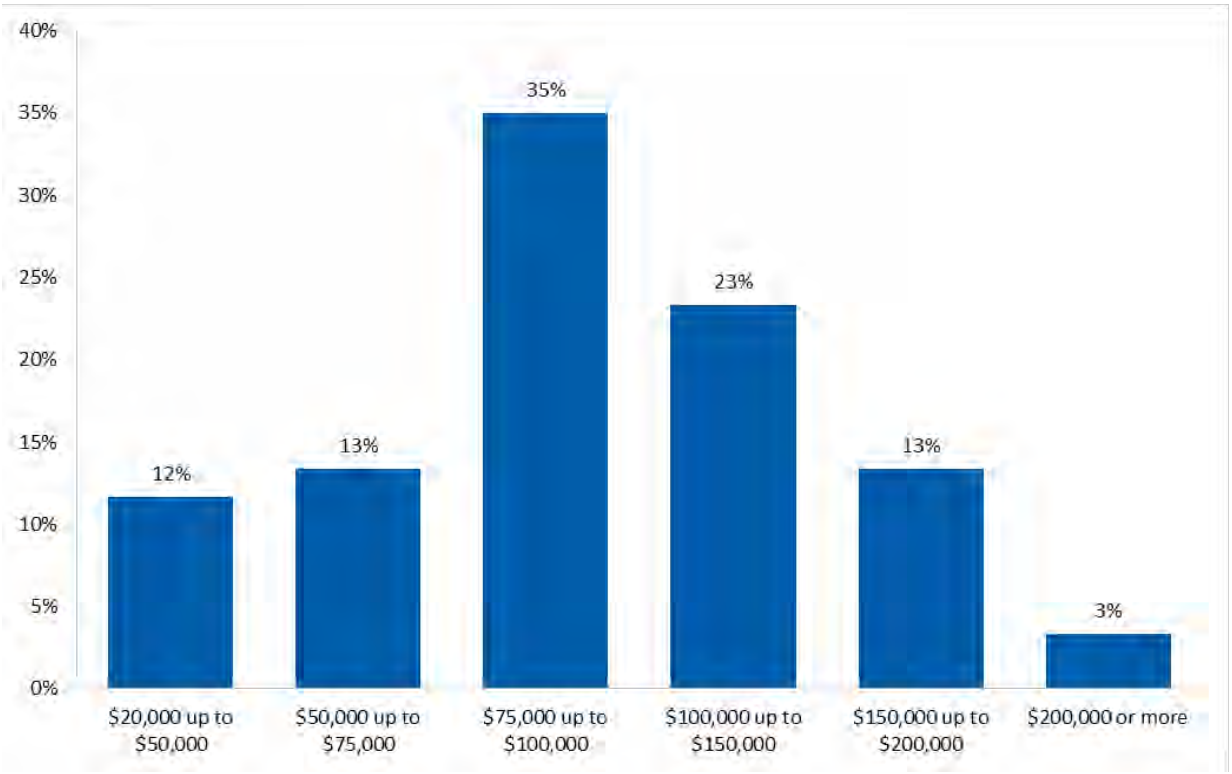
Source: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016.
Question D11: "I am going to read you a list of activities you may have performed with your new thermostat. For each, please rate how easy or difficult it has been to use your thermostat for that activity. If you have not performed the activity, please give that as your answer." (n=70).

Smart Thermostat Pilot Participant Demographics

The Evaluation Team collected demographic information from each respondent of the Smart Thermostat Pilot participant survey. All survey respondents reported owning their homes, and the majority of participants lived in single-family homes (single-unit, detached homes, 92%), while 7% lived in a multifamily dwelling and 1% lived in an attached house (townhouse, row house, or duplex).

As shown in Figure 56, a majority of respondents (58%) reported that their total annual household income was between $75,000 and $150,000 before taxes, about one-quarter said their household income was lower than $75,000, and 17% said that their income was higher than $150,000. No respondents reported an annual household income of less than $20,000.

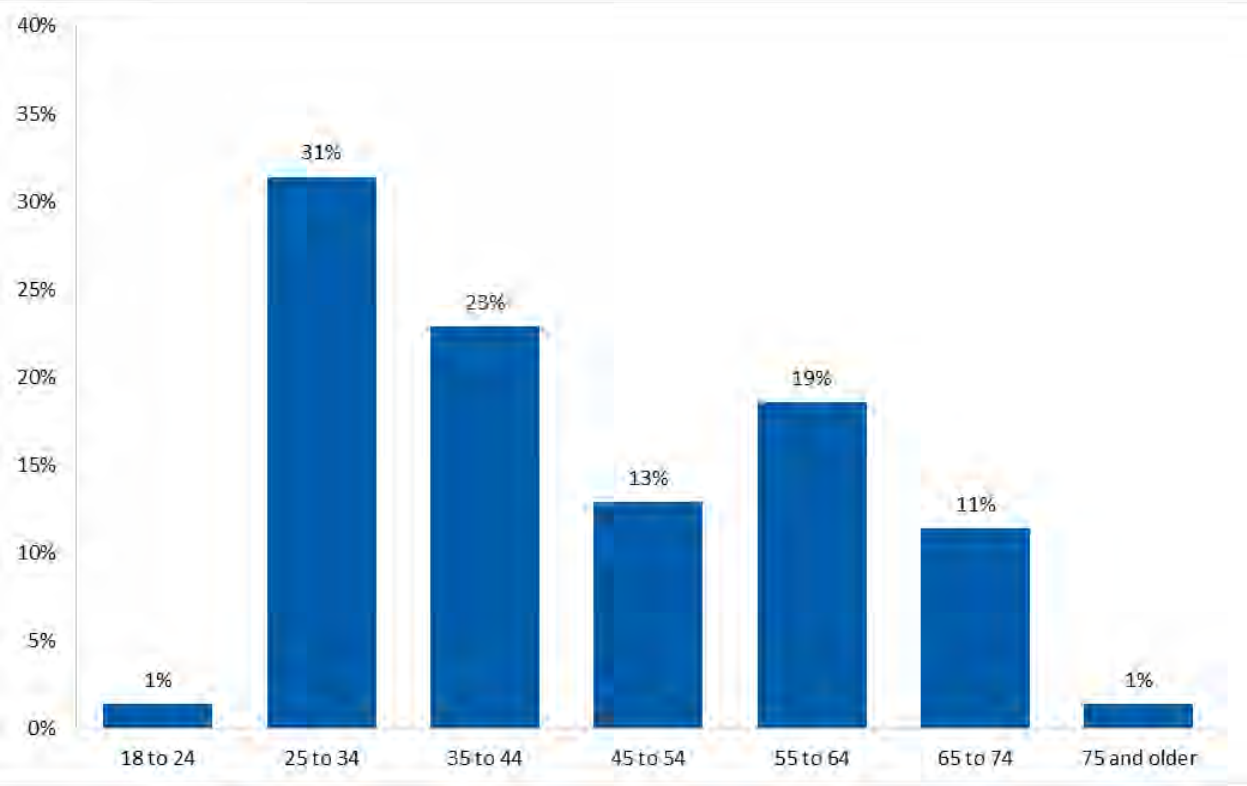
Figure 56. Smart Thermostat Pilot Participant Total Household Income



Source: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016. Question H18: "Which category best describes your total household income in 2014 before taxes?" (n=60).

More than half of participants (54%) were between the ages of 25 and 44, 33% were between the ages of 45 and 64, and 13% were 65 or older. Figure 57 presents further details on the ages of respondents.

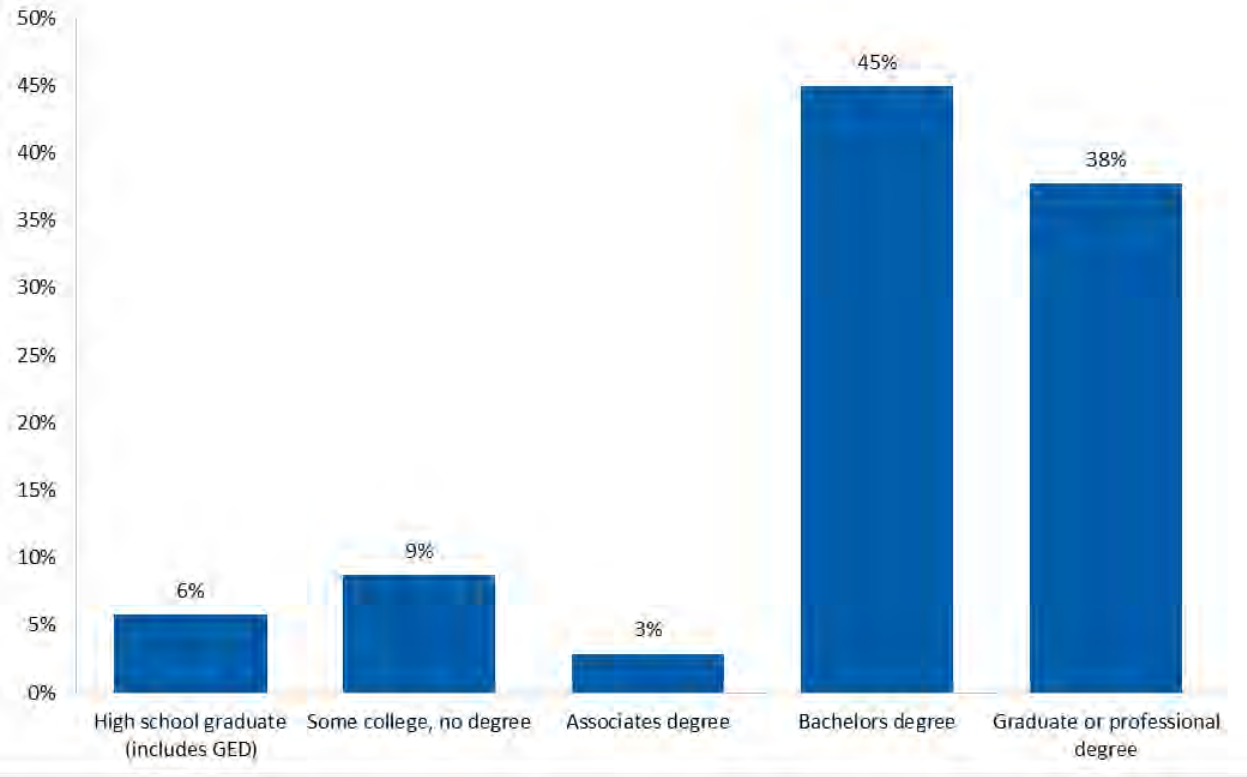
Figure 57. Smart Thermostat Pilot Participant Age Categories



Source: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016. Question H17: "Which of the following categories best represents your age?" (n=70).

Figure 58 shows the education levels of participants, which ranged from high school graduate to graduate degree, but most respondents had a bachelor's degree or higher, with 45% of the respondents holding a bachelor's degrees and 37% holding graduate or professional degrees.

Figure 58. Smart Thermostat Pilot Participant Highest Level of School Completed



Source: Wisconsin Focus on Energy Smart Thermostat Pilot Participant Telephone Survey 2016. Question H16: "What is the highest level of school that someone in your home has completed?" (n=69).

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the total resource test (TRC) test. Appendix F includes a description of the TRC test.

Table 61 lists the CY 2015 and CY 2016 incentive costs for the Home Performance with ENERGY STAR Program whole home and HVAC paths.

Table 61. Whole Home and HVAC Path Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$5,409,905	$1,667,813

The Evaluation Team found the CY 2016 whole home and HVAC paths were cost-effective (1.23). Table 62 lists the evaluated costs and benefits.

Table 62. Whole Home and HVAC Path Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$1,077,241	$272,801
Delivery Costs	$2,456,590	$622,109
Incremental Measure Costs	$33,289,125	$3,530,955
Total Non-Incentive Costs	**$36,822,956**	**$4,425,865**
Benefits		
Electric Benefits	$15,381,498	$841,975
Gas Benefits	$25,501,072	$4,292,688
Emissions Benefits	$4,505,567	$585,474
Total TRC Benefits	**$45,388,136**	**$5,720,137**
Net TRC Benefits	**$8,565,180**	**$1,294,272**
TRC B/C Ratio	**1.23**	**1.29**

Table 63 lists the CY 2015 and CY 2016 incentive costs for the Renewable Rewards Program.

Table 63. Renewable Rewards Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$1,084,624	$4,095,199

The Evaluation Team found the CY 2016 Renewable Rewards Program was not cost-effective (0.89). Table 64 lists the evaluated costs and benefits.

Table 64. Renewable Rewards Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015[37]
Costs		
Administration Costs	$180,122	$976,181
Delivery Costs	$410,759	$2,226,129
Incremental Measure Costs	$7,612,624	$17,128,198
Total Non-Incentive Costs	**$8,203,505**	**$20,330,509**
Benefits		
Electric Benefits	$6,511,948	$16,012,637
Gas Benefits	$0	$8,983,211
Emissions Benefits	$807,021	$3,025,234
Total TRC Benefits	**$7,318,969**	**$28,021,081**
Net TRC Benefits	**($884,536)**	**$7,690,573**
TRC B/C Ratio	**0.89**	**1.38**

Table 65 lists the CY 2015 and CY 2016 incentive costs for the overall Home Performance with ENERGY STAR Program (comprising of the whole home, HVAC, and Renewable Rewards components).

Table 65. Home Performance with ENERGY STAR Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$7,065,849	$7,851,395

The Evaluation Team found the CY 2016 Home Performance with ENERGY STAR Program was cost-effective (1.24). Table 66 lists the evaluated costs and benefits.

[37] CY 2015 Results are for the Residential Rewards program and are not directly comparable to Renewable Rewards.

Table 66. Home Performance with ENERGY STAR Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$1,285,139	$1,530,893
Delivery Costs	$3,237,582	$3,491,119
Incremental Measure Costs	$41,880,409	$25,013,024
Total Non-Incentive Costs	**$46,403,130**	**$30,035,036**
Benefits		
Electric Benefits	$25,781,760	$18,084,569
Gas Benefits	$26,355,678	$20,412,547
Emissions Benefits	$5,606,995	$4,488,641
Total TRC Benefits	**$57,744,434**	**$42,985,756**
Net TRC Benefits	**$11,341,304**	**$12,950,720**
TRC B/C Ratio	**1.24**	**1.43**

Table 67 lists the CY 2015 and CY 2016 incentive costs for the Smart Thermostat Pilot.

Table 67. Smart Thermostat Pilot Incentive Costs

	CY 2015 and CY 2016
Incentive Costs	$571,320

The Evaluation Team found the CY 2016 Smart Thermostat Pilot was cost-effective (3.66). Table 68 lists the evaluated costs and benefits.

Table 68. Smart Thermostat Pilot Costs and Benefits

Cost and Benefit Category	CY 2015 and CY 2016
Costs	
Administration Costs	$27,776
Delivery Costs	$370,234
Incremental Measure Costs	$978,660
Total Non-Incentive Costs	**$1,376,670**
Benefits	
Electric Benefits	$3,888,314
Gas Benefits	$854,607
Emissions Benefits	$294,408
Total TRC Benefits	**$5,037,328**
Net TRC Benefits	**$3,660,659**
TRC B/C Ratio	**3.66**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Home Performance with ENERGY STAR Program.

Outcome 1. Unseasonably warm weather, Program changes, reduced incentive levels, and increased complexity in Program design may have contributed to the reduced participation for both the whole home and HVAC paths in CY 2016.

Despite improved participant satisfaction scores, participation in both the HVAC and whole home paths was lower in CY 2016 than in the previous year. Program changes may have contributed to reduced participation, although other factors, such as a warmer than usual fall, may have played a part as well. On the HVAC path, reduced incentives may have been less effective at convincing homeowners to participate. For the whole home path, several changes impacted the Trade Ally and participant experience in ways that may have led Trade Allies to promote the Program less or customers to be less receptive to the Program. These changes included the new incentive structure based on project savings, the elimination of direct-install measures, and the addition of a $50 co-pay for income-qualified track assessments. Although average savings per home increased, the difference was not enough to compensate for the reduced level of participation.

Recommendation 1a: The Program Implementer should keep the Program design as stable as possible for CY 2017, especially for the whole home path, to allow Trade Allies to adjust to the new structure. The drop in participation following an in-depth change to the Program design is not unexpected, and, as noted above, other factors may also have played a role. However, over time, Trade Allies should be able to adjust to the changes, and participation levels should increase. Assuming no further major changes to the Program design, or extreme external conditions (such as warm weather or a down economy), participation should increase in CY 2017.

Recommendation 1b: The Program Implementer should focus its efforts in CY 2017 on helping whole home Trade Allies adjust to the new incentive structure. First, the Program Implementer should emphasize to all Trade Allies that the Program will not decrease incentives after the initial assessment. Program outreach coordinators should talk with Trade Allies one-on-one to understand which Trade Allies may not fully understand how the incentive structure operates, and offer assistance as needed.

Recommendation 1c: Although the Program design itself should not change in CY 2017, the Program Implementer could consider ways to repackage the design to make it more palatable for participants. The Program Implementer could consider creating a flyer and/or web page that Trade Allies can reference to explain to customers how savings-based incentives are related to achieving deeper savings. Language should be designed to build customers' trust in the Trade Ally and the Program. For example: "The tiered incentives help ensure that customers understand the savings they can expect from their project—and that they benefit from greater incentives as they invest in the improvements that save more." Use the flyer and website to showcase one or two projects at each of the three levels so that Trade Allies can support their proposals that customers purchase more than just attic insulation.

Outcome 2. The tiered incentive structure led to higher natural gas savings per project.

The tiered incentives appeared to be effective at driving Trade Allies and participants to pursue deeper energy savings, based on in the average savings per project. Although electric savings decreased slightly, there was a significant increase in natural gas savings for projects completed under the new incentive structure, and an overall increase in MMBtu savings per project. The increased natural gas savings was not enough to compensate for reduced participation. Nevertheless, if participation increases as the market adjusts to the new Program design, the tiered incentive structure may drive deeper natural gas savings for the Program in the future.

Recommendation 2: The Program Implementer should review CY 2016 project data to better understand any differences in the characteristics of participant homes or measure combinations that are driving increased savings compared to projects completed under the previous incentive structure. The Program Implementer should share these results with Trade Allies to help them get a better sense of which measure combinations can achieve higher incentive levels.

Outcome 3. Replacing emHome with Snugg Pro reduced the data entry burden on Trade Allies and streamlined the incentive process.

All Trade Allies who used the Snugg Pro software said it was an improvement over the previous emHome software because it produced similar results with less data entry required.

Recommendation 3: The Program Implementer should continue to use Snugg Pro as the Program software platform for energy assessments.

Outcome 4. Merging the administration of the whole home, HVAC, and renewables paths has so far resulted in limited overlap in Program participation and few completed projects that incorporated measures from two paths. This short-term result is not unexpected because CY 2016 was the first year of the new Program design.

The Program Implementer took several steps to drive more projects that install both HVAC and whole home measures; these steps included the $250 bonus incentive; the reach-back campaign; cross-linking the whole home, HVAC, and renewables pages on the website; and providing HVAC Trade Allies with BPI certification. In this first year, 25 projects—0.2% of the total number of whole home projects—received the bonus incentive, and few Trade Allies expressed interest in promoting measures to customers outside of their own selection of services. The Evaluation Team acknowledges this is an early point in a major market transformation effort.

Recommendation 4a: The Program Implementer should consider more integrated marketing (described in more detail in Recommendation 6) and continue cross-trade training such a BPI training for HVAC Trade Allies. In addition, the Program Implementer should focus on facilitating connections between HVAC Trade Allies and whole home contractors. One low-cost approach may be to recruit consultation or other assistance from an organization that specializes in this kind of market overlap, such as Efficiency First or the Home Performance Guild of Oregon. The Program Administrator should consider setting a

quantitative target for the number of Trade Allies completing projects that include both whole home and HVAC measures in a single home.

Recommendation 4b: In future years, the Program Implementer may want to consider design changes to more effectively promote these kinds of projects. In the experience of the Evaluation Team, driving combined HVAC and whole home projects is a particularly difficult endeavor for two reasons. One, Trade Allies typically do not offer both types of services and are unwilling to share their customers' limited budget with another company. Two, incorporating the two types of measures can often double the participant's expenditures, adding significant financial strain.

To address these issues, the Program Implementer should consider mitigating the financial disincentive for Trade Allies by offering an incentive directly to the Trade Ally. In most companies, this type of incentive goes directly to the sales representative who is responsible for convincing the customer to move forward. To minimize the Program expense, the contractor incentive should be offered as a limited-time bonus during peak seasons.

Outcome 5. The HVAC path continues to show low activity by income-qualified participants, relative to the standard track.

Despite higher incentives for income-qualified participants, the HVAC path has had low penetration in this market for the past two years, with only 5% of projects in the income-qualified market in CY 2016. As a point of comparison, in the whole home path, 31% of participants are income-qualified. Considering the higher total cost of most whole home projects compared to most HVAC projects, it is unlikely that income-qualified participants cannot afford higher-efficiency HVAC measures. Therefore, it was not clear from this evaluation why the design of the HVAC path has attracted fewer income-qualified participants than the whole home path.

Recommendation 5: The Program Administrator should assess whether the current income-qualified track participation level is consistent with its intent for the HVAC path, considering factors such as the population of income-qualified track eligible customers in the Focus on Energy territory, the additional cost to serve this market, and the degree to which serving this market is an objective of the Program. The Program Administrator's intent for income-qualified track representation for both the HVAC and whole home paths should be documented in the Program operations manual.

If the current level of income-qualified track participation is below the desired level, the Program Administrator and Program Implementer should consider the following:

- The Program Administrator and Program Implementer should reassess the funding level for the HVAC path to ensure it is sufficient to meet the savings targets given the desired level of income-qualified track participation.
- The Program Implementer should monitor how many participating HVAC Trade Allies work with income-qualified customers. If income-qualified track projects are concentrated among a small number of Trade Allies, the Program Implementer may be able to increase penetration into the

income-qualified market through outreach to other Trade Allies. In addition, the CY 2017 evaluation should target this as a research issue. The Evaluation Team should speak with Trade Allies who work with income-qualified customers in CY 2017 and HVAC Trade Allies who do not understand what barriers prevent some Trade Allies from pursuing this market segment and how other Trade Allies overcome those barriers.

- Because whole home Trade Allies appear to be better able to penetrate the income-qualified market, the Program Implementer should consider ways to encourage these whole home Trade Allies to promote HVAC installations. For example, the Program Implementer could consider a special incentive paid directly to the Trade Ally for income-qualified track projects that include both whole home and HVAC measures, in addition to the existing bonus incentive for participants.
- Because whole home Trade Allies would likely need to subcontract the HVAC installation, there could be a business opportunity for an HVAC Trade Ally willing to specialize as a partner to whole home Trade Allies. Outreach coordinators should discuss this possible opportunity with HVAC Trade Allies to be able to direct whole home contractors to appropriate HVAC partners.

Outcome 6. The Program Implementer added new marketing materials and improved the Focus on Energy website, but it could do more to attract whole home and income-qualified track participation and take advantage of existing Trade Ally marketing.

The Program Implementer's efforts to improve marketing received positive feedback from Trade Allies. Most Trade Allies use flyers provided by the Program in their sales calls, and several refer customers to the Focus on Energy website. However, Program savings were driven largely by standard track HVAC-only projects. Both groups of Trade Allies requested small changes to the website, and whole home Trade Allies expressed some frustration about the Program Implementer's messaging for whole home projects. In addition, because many HVAC Trade Allies do not mention the Program on their websites, the Program is missing an opportunity to significantly boost the Program profile through marketing activity by Trade Allies.

Recommendation 6: The Evaluation Team supports the Program Implementer's efforts to continuously improve the website and the materials available to Trade Allies. For 2017, the Program Implementer should focus on a more holistic presentation of the HVAC and whole home paths, both on the website and in print materials. On the website, the two separate pages for HVAC and whole home measures should be integrated into a single page. The Program Implementer should also develop case studies for projects that achieve the 10%, 20%, and 30% or more savings levels using projects that include HVAC measures as the 20% and 30% or more examples.

The following activities should be conducted to improve the Program marketing and marketing support for Trade Allies in CY 2017:

- Outreach coordinators should periodically monitor the look-up feature on the website to ensure all Trade Allies are accurately represented.

- The Program Implementer should consider promoting Xcel Energy's whole home overview brochure to Trade Allies through different channels to ensure Trade Allies are aware of it.
- Because Hispanics/Latinos make up about 20% of the population in key markets such as Milwaukee,[38] the Program Implementer should consider developing a program overview flyer in Spanish. Outreach coordinators should identify which Trade Allies serve these communities to ensure they know about and use these materials.
- To generate greater awareness of the Program, the Program Implementer should encourage HVAC Trade Allies to promote the Program on their websites. To understand why many HVAC Trade Allies do not already mention the Program, the Program Implementer should consider conducting a focus group with the Trade Allies or consulting their Trade Ally Advisory Group.

Outcome 7. Despite a KPI to maintain or reduce the days incentive outstanding, several Trade Allies reported long delays in incentive check processing.

Several Trade Allies reported that the typical time to receive their check was relatively low, between three and five weeks. This time range is confirmed by SPECTRUM data, although several Trade Allies reported longer processing times were not uncommon. It was not clear from interviews what caused the longer processing time in these instances: if this was more often Trade Ally error when completing the application or delays by the Program Implementer. Whole home Trade Allies indicated they were experiencing additional data entry workload for projects that had a final savings level that was different from the level predicted by the initial assessment. This additional step may be causing Trade Allies to make errors in calculations or in entering information.

Recommendation 7: Review instances in CY 2016 where the incentive check was processed more than five weeks after the Program Implementer received the initial paperwork from the Trade Ally to determine the most frequent causes of delay. If Trade Allies are struggling with a particular step in the application process, the Program Implementer should review the process for any opportunities to streamline the process or reduce the data entry burden through automation or other methods. The Program Implementer should also make sure Program training resources are available at all times—for example, as print materials become available for download and as a recorded webinar or video—to support training for newly hired Trade Ally staff.

Outcome 8. Uncertainty about the future of the renewables incentives resulted in low satisfaction among renewables Trade Allies.

For most of the year, it was unclear whether the Program would offer incentives for renewable projects in 2017 or beyond. For this reason, the Program Implementer appropriately limited its efforts to promote this path so the market would not come to rely on a resource that was no longer available in the coming year. However, Trade Allies who participated in the renewable path were frustrated by the

[38] 2010 Census data, U.S. Census Bureau. Available online: https://www.census.gov/quickfacts/table/RHI125215/5553000

Program's limited marketing support and training. Overall, a much higher percentage of renewables Trade Allies indicated lower satisfaction with the Program than did Trade Allies in the other two paths.

Recommendation 8: Now that the PSC has approved continuing to offer incentives for renewables, the Program Implementer should focus on improving satisfaction among this group of Trade Allies. The Program Implementer should create marketing materials and conduct an outreach campaign to renewables Trade Allies, especially the solar PV companies responsible for the majority of renewables projects. The campaign should discuss the status of the Program and the likelihood it will continue in future years. It should also focus on the available training and marketing resources to counter the Trade Allies dissatisfaction with the resources available in CY 2016.

Outcome 9. PV systems and GSHPs are saving customers more electricity than expected.

This appears to be related to the methods used for estimating program energy savings (these methods are based on the TRM). Particular items noted by the Evaluation Team include these:

- PV system DC-to-AC derate factor of 0.8 reflects an assumed overall system loss of 20%. More recent work by National Renewable Energy Laboratory and others has shown loss factors to be lower (in the range of 11.4% for systems with no shading).
- Assumed shading of 10% is much more conservative than the roughly 2% shading observed by the Evaluation Team.
- The GSHP systems the Evaluation Team reviewed had 40% to 50% greater capacity than indicated in the TRM.

Recommendation 9. Consider revisiting the methods used to calculate energy savings for GSHPs and PV systems. The Program appears to have low overall estimates of annual energy savings compared to the Evaluation Team's calculations of energy savings. In particular, the baseline conditions and hours of use assumptions for developing deemed savings for GSHP systems and the assumed savings for solar PV systems should be reviewed and, if warranted, updated in the TRM to reflect the updated assumptions and calculations in the newest version of PVWatts.

Also consider reviewing the TRM's assumptions and update the assumed GSHP system sizes to better reflect actual installation trends. In addition, consider a careful review of the system efficiencies and other assumptions during this process.

Outcome 10. The Program application generally contains enough information for basic evaluation purposes but could benefit from some minor updates.

The application currently includes fields for the applicant to enter system tilt, orientation, shading loss, and information on the make and model of key equipment.

Recommendation 10. The Renewable Rewards Program application for a PV system generally includes sufficient information for a basic desktop review and independent estimate of energy savings; however,

consider updating the application field for "compass direction" to indicate whether the azimuth value is entered as the magnetic or true orientation.

Outcome 11. The Smart Thermostat Pilot billing analysis found underestimated electric savings and overestimated gas savings.

The Evaluation Team offered several theories for these results, including possible misalignment between TRM *ex ante* participant characteristic assumptions and Pilot participant characteristics, and the limited number of similar evaluations to compare the Pilot to.

Recommendation 11a. Focus on Energy should review the TRM assumptions for smart thermostats and update them as appropriate. For example, Focus on Energy could collect heating capacity, cooling capacity, AFUE, and SEER for future smart thermostat participants from telephone surveys and rebate forms. Focus staff should update their assumptions on baseline thermostat type from the results of the Smart Thermostat Pilot survey. Focus staff should also review more recent smart thermostat evaluation studies whose results may more closely align with its delivery structure, and use that information to update TRM energy savings factors.

Recommendation 11b. Once there is enough long-term participation of smart thermostat customers, Focus on Energy should conduct a billing analysis with a control group so that it can compare the savings trends of nonparticipants to participants and realize net savings results to further ensure that the smart thermostat measures that it offers have the best estimates of per-unit savings.

Recommendation 11c. Focus on Energy should limit the types of smart thermostat models that participants can receive rebates for, and ensure that participants are installing smart thermostats that have a track record of realizing energy savings. Furthermore, TRM savings are based exclusively on Nest thermostat evaluation results. If Focus on Energy decides to continue to allow customers to purchase multiple smart thermostat models, then it should revise its TRM savings assumptions to reflect a more diverse range of products that, on average, may have lower gas-saving potential than Nest smart thermostats.

Outcome 12. Whole home path savings remain overestimated for gas and underestimated for electricity.

NTG ratios based on the CY 2015 billing analysis and Snugg Pro software modeling calibration show that *ex ante* savings continue to overestimate gas savings and underestimate electric savings, even with projects modeled with Snugg Pro. Snugg Pro appears to overestimate gas savings by roughly the same amount as the previous software, emHome, but to underestimate electric savings considerably more. For instance, with Standard Track projects, the Evaluation Team calculated the NTG ratio for electric savings as 217% for Snugg Pro, compared with the NTG of 127% used with emHome.

Because Snugg Pro is used in many utility territories across the country, it is quite possible that this issue affects evaluators other than Focus on Energy. Therefore, requiring Snugg Pro to update its software to

fit Wisconsin-specific assumptions is probably not feasible. Furthermore, these realization rates may be affected by factors other than Snugg Pro's software, such as customer-specific energy usage.

Recommendation 12. The Program Implementer should explore ways to refine its savings estimates, both through reviewing Snugg Pro modeling inputs and understanding other external factors that affect the modeling outputs. To mitigate customer expectations as to how much energy they may save, the Program Implementer is already beginning to take action. It plans to review customer-facing materials in CY 2017 and add language to clearly state that modeling results are estimates and that actual energy savings will be affected by each home's usage and occupancy characteristics.

New Homes Program

The New Homes Program provides information, implementation assistance, and incentives for builders of new single-family homes in Wisconsin that meet energy efficiency requirements set by the Program. In CY 2016, the New Homes Program paired prospective homeowners with builders and energy experts to construct new homes that were between 15% and 100% more efficient than homes built to Wisconsin's Uniform Dwelling Code.[39]

Focus delivered the New Homes Program to eligible homeowners throughout Wisconsin through the Program Administrator (CB&I), the Program Implementer (WECC), participating Trade Allies (home builders), and Building Performance Consultants (BPCs). Home builders hired BPCs affiliated with the Program to guide them on better building techniques and to model and verify the new home's energy performance. The home builder typically received Program incentives to help offset the cost of achieving one of four Program incentive levels.

In CY 2016, Focus revised the eligibility requirements for homes, increasing all four of the efficiency tiers (or levels) by 5% from the previous program year:

- Level 1 homes must be 15% more efficient than code
- Level 2 homes must be 25% more efficient than code
- Level 3 homes must be 35% more efficient than code
- Level 4 homes must be 100% more efficient than code

The Program Administrator implemented this change primarily to push builders to advance their building practices because the majority of homes were already at the 10% efficiency level. In addition, Focus increased the Level 4 incentive for electric and gas homes to entice more builders to aim for the highest, and rarely reached, efficiency level. Level 1 through Level 3 incentives remained unchanged. CY 2016 incentives for electric-only homes also did not change.

Because a billing analysis of Program homes built in previous years that was published in May 2016 found that most builders in Wisconsin are now constructing new homes to efficiency levels above the Wisconsin Uniform Dwelling Code, Focus on Energy is conducting a Baseline and Market Characterization Study that will inform the redesign and launch of a New Homes Program for CY 2018. Focus on Energy will continue the Program during the CY 2017 transition year with reduced and simplified incentives to maintain the relationships with participating builders, energy raters, and stakeholders.

[39] Wisconsin Department of Health and Human Services. "One and Two Family (UDC) – Administrative Code." January 2016. Available online: http://dsps.wi.gov/Programs/Industry-Services/Industry-Services-Programs/One-and-Two-Family-UDC/UDC-Admin-Code/

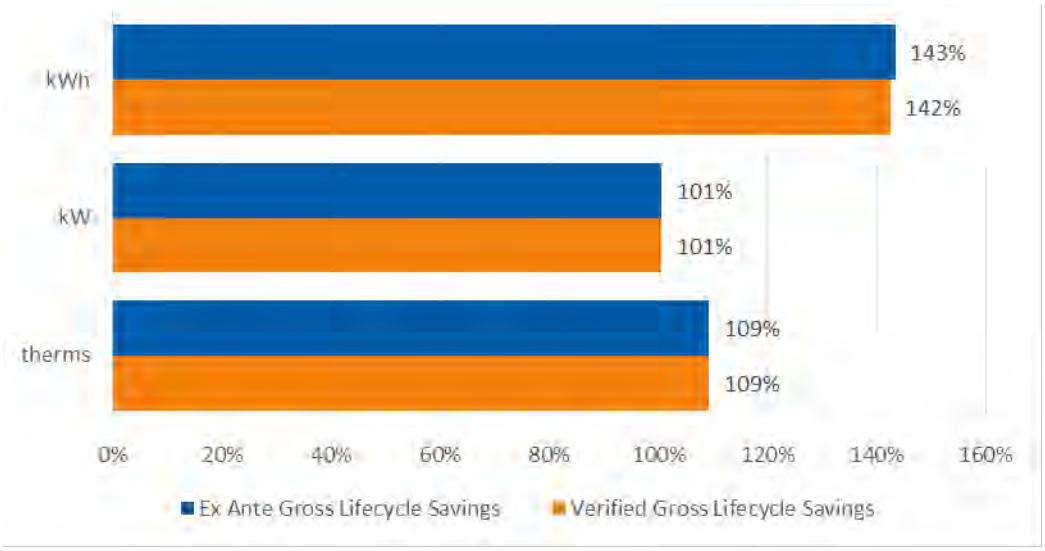
Table 69 lists the actual Program spending, savings, participation, and cost-effectiveness.

Table 69. New Homes Program Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$1,170,200	$1,605,000
Participation	Number of Participants	2,400	2,062
Verified Gross Lifecycle Savings	kWh	137,381,915	107,308,526
	kW	1,388	1,122
	therms	31,370,820	29,640,810
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	100%
Net Annual Savings	kWh	0	0
	kW	0	0
	therms	77,139	72,885
Annual Net-to-Gross Ratio	% (MMBtu)	6%	7%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost ratio	1.81	1.36

Figure 59 shows the percentage of gross lifecycle savings goals achieved by the New Homes Program in CY 2016. The Program exceeded all CY 2016 goals for both *ex ante* and verified gross savings. The Program exceeded its kWh savings goal because the Program realized higher participation than expected. The Program also updated its efficiency tiers in CY 2016, which led to higher energy savings per home.

Figure 59. New Homes Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for the New Homes Program in CY 2016. Table 70 lists the specific data collection activities and sample sizes used in the evaluations.

Table 70. New Homes Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and Program Implementer in August 2016 to learn about the current status of the New Homes Program and to gain insight into its successes and challenges. Interview topics covered Program design, goals, marketing strategies and outreach to home builders, and market impacts on the Program. In addition, the Evaluation Team asked about the Program's upcoming transition process in CY 2017, its possible effects, and future plans.

Tracking Database Review

The Evaluation Team review of the census of the Program SPECTRUM tracking data included these tasks:

- Thoroughly reviewing the data to ensure the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to measure names
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Impact Evaluation

In CY 2016, 2,400 new homes were built that went through the Program. The Program design and offerings were similar to CY 2015. Therefore, for the impact evaluation, the Evaluation Team conducted a tracking database review and applied the electric and gas billing analysis results from CY 2015 to calculate net savings.

Evaluation of Gross Savings

The Evaluation Team assessed gross savings for the Program through the tracking database review.

Tracking Database Review

The Evaluation Team reviewed the census of the CY 2016 New Homes Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EULs in adherence to the Wisconsin TRM or other deemed savings sources.

The Evaluation Team found that an estimated EUL was incorrectly applied to ground source heat pumps. The Wisconsin TRM listed 15 years as the EUL for ground source heat pumps; however, the Team

divided lifecycle savings by annual savings and found that the EUL was 18 years. The Team adjusted the EUL to 15 years to calculate verified gross savings, which decreased lifecycle realization rates for ground source heat pumps but did not change the Program's annual realization rates. The Team found no other issues with the tracking database.

CY 2016 Verified Gross Savings Results

Overall, the New Homes Program achieved an evaluated annual realization rates of 100% (Table 71).[40] The New Homes Program realized an evaluated lifecycle kWh realization rate of 99%, which was due to the adjustment to the EUL for ground source heat pumps.

Table 71. CY 2016 New Homes Program Annual and Lifecycle Realization Rates by Measure Type

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Certification (Electric), Level 1, 15 to 24.9% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Electric), Level 2, 25 to 34.9% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Electric), Level 3, 35 to 44.9% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Electric), Level 4, 45 to 100% Better Than Code	100%	100%	n/a	100%	100%	100%	n/a	100%
Certification (Gas), Level 1, 15 to 24.9% Better Than Code	100%	100%	100%	100%	100%	100%	100%	100%
Certification (Gas), Level 2, 25 to 34.9% Better Than Code	100%	100%	100%	100%	100%	100%	100%	100%
Certification (Gas), Level 3, 35 to 44.9% Better Than Code	100%	100%	100%	100%	100%	100%	100%	100%
Certification (Gas), Level 4, 45 to 100% Better Than Code	100%	100%	100%	100%	100%	100%	100%	100%
Ground Source Heat Pump	100%	100%	n/a	100%	83%	100%	n/a	83%
Solar PV	100%	100%	n/a	100%	100%	100%	n/a	100%
Total Annual	**100%**	**100%**	**100%**	**100%**	**99%**	**100%**	**100%**	**100%**

Table 72 lists the *ex ante* and verified annual gross savings for the New Homes Program for CY 2016.

[40] The Evaluation Team calculated realization rates by dividing verified gross savings by *ex ante* savings.

Table 72. CY 2016 New Homes Program Annual Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
Certification (Electric), Level 1, 15 to 24.9% Better Than Code	28,250	6	0	28,250	6	0
Certification (Electric), Level 2, 25 to 34.9% Better Than Code	110,218	20	0	110,218	20	0
Certification (Electric), Level 3, 35 to 44.9% Better Than Code	188,696	31	0	188,696	31	0
Certification (Electric), Level 4, 45 to 100% Better Than Code	61,741	9	0	61,741	9	0
Certification (Gas), Level 1, 15 to 24.9% Better Than Code	459,167	163	177,363	459,167	163	177,363
Certification (Gas), Level 2, 25 to 34.9% Better Than Code	2,642,423	844	647,980	2,642,423	844	647,980
Certification (Gas), Level 3, 35 to 44.9% Better Than Code	849,346	266	206,969	849,346	266	206,969
Certification (Gas), Level 4, 45 to 100% Better Than Code	44,105	16	13,382	44,105	16	13,382
Ground Source Heat Pump	290,184	1	0	290,184	1	0
Solar PV	60,431	33	0	60,431	33	0
Total Annual	**4,734,561**	**1,388**	**1,045,694**	**4,734,561**	**1,388**	**1,045,694**

Table 73 lists the *ex ante* and verified gross lifecycle savings by measure type for the New Homes Program in CY 2016.

Table 73. CY 2016 New Homes Program Lifecycle Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Certification (Electric), Level 1, 15 to 24.9% Better Than Code	847,500	6	0	847,500	6	0
Certification (Electric), Level 2, 25 to 34.9% Better Than Code	3,306,540	20	0	3,306,540	20	0
Certification (Electric), Level 3, 35 to 44.9% Better Than Code	5,660,880	31	0	5,660,880	31	0
Certification (Electric), Level 4, 45 to 100% Better Than Code	1,852,230	9	0	1,852,230	9	0
Certification (Gas), Level 1, 15 to 24.9% Better Than Code	13,775,010	163	5,320,890	13,775,010	163	5,320,890
Certification (Gas), Level 2, 25 to 34.9% Better Than Code	79,272,690	844	19,439,400	79,272,690	844	19,439,400
Certification (Gas), Level 3, 35 to 44.9% Better Than Code	25,480,380	266	6,209,070	25,480,380	266	6,209,070
Certification (Gas), Level 4, 45 to 100% Better Than Code	1,323,150	16	401,460	1,323,150	16	401,460
Ground Source Heat Pump	5,223,312	1	0	4,352,760	1	0
Solar PV	1,510,775	33	0	1,510,775	33	0
Total Lifecycle	**138,252,467**	**1,388**	**31,370,820**	**137,381,915**	**1,388**	**31,370,820**

Evaluation of Net Savings

This section details the Evaluation Team's method for estimating the Program's verified net savings.

The Evaluation Team conducted a billing analysis in CY 2015 with a nonparticipant control group composed of customers with accounts from new residential addresses. This provided a representative group to establish the current market baseline energy use and estimated net savings for the Program. The nonparticipant control group also helped account for other factors occurring in the market such as freeridership (by comparing nonparticipant market baseline to an efficient baseline) and spillover (by measuring total energy changes from one year to next, which included additional improvements). The Team estimated net savings by comparing the difference in usage per square foot for participants with the nonparticipant homes built during the same time.

The Evaluation Team defined the analysis period as July 2014 through June 2015 for both participants and nonparticipants. This was the latest annual period of billing data with the most complete data for all utilities.

Billing Analysis

To conduct the billing analysis, the Evaluation Team used regression models to measure savings achieved by Program homes. Specifically, the Team calculated savings by comparing the energy intensity of the participating program homes with the energy intensity of similar nonparticipating new homes over the same period, accounting for variables such as weather and square footage of home.

The Evaluation Team compared home square footage between participant and nonparticipant groups. From the screened billing analysis samples, the Team summarized the analysis post-participation period usage and divided it by the square footage to obtain a kWh per-square-foot savings estimate for each customer. The difference between the participant and nonparticipant kWh per square footage yielded the net savings. Overall, electric participants averaged negative net savings and gas participants averaged low net savings—7% of the average expected gas savings.

The Evaluation Team found that nonparticipating builders were already constructing new homes to levels above the Wisconsin new residential construction building code. This finding was likely a major factor driving the difference between evaluated and expected energy savings.[41]

The Program has probably influenced residential home building practices over time and nonparticipating builders are constructing more efficient homes than they would have had the Program not existed. Billing analysis methodology was not designed to measure this kind of market effect, however, so the long-term impact of the Program remains unquantified.

[41] The Wisconsin Uniform Dwelling Code has not been updated for more than five years.

Table 74 lists the NTG ratios estimated from the billing analysis in CY 2015. NTG ratios were 7% for gas savings and 0% for electric savings. Since there were no major Program changes from CY 2015 to CY 2016, the Evaluation Team applied the CY 2015 billing analysis results to CY 2016 projects.

Table 74. CY 2015 Program Billing Analysis Results Applied to CY 2016 Projects

Savings Type	NTG Rate
Electricity	0%
Gas	7%

Appendix J of the *Focus on Energy CY 2015 Evaluation Report* contains additional details on the methodology, attrition, and results for these analyses.

CY 2016 Verified Net Savings Results

Applying the NTG rates from the billing analysis to the gross savings from the tracking database review, the Evaluation Team developed the evaluated net savings for the Program. This yielded an estimated overall (MMBtu weighted) NTG ratio of 6% for the Program. Because there was a higher proportion of electric savings to therms savings in CY 2016, the MMBtu NTG rate dropped by 0.1%, from 6.5% in CY 2015 to 6.4% in CY 2016.

Table 75 shows the annual net energy impacts (kWh, kW, and therms) by measure type for the Program.

Table 75. CY 2016 New Homes Program Annual Net Savings by Measure Type

Measure	Annual Net		
	kWh	kW	therms
Certification (Electric), Level 1, 15 to 24.9% Better Than Code	0	0	0
Certification (Electric), Level 2, 25 to 34.9% Better Than Code	0	0	0
Certification (Electric), Level 3, 35 to 44.9% Better Than Code	0	0	0
Certification (Electric), Level 4, 45 to 100% Better Than Code	0	0	0
Certification (Gas), Level 1, 15 to 24.9% Better Than Code	0	0	13,084
Certification (Gas), Level 2, 25 to 34.9% Better Than Code	0	0	47,800
Certification (Gas), Level 3, 35 to 44.9% Better Than Code	0	0	15,268
Certification (Gas), Level 4, 45 to 100% Better Than Code	0	0	987
Ground Source Heat Pump	0	0	0
Solar PV	0	0	0
Total Annual	**0**	**0**	**77,139**

Table 76 shows the lifecycle net energy impacts (kWh, kW, and therms) by measure type for the Program.

Table 76. CY 2016 New Homes Program Lifecycle Net Savings by Measure Type

Measure	Lifecycle Net		
	kWh	kW	therms
Certification (Electric), Level 1, 15 to 24.9% Better Than Code	0	0	0
Certification (Electric), Level 2, 25 to 34.9% Better Than Code	0	0	0
Certification (Electric), Level 3, 35 to 44.9% Better Than Code	0	0	0
Certification (Electric), Level 4, 45 to 100% Better Than Code	0	0	0
Certification (Gas), Level 1, 15 to 24.9% Better Than Code	0	0	392,512
Certification (Gas), Level 2, 25 to 34.9% Better Than Code	0	0	1,434,007
Certification (Gas), Level 3, 35 to 44.9% Better Than Code	0	0	458,031
Certification (Gas), Level 4, 45 to 100% Better Than Code	0	0	29,615
Ground Source Heat Pump	0	0	0
Solar PV	0	0	0
Total Lifecycle	**0**	**0**	**2,314,165**

Process Evaluation

In CY 2016, the Evaluation Team interviewed two stakeholders, the Program Administrator and the Implementer, as part of the process evaluation activities. The Team focused the process evaluation on these key topics for the New Homes Program:

- Program transition in 2016 and 2017 and its possible effects on the new homes market
- Upcoming market characterization study
- Program goals and KPIs
- Program tracking processes and coordination among the Program Administrator, Program Implementer, and Trade Allies

Program Design, Delivery, and Goals

The New Homes Program offers builders graduated incentives for constructing homes that are at least 15% more efficient than Wisconsin's Uniform Dwelling Code. In CY 2016, the Program offered four incentive levels for homes built by customers who received electric service and four incentive levels for homes built by customers who received electric and gas service. In addition, builders could receive incentives for installing qualified geothermal heat pumps ($650 per system) and/or solar electric (up to $2,400 based on the size of the system). Table 77 shows the incentive levels for each type of home available in CY 2016.

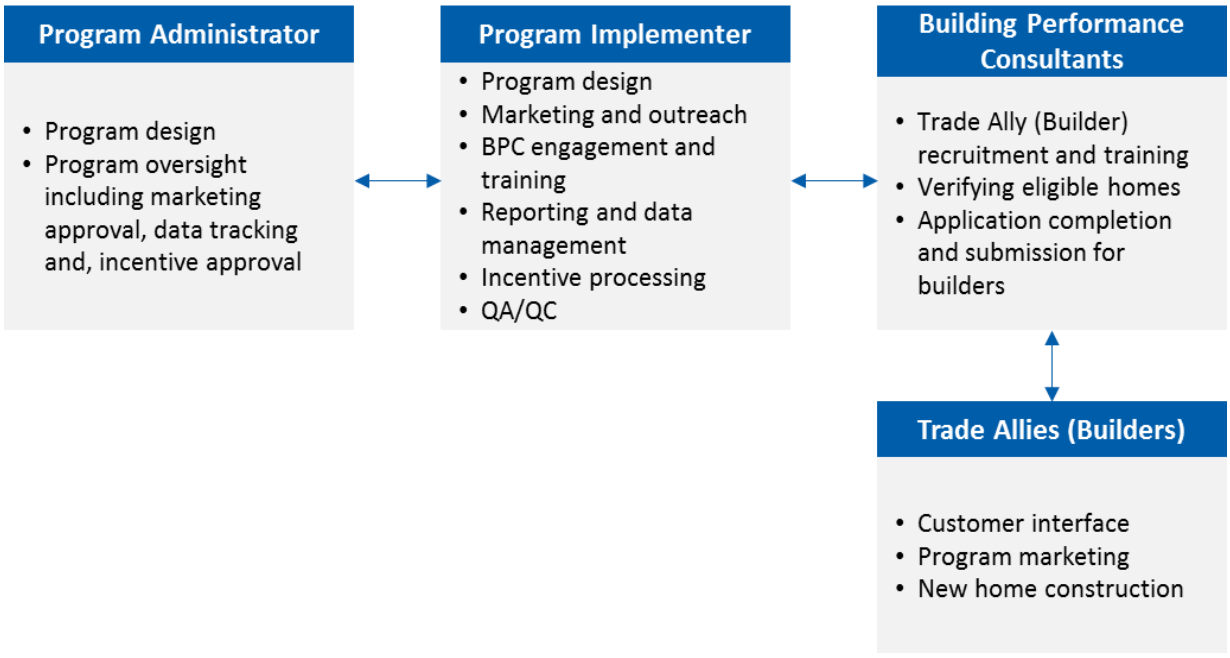
Table 77. CY 2016 New Homes Program Incentive Levels

Certification Level	Incentive Level
Electric Homes	
Level 1: 15.0% – 24.9% better than code	$100
Level 2: 25.0% – 34.9% better than code	$150
Level 3: 35.0% – 44.9% better than code	$250
Level 4: 45.0% – 100% better than code	$350
Electric and Gas Homes	
Level 1: 15.0% – 24.9% better than code	$100
Level 2: 25.0% – 34.9% better than code	$425
Level 3: 35.0% – 44.9% better than code	$1,100
Level 4: 45.0% – 100% better than code	$1,600

Program Management and Delivery Structure

Focus on Energy delivers the Program to eligible homeowners throughout Wisconsin through the Program Administrator, the Program Implementer, BPCs, and participating home builders. Figure 60 shows the Program management and delivery structure.

Figure 60. CY 2016 New Homes Program Management and Delivery Structure



Home builders hire a BPC affiliated with the Program to visit the site at least twice during home construction, during which the BPC inspects the construction and verifies the home's energy performance. The first site visit is conducted at the framing stage and the final site visit when the home is 100% complete. After each site visit, the BPC submits a report of the findings to the home builder. The BPC may recommend corrections that the builder needs to make prior to submitting final paperwork to

the Program Implementer. After the Program Implementer completes its review, the paperwork is forwarded to the Program Administrator for final approval and payment of the incentive to the builder.

Program Changes

Efficiency and Incentive Levels

In CY 2016, Focus revised the eligibility requirement for homes, increasing all four of the efficiency tiers by 5% from CY 2015 levels. This change was primarily to allow the Program Implementer to meet reduced incentive levels while still achieving its energy savings goals.

In addition, Focus increased the Level 4 incentive for electric and gas homes to entice more builders to aim for the highest, and rarely reached, efficiency level. Level 1 through Level 3 incentives remained unchanged. CY 2016 incentives for electric-only also homes did not change. Table 78 presents CY 2015 and CY 2016 efficiency levels and incentive levels.

Table 78. CY 2015 and CY 2016 New Homes Efficiency Level and Incentive Changes – Electric and Gas Homes

Certification Level	Incentive
CY 2015 Electric and Gas Homes	
Level 1: 10.0% – 19.9% better than code	$150
Level 2: 20.0% – 29.9% better than code	$425
Level 3: 30.0% – 39.9% better than code	$1,100
Level 4: 40.0% – 49.9% better than code	$1,300
CY 2016 Electric and Gas Homes	
Level 1: 15.0% – 24.9% better than code	$100
Level 2: 25.0% – 34.9% better than code	$425
Level 3: 35.0% – 44.9% better than code	$1,100
Level 4: 45.0% – 100% better than code	$1,600

Despite the increase in incentives for Level 4 electric and gas homes, the percentage of homes reaching the Level 4 efficiency level slightly decreased from CY 2015 to CY 2016. Furthermore, only 15% of CY 2016 builders built homes to Level 3 efficiency standards compared to 53% in CY 2015. This may be due to the increases in the certification levels from CY 2015 to CY 2016. Table 79 shows the changes between CY 2015 and CY 2016 for electric and gas homes.

Table 79. CY 2016 Percentage of Homes by Efficiency and Incentive Level – Electric and Gas Homes

Certification Level	Percentage of Homes
CY 2015 Electric and Gas Homes	
Level 1: 10.0% – 19.9% better than code	7%
Level 2: 20.0% – 29.9% better than code	38%
Level 3: 30.0% – 39.9% better than code	53%
Level 4: 40.0% – 49.9% better than code	3%
CY 2016 Electric and Gas Homes	
Level 1: 15.0% – 24.9% better than code	18%
Level 2: 25.0% – 34.9% better than code	62%
Level 3: 35.0% – 44.9% better than code	15%
Level 4: 45.0% – 100% better than code	1%

Market Characterization Study

Because a billing analysis of Program homes built in previous years that was published in May 2016 found that most builders in Wisconsin are now constructing new homes to efficiency levels above the Wisconsin Uniform Dwelling Code, Focus on Energy is conducting a Baseline and Market Characterization Study. The study is intended to establish a market baseline in Wisconsin by obtaining data about the efficiency levels of homes built outside of the Program. The study will also inform the redesign and relaunch of the New Homes Program for CY 2018.

During CY 2017, the New Homes Program plans to offer one flat rate as an incentive to builders who construct homes that are at least 25% more efficient than code. In other words, the Program plans to remove the lowest incentive tier (currently Level 1 is $150 for homes built 15% to 24.99% higher than code) and combine the other three incentive tiers into one. The Program will offer $400 for gas and electric homes and $100 for electric-only homes that achieve 25% to 100% more than code. The consolidation of the incentives into one flat rate is intended to cover the assessment cost and rater fees so builders do not lose money by participating in the Program and to maintain relationships with builders throughout the year until the Program is relaunched in CY 2018.

Program Goals

The Implementer tracked four KPIs. Table 80 shows the KPI goal and achievement through December 2016 for all indicators. The Program Implementer met three of its KPI goals but did not meet its goal of maintaining 30 active BPCs. According to the Program Implementer, two BPCs submitted projects under their partnering BPC's rater number. Two other BPCs who had participated in previous years did not certify a home in CY 2016.

Table 80. New Homes CY 2016 Key Performance Indicators

KPI	CY 2016 Goal	CY 2016 Result	CY 2016 Result Source
Market Share of New Homes Built	26%	28.10%	Reported by Program Implementer
Active Participating Builders	200	247	
Active Building Performance Consultants	30	26	
Average Days Incentive Outstanding	18	17.4	

Data Management and Reporting

The Program Administrator and the Program Implementer reported that SPECTRUM, the data tracking system, was very functional and running smoothly in CY 2016 and no changes were planned.

Marketing and Outreach

Focus on Energy has typically marketed the New Homes Program primarily through the BPCs and home builders. However, minimal marketing efforts took place in CY 2016 (the CY 2018 Program design is expected to change following the Baseline and Market Characterization Study). Marketing efforts during CY 2016 included bill inserts, social media posts, and a radio campaign to keep customers aware of Program offerings and maintain builder engagement throughout the Program's transition.

In addition, in CY 2016 the Program offered energy code training to builders. After reviewing results from the upcoming Baseline and Market Characterization Study, the Program will direct marketing efforts toward updating collateral material and conveying changes in the CY 2018 Program to builders and customers.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 81 lists the CY 2015 and CY 2016 incentive costs for the New Homes Program.

Table 81. New Homes Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$1,170,050	$1,605,000

The Evaluation Team found the CY 2016 Program was cost-effective (1.81). Table 82 lists the evaluated costs and benefits.

Table 82. New Homes Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$224,605	$243,045
Delivery Costs	$512,199	$554,252
Incremental Measure Costs	$306,382	$369,797
Total Non-Incentive Costs	**$1,043,185**	**$1,167,094**
Benefits		
Electric Benefits	$0	$0
Gas Benefits	$1,738,214	$1,455,814
Emissions Benefits	$154,636	$132,587
Total TRC Benefits	**$1,892,850**	**$1,588,401**
Net TRC Benefits	**$849,664**	**$421,307**
TRC B/C Ratio	**1.81**	**1.36**

Evaluation Outcomes

The Evaluation Team identified the following outcomes.

Outcome 1. The results of the CY 2015 billing analysis showed that the New Homes Program produced minimal net savings.

A billing analysis of Program homes built in previous years that was published in May 2016 found that builders outside of the New Homes Program are already building to the Program's standards; therefore, Focus on Energy is conducting a Baseline and Market Characterization Study to inform the redesign and launch of a New Homes Program for CY 2018. Until then, the Program has continued with minimal changes in CY 2016 and CY 2017 to maintain the relationships with participating builders, energy raters, and stakeholders.

Retailer Lighting and Appliance Program

The Retailer Lighting and Appliance Program partners with retailers and manufacturers to provide education on qualified lighting and appliance products and instant discounts of lighting products to residential customers throughout Wisconsin. The Program provides a wide range of retail support activities such as retail staff training, in-store display materials, and CFL recycling at select participating retailers.

In CY 2016, CB&I was the Program Administrator and ICF International became the Program Implementer. Early in CY 2016, the Program Administrator and Program Implementer discontinued CFL discounts to offer LEDs exclusively. They also expanded the Program scope, partnering with the U.S. Environmental Protection Agency (EPA) to launch a market transformation program called the Retail Products Platform (RPP). The RPP is delivered through a midstream design, in which incentives are paid directly to participating retailers to influence their stocking practices.

The RPP, initiated as a pilot in April 2016, was initially sponsored by 17 utilities across 10 states. Given the novelty of its design and the limited experience the larger evaluation community has with such programs, the EPA and other evaluation stakeholders are currently collaborating to develop formal evaluation protocols.

Although the lighting and RPP components were combined into a single program in CY 2016, these components retained their own budgets and savings targets within the Retailer Lighting and Appliance Program. In CY 2016, the Evaluation Team conducted a limited process evaluation of the RPP and initiated on-site and online shelf stocking studies. The first impact evaluation is planned for CY 2017 if sufficient tracking and sales data are available.

Table 83 lists the actual spending, savings, participation, and cost-effectiveness of the Program's lighting component.

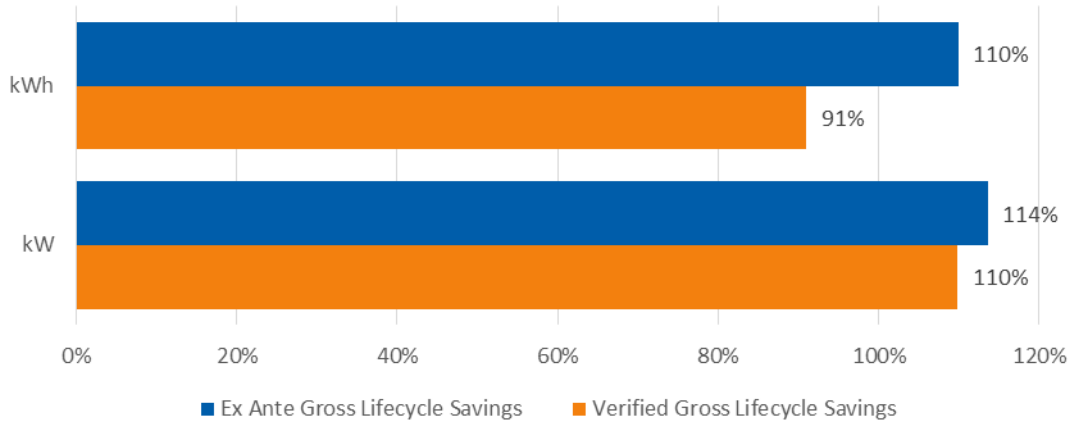
Table 83. Retailer Lighting and Appliance Program Lighting Component Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$8,439,351	$8,299,005
Participation	Number of Lighting Participants[1]	688,204	856,664
	Qty. Lighting Units	4,092,599	5,737,180
Verified Gross Lifecycle Savings	kWh	2,265,216,411	1,379,473,307
	kW	17,135	20,169
	therms	0	0
Verified Gross Lifecycle Realization Rate	% (MMBtu)	83%	84%
Net Annual Savings	kWh	105,898,165	167,418,765
	kW	12,349	19,207
	therms	0	0
Annual Net-to-Gross Ratio	% (MMBtu)	72%	95%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost ratio	4.51	9.37

[1] Due to the upstream nature of the Program, total participants are not recorded through program tracking. The CY 2015 residential general population survey indicated that on average, CFL purchasers bought 6.8 CFLs annually, and LED purchasers bought 5.8 LEDs annually. The Evaluation Team applied these estimates to the total CFLs and LEDs sold and summed them to estimate average lighting purchasers. Also note that the Program discontinued CFL incentives effective Q2, CY 2016.

Figure 61 shows the percentage of gross lifecycle savings goals achieved by the Retailer Lighting and Appliance Program's lighting component in CY 2016. The Program exceeded CY 2016 goals for *ex ante* gross energy savings, however, the verified gross kWh achievement was slightly lower.

Figure 61. Retailer Lighting and Appliance Program's Lighting Component Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program implementation contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

In CY 2016, the Evaluation Team conducted a process evaluation for the Program's lighting and RPP components and an impact evaluation for the lighting component.[42] The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance.

Table 84 lists the specific data collection activities and sample sizes used in the process and impact evaluations. Note that, with the exception of the Program Actor interviews, the data collection activities listed in the table and described below were performed only for the lighting component of the Program.

Table 84. Retailer Lighting and Appliance Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Actor Interviews[1]	2
Tracking Database Review	Census
Retail Storefront Manager Surveys	71
Manufacturer and Corporate Retailer Surveys	7
In-Home Audits	120

[1] The Evaluation Team and Program Actors discussed both the lighting and RPP categories of the Program.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and the Program Implementer in June and July 2016 to learn about the Program's current status and any high-level changes, successes, and concerns. Topics included the implementation contract transition, changes to Program design and goals, marketing strategies, and measure offerings, including the status of the RPP.

Tracking Database Review

The Evaluation Team review of the census of the Program SPECTRUM tracking data included these tasks:

- Thoroughly reviewing the data to ensure the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to measure names
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

[42] As mentioned above, the Evaluation Team will conduct the first impact evaluation of the RPP component of the Program in CY 2017, if tracking and sales data are available.

Retail Storefront Manager, Corporate Retailer, and Manufacturer Surveys

In July and August 2016, the Evaluation Team surveyed 71 participating storefront managers and interviewed seven corporate retailer and manufacturer contacts to learn about their experience with the Program. To inform the survey sampling plans, the Program Implementer provided the quantities of discounted LEDs, by retailer and manufacturer, for the first half of 2016.

The Evaluation Team established these four research objectives for the surveys:[43]

- Estimate likely LED sales in the absence of Program activities and incentives. Responses were used in the NTG triangulation task.
- Discuss reactions to and planned changes as a result of new ENERGY STAR lighting specifications and Energy Independence and Security Act of 2007 (EISA) backstop provision
- Assess stocking and manufacturing changes planned for the next several years, focusing on the expected mix of LEDs, CFLs, incandescents, and halogen lamps
- Assess Program satisfaction, particularly with respect to marketing activities and changes to the Program Implementer

The survey findings contributed quantitative and qualitative evaluation parameters about the influence of the Program, marketing and sales of lighting products, Program satisfaction, and interactions with Program representatives.

In-Home Audits

The Evaluation Team recruited participants from the general population survey to conduct in-home audits to inventory lighting and appliances. Conducting annual in-home audits allows the tracking of bulb purchases, installations, and failure and removal rates over time. In the summer of 2015, the Evaluation Team made the first of several annual visits, completing 124 audits. In the summer of 2016, the Evaluation Team attempted to revisit all 124 of these sites and successfully reached 120.

The main objective of the audits was to gather information to determine these:

- Penetration (use of one or more) and saturation (prevalence of technology) of bulb, fixture, and control technologies
- Remaining potential for efficient bulbs
- First-year in-service rate (ISR), by technology and room type
- Market sales of efficient bulbs, by retailer

In the initial visit, the Evaluation Team made a complete inventory of household lighting and marked each bulb with an indicator. In the 2016 visit, the Team noted the presence or absence of that indicator

[43] Note that CFLs were not a focus of the surveys since they were phased out of the CY 2016 Program offerings.

to determine which bulbs were still installed and which had been replaced or removed. New or moved bulbs were marked with a different indicator in the 2016 audit.

The Evaluation Team will conduct a third visit in CY 2017 to document any further changes to the bulb inventories. The objectives of the subsequent audits include these:

- Changes in penetration and saturation of bulb technologies, by home and room
- Bulb replacements (e.g., CFL to CFL and CFL to LED replacements)
- Short-term storage duration
- How often bulbs fail or are replaced in a home
- Changes in market sales of efficient bulbs, by retailer

Lumen Equivalence Analysis

Consistent with the previous year's evaluation and the plan in CY 2016, the Evaluation Team employed the lumen equivalence method to determine the appropriate baselines wattages for each program bulb. This method, which adheres to the best practices prescribed by the Uniform Methods Project (UMP),[44] maps each efficient wattage to a corresponding baseline wattage by using the lumen output of the efficient bulb to determine the least efficient wattage allowed by federal standards.

Demand Elasticity Modeling

As part of the NTG triangulation task, the Evaluation Team performed demand elasticity modeling using sales tracking data provided by the Program Implementer. Demand elasticity modeling draws upon the same economic principle that drives program design—changes in price and merchandising generate changes in quantities sold (i.e., the upstream buy-down approach).

National Sales Data Modeling

The Evaluation Team developed a national lighting sales model to determine Program attribution for the Wisconsin efficient lighting market. The model quantified the relationship between Program intensity (e.g., Program spending per household) and efficient lighting sales (the percentage of light bulb purchases that are efficient), which was used in the Program's NTG triangulation task.

[44] The Uniform Methods Project (UMP) is a framework and set of protocols established by the U.S. Department of Energy for determining energy savings from energy efficiency measures and programs. Its latest update was in February 2015. National Renewable Energy Laboratory. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* "Chapter 21: Residential Lighting Evaluation Protocol." Prepared by Apex Analytics, LLC. February 2015. Available online: http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter21-residential-lighting-evaluation-protocol.pdf

Impact Evaluation

This chapter provides impact evaluation findings for the Retailer Lighting and Appliance Program, based on these methods:

- Gross savings methods
  - Tracking database review
  - In-home audits
  - Engineering reviews
- Net savings methods
  - Demand elasticity modeling
  - Corporate retailer and manufacturer surveys
  - National sales data modeling

The Evaluation Team calculated gross savings for each individual bulb sold through the Program using the bulb's model information along with inputs calculated from the gross savings methods (database reviews, in-home audits, and engineering reviews). The Team triangulated the results from the net savings methods (demand elasticity modeling, surveys, and national sales data modeling) to determine an overall Program NTG ratio for LEDs. The Team applied the demand elasticity modeling and lighting saturation model results from CY 2015 to CY 2016 CFL bulbs. The next sections provide details regarding the gross and net savings analyses.

Evaluation of Gross Savings

The Evaluation Team reviewed the tracking database and applied the most recent research to determine estimated verified gross savings.

Tracking Database Review

The Evaluation Team reviewed the census of the CY 2016 Retailer Lighting and Appliance Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EUL values in adherence to the Wisconsin TRM or other deemed savings sources. The Evaluation Team found that all of the inputs used in the SPECTRUM database were consistent with the deemed values in the Wisconsin TRM.

The Evaluation Team also reviewed the 2016 sales data for information required to calculate savings and found complete data for all of the inputs (such as model number, measure description, quantity, and wattage) used in the gross savings analysis.

To verify the dataset, the Evaluation Team used the model number and description of each bulb to gather data on lumens, wattage, and bulb type from the ENERGY STAR lighting database. The Evaluation Team was able to match 95% of the total bulbs listed in the Program. For bulbs that were not matched in the ENERGY STAR database, the Evaluation Team deferred to the values listed in the tracking database. The Team applied other inputs for the savings analysis, such as hours of use, from the

Wisconsin TRM. The Evaluation Team made no adjustments to the tracking data. A comprehensive list of *ex ante* and verified inputs are provided in Appendix H.

Verified Unit Energy Savings

The Evaluation Team used these algorithms to calculate the verified, gross, unit energy savings, and demand reduction for CFLs and LEDs installed in residential and nonresidential applications:

$$\Delta kWh = {}^{\Delta Watts}/_{1{,}000} * ISR * HOU * 365$$

$$\Delta kW = {}^{\Delta Watts}/_{1{,}000} * ISR * CF$$

The inputs were derived from the cross-sector sales proportion (described in more detail in the *Cross-Sector Sales* section). Appendix H provides the descriptions, values, and sources for all of the inputs that the Program Implementer applied to estimate *ex ante* savings and that the Evaluation Team applied to estimate verified savings.

Table 85 provides the *ex ante* gross unit savings and the verified gross unit savings with associated realization rates. The verified gross unit savings separated for residential and nonresidential savings can also be found in Appendix H.

Table 85. CY 2016 Lighting Unit Savings by Measure

Measure	Quantity	*Ex Ante* Unit Savings		Verified Gross Unit Savings		Realization Rate	
		kWh	kW	kWh	kW	kWh	kW
CFL, Reflector[1]	2,586	51	0.006	35	0.004	69%	71%
CFL, Standard Bulb, 310-749 lm	1,903	20	0.002	18	0.002	91%	88%
CFL, Standard Bulb, 750-1,049 lm	589,187	30	0.004	29	0.003	96%	93%
CFL, Standard Bulb, 1,050-1,489 lm[1]	2,386	35	0.004	31	0.004	89%	87%
CFL, Standard Bulb, 1,490-2,600 lm	90,845	50	0.006	47	0.005	93%	93%
LED, Reflector	726,180	54	0.006	50	0.006	90%	90%
LED, Omnidirectional, 310-749 lm	286,352	22	0.003	26	0.003	119%	118%
LED, Omnidirectional, 750-1,049 lm	2,221,458	33	0.004	33	0.004	99%	97%
LED, Omnidirectional, 1,050-1,489 lm	32,482	41	0.005	40	0.005	98%	98%
LED, Omnidirectional, 1,490-2,600 lm	139,220	55	0.006	56	0.007	103%	101%

[1]The Evaluation Team was not able to evaluate per-unit savings for this bulb type because the Program Implementer tracking database did not include it. Therefore, the Team applied verified per-unit energy savings from its CY 2015 analysis.

One of the primary factors driving most of the realization rates below 100% in Table 85 is that the Program Implementer (and the Wisconsin TRM) did not apply an ISR. The LED realization rates were consistently higher than the corresponding CFL realization rates because the delta watts for LEDs were higher than assumptions in the TRM, while the delta watts for CFLs were lower than assumptions in the TRM. Furthermore, the LED ISR was slightly higher than the CFL ISR. The verified delta watts for each

measure also accounted for a small portion of the variation in the realization rates. The Evaluation Team used the actual efficient wattage for each bulb using bulb data from the Program Implementer tracking database, whereas the Wisconsin TRM provided deemed wattages and bins for the measures listed in Table 85.

Like CY 2015, delta watts for CFL reflectors showed the highest degree of variability between *ex ante* and verified gross assumptions. The *ex ante* assumptions applied a single delta watts value of 65 for all CFL reflectors, whereas the Evaluation Team applied specific lumen bins. This difference in the CFL reflector baseline drove the lower realization rate for CFL reflectors.

The following sections describe the methodology and results for updating ISRs and delta watts.

In-Service Rates

The Evaluation Team calculated two types of ISRs in CY 2016: first-year and lifetime. The first-year ISR represented the percentage of bulbs still installed, in use, and operating properly following the purchase of all bulbs within 12 months. During the CY 2016 in-home audits, the Evaluation Team inventoried bulbs and estimated a first-year ISR for CFL and LED bulbs. Table 86 shows the first-year ISRs estimated by measure for CY 2016.

Table 86. CY 2016 Lighting Measure-Level First-Year In-Service Rates

Bulb Type	First-Year ISR[1]
CFL	62%
LED	83%

[1] In CY 2015, the Evaluation Team changed to applying a net present value ISR that accounts for future installations of bulbs put into storage during the first year of purchase.

The first-year ISRs help explain the installations during the first year after purchase but do not account for the eventual installation in subsequent years. A common approach factors in the trajectory of installations, which is also documented in the UMP.[45]

The trajectory of installations is imputed annually between year one and year four, after which the UMP recommends either claiming savings in the year in which the bulbs are installed or—if all savings are claimed in the program year in which the bulbs are sold—discounting the future savings to properly account for installations in the cost-effectiveness calculations. The UMP-based four-year CFL installation trajectory values, along with a single four-year discounted installation rate, are shown in Table 87. The verified gross savings apply the net present value ISRs of 96% for CFLs and 97% for LEDs.

[45] National Renewable Energy Laboratory. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* "Chapter 21: Residential Lighting Evaluation Protocol." Prepared by Apex Analytics, LLC. February 2015. Available online: http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter21-residential-lighting-evaluation-protocol.pdf

Table 87. Lifetime CFL and LED In-Service Rates

Bulb Type	First-Year ISR	Second-Year ISR	Third-Year ISR	Fourth-Year ISR	Net Present Value ISR
CFL	62%	78%	88%	97%	96%
LED[1]	83%	90%	95%	97%	97%

[1] Note that the UMP includes only CFL-based trajectories. To provide a similar analysis for LEDs, the Evaluation Team applied the same relative percentage trajectory as CFLs, assuming 100% installation after four years. The Evaluation Team determined that this is a reasonable assumption due to the higher cost and fewer LED bulbs sold per package compared to CFLs.

Delta Watts Analysis

The Evaluation Team employed the lumen equivalence methodology to determine the baseline wattage for each Program bulb. Calculating the difference between the baseline and efficient wattages provided the delta watts input.

The Evaluation Team matched each individual bulb from the Program Implementer's tracking database, using its model number, to its corresponding listing in the ENERGY STAR-qualified product list database. The ENERGY STAR database provided other product details for each bulb, including lumen output, rated wattage, technology (CFL or LED), type, and ENERGY STAR certification status. If these data were not available, the Evaluation Team used the database values for lumens and/or efficient wattage from the Program Implementer's database, or conducted internet searches based on product make and model numbers.

The Evaluation Team then categorized each bulb into specific bins, based on the bulb lumen output and type. Each bin had an assumed baseline wattage for use in the delta watts calculation. The UMP provides lumen bins for standard, decorative, globe, and EISA-exempt lamps. For example, the bins and associated baseline halogen watts for standard bulbs are shown in Table 88.

Table 88. EISA (Phase 1) Lumen Bins and Baseline Watts for Standard Bulbs

Lumen Bin	2016 EISA Baseline	EISA
0-309	25	Not impacted by EISA
310-449	25	EISA impacted
450-799	29	
800-1099	43	
1100-1599	53	
1600-1999	72	
2000-2600	72	
2601-3300	150	Not impacted by EISA
3301-4815	200	

Source: *Energy Independence and Security Act of 2007*. Public Law 110-140-December 19, 2007. 121 Stat. 1492. Available online: https://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf. Note that in December 2016 the U.S. Department of Energy issued two final rules proposing to keep the existing EISA "Phase 2" backstop provision set to take effect on January 1, 2020, as well as expanding the definition of EISA general service lamps (and thus the types of lamps impacted by the backstop provision) to include a number of previously exempted lamps, including globes, candelabras, reflectors, and lamps up to 3,300 lumens. Although these rules do not immediately impact the first-year savings for lighting, they could have impacts on the measure lifetimes for a wider assortment of bulbs than were previously impacted. See U.S. Department of Energy 10 CFR Part 430, Docket Number EERE–2013–BT–STD–0051, RIN 1904-AD09.

EISA affects bulbs only in the 310 to 2,600 lumen output range. The Evaluation Team applied a similar methodology to categorize specialty bulbs, reflectors, or EISA-exempt bulbs into their respective bins with different lumen ranges and different baselines.

For reflectors, the UMP defers to EISA requirements for the determination of lumen bins and does not list them explicitly. The Mid-Atlantic TRM presents an analysis examining the requirements and defines lumen bins for six different reflector categories, depending on reflector type and diameter.[46]

The average delta watts for each category are listed in Table 89 and compared to the *ex ante* delta watts. The *ex ante* delta watts are based off of values deemed in the 2016 Wisconsin TRM and not directly on the sales data (which can vary within each measure name category). The average, verified, gross delta watts is calculated by subtracting the wattage of the efficient bulb from the baseline wattage determined from its lumen bin, which causes variation between the *ex ante* delta watts and the evaluated delta watts. Similar to CY 2015, the comparison in Table 89 shows strong agreement between the verified and *ex ante* delta watts values.

[46] Northeast Energy Efficiency Partnership. *Mid-Atlantic Technical Reference Manual (TRM)*. Version 5.0. May 2015. Available online: http://www.neep.org/mid-atlantic-technical-reference-manual-v5

Table 89. CY 2016 *Ex Ante* and Verified Gross Delta Watts

Measure	*Ex Ante* Delta Watts	Average Verified Gross Delta Watts
CFL, Reflector[1]	50	39
CFL, Standard Bulb, 310-749 lm	20	19
CFL, Standard Bulb, 750-1,049 lm	30	30
CFL, Standard Bulb, 1,050-1,489 lm[1]	35	34
CFL, Standard Bulb, 1,490-2,600 lm	49	49
LED, Reflector	53	52
LED, Omnidirectional, 310-749 lm	22	27
LED, Omnidirectional, 750-1,049 lm	32	34
LED, Omnidirectional, 1,050-1,489 lm	40	42
LED, Omnidirectional, 1,490-2,600 lm	55	58

[1]The Evaluation Team was not able to evaluate delta watts for this bulb type because the Program Implementer tracking database did not include it. Therefore, the Team applied verified gross delta watts values from its CY 2015 analysis.

Cross-Sector Sales

In CY 2015, the Evaluation Team surveyed Focus on Energy's residential customers (residential general population survey) and a subset of its small business customer base to estimate the percentage of customers (from each population) who purchased CFLs and/or LEDs from a participating retailer during the previous 12 months. Because store intercept studies and the phone surveys have inherent biases specific to the populations they target and the methods they employ, the Evaluation Team combined the results from CY 2015 survey with those from the CY 2014 intercept study. By averaging the CY 2014 residential store intercept study (7.1%) and the CY 2015 phone survey (6.0%), the cross-sector sales proportion was 6.6%.

Because there had been no large changes to the Program design or population from CY 2015 to CY 2016, the Evaluation Team applied the 6.6% cross-sector sales proportion to CY 2016 bulbs. Appendix I of the *Focus on Energy CY 2015 Evaluation Report* describes the full methodology and findings of the cross-sector sales analysis.[47]

[47] Cadmus *Focus on Energy Calendar Year 2015 Evaluation Report. Appendices.* Prepared for Public Service Commission of Wisconsin. May 20, 2016. Available online: https://www.focusonenergy.com/sites/default/files/WI%20FOE%20CY%202015%20Appendices.pdf

CY 2016 Verified Gross Savings Results

Overall, the Retailer Lighting and Appliance Program achieved an annual evaluated realization rate of 98% for electric energy and 97% for demand savings (Table 90).[48]

Table 90. CY 2016 Retailer Lighting and Appliance Program Annual and Lifecycle Realization Rates by Measure Type

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	KWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
CFL	95%	93%	n/a	95%	86%	93%	n/a	86%
LED	98%	97%	n/a	98%	83%	97%	n/a	83%
Overall	**98%**	**97%**	**n/a**	**98%**	**83%**	**97%**	**n/a**	**83%**

The main factors that caused realization rates to fall below 100% included these:

- No *ex ante* ISR applied
- Lower verified gross cross-sector sales percentage
- Differences in delta watts (in some cases)

The Program's electric demand savings realization rate was slightly lower than the electric energy savings because of differences in the coincidence factor applied. The Wisconsin TRM uses a coincidence factor for the *ex ante* calculation based on a weighted value from single-family residential, multifamily residential, and nonresidential coincidence factors. The Wisconsin TRM weights the nonresidential coincidence factor for 7.1% of bulbs. The Evaluation Team applied the verified gross cross-sector sales percentage of 6.6%,[49] meaning that fewer bulb savings were estimated using the higher nonresidential coincidence factor and more were estimated using the lower residential coincidence factor.

The lifecycle realization rate differed from the annual realization rate because the Evaluation Team applied lower EUL values for CFL and LED bulbs used in nonresidential applications.

Table 91 lists the *ex ante* and verified annual gross savings for the Retailer Lighting and Appliance Program for CY 2016.

[48] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

[49] The Evaluation Team calculated this cross-sector sales percentage form the results of its CY 2015 general population survey.

Table 91. CY 2016 Retailer Lighting and Appliance Program
Annual Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
CFL	22,471,316	2,678	0	21,321,717	2,486	0
LED	127,810,440	15,044	0	125,620,719	14,648	0
Total Annual	**150,281,756**	**17,722**	**0**	**146,942,436**	**17,135**	**0**

Table 92 lists the *ex ante* and verified gross lifecycle savings by measure for the Retailer Lighting and Appliance Program in CY 2016.

Table 92. CY 2016 Retailer Lighting and Appliance Program
Lifecycle Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
CFL	181,175,329	2,678	0	155,801,395	2,486	0
LED	2,556,208,800	15,044	0	2,109,415,017	14,648	0
Total Lifecycle	**2,737,384,129**	**17,722**	**0**	**2,265,216,411**	**17,135**	**0**

Evaluation of Net Savings

This section details the Evaluation Team's methods for estimating the net Program savings. Assessing net savings for upstream lighting evaluations faces a number of unique challenges, which include the upstream design of the Program (i.e., the Program is largely "invisible" to customers purchasing Program bulbs), the rapidly changing market due to EISA, the release of a new ENERGY STAR lighting specification in 2016, and the rapid introduction of lower-cost LED lamps.

To account for these challenges, the Team chose to assess NTG for the upstream lighting portion of the Program using these three methods—demand elasticity modeling, corporate retailer and manufacturer surveys, and national sales data modeling. Using three methods balances the strengths and limitations of each method and allows for a more comprehensive assessment that captures each of the NTG components (freeridership, participant spillover, and nonparticipant spillover). The next section presents the approach and findings for each of these methods then describes the approach to triangulating each set of findings.

Demand Elasticity Modeling

Demand elasticity modeling uses sales and merchandising information to achieve the following:

- Quantify the relationship of price and promotion to sales
- Determine likely sales levels without the program's intervention (baseline sales)

After estimating variable coefficients, the Evaluation Team used the resulting model to predict these:

- Sales that would occur *without* the program's price and merchandising impact
- Sales that would occur *with* the program (and should be close to actual sales with a representative model)

The Evaluation Team applied evaluated savings values, calculated as part of this evaluation, to these sales predictions and then calculated freeridership using this formula:

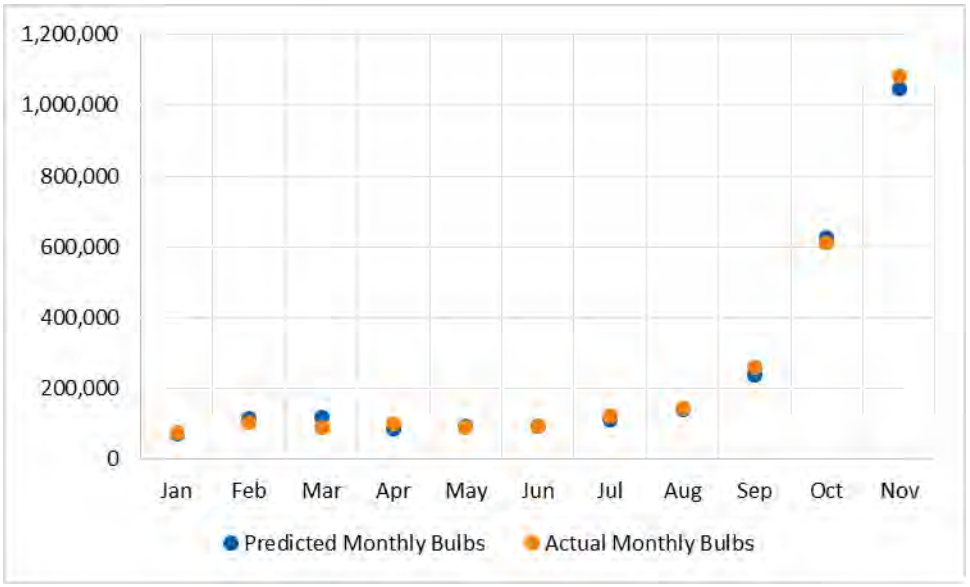
$$FR\ Ratio = \left(\frac{Modeled\ Savings\ without\ Program}{Modeled\ Savings\ with\ Program}\right)$$

Model Specification

The Evaluation Team modeled the data as a panel, using a cross-section of Program bulb quantities over time as a function of prices, promotional events, and retail channels. The fit of the model was based on how closely the model predicted sales match actual sales.

As shown in Figure 62, the model-predicted sales matched the actual sales very closely with no persistent bias, indicating a good model fit.

Figure 62. Predicted Versus Actual Bulb Sales by Month

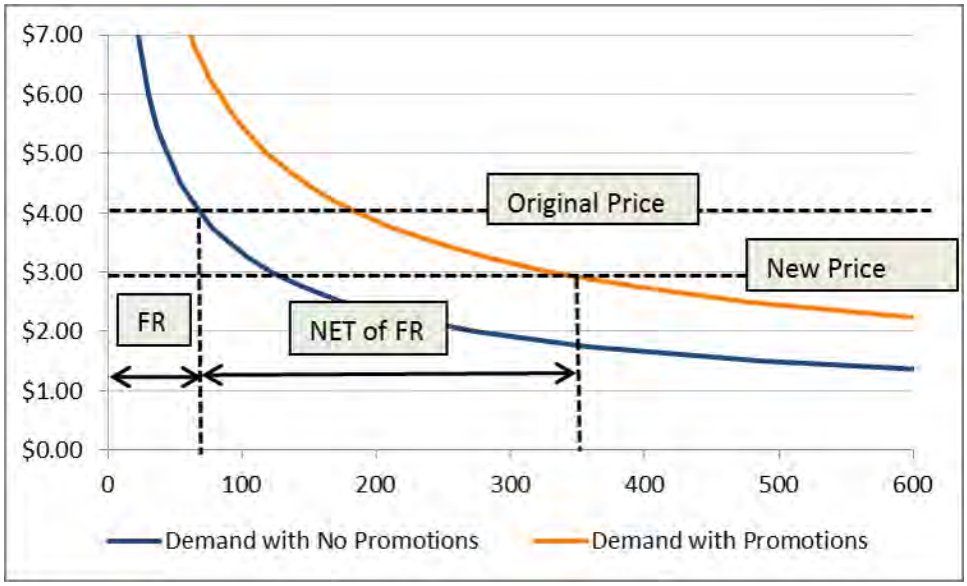


Elasticities

The Evaluation Team determined the Program's freeridership ratios, in part from the estimate of the price elasticity of demand, which measures the percentage change in the quantity demanded (bulb sales) given a percentage change in price. The model's coefficients represent the elasticity for each price variable. The sign of the coefficient specifies the relationship between changes in both the quantity

demanded and price. A negative coefficient indicates that an increase in price correlates with a decrease in sales and vice versa. Figure 63 illustrates changes in the demand curve for a hypothetical bulb.

Figure 63. Illustration of Hypothetical Demand Curve



In this example, the blue line represents the demand for bulbs at each price assuming no merchandising takes place. The slope of the curve is the elasticity. If $4 is the original price without any program incentives, the corresponding quantity demanded is approximately 75 bulbs. These are the freerider sales, as these units would have been purchased in the absence of the program. Changes in price move demand along the blue line. If the price drops to $3, the quantity demanded increases to approximately 125 bulbs. The difference between the quantity demanded with incentives and without, in this case 50 bulbs, is the net lift.

The steeper the slope of the demand curve, the greater the elasticity. This means that for a given markdown (program incentive relative to the original retail price) a greater elasticity means lower freeridership.

The orange line represents demand with merchandising promotions, which increase sales at every price and shift the demand curve to the right.

The demand elasticity model estimates the slope of the demand curve and how far merchandising promotions shift the demand curve. The model then predicts sales at the program price as well as the price absent program incentives to estimate the freerider sales and net lift. In previous, similar analyses, the Evaluation Team has seen elasticities range from -1 to -3 for efficient lighting products, meaning a 10% drop in price corresponds with a 10% to 30% increase in the quantity sold.

The Evaluation Team categorized the Program's bulb sales by the retail channel through which they were purchased (big-box do-it-yourself [DIY] store, club store, large hardware, grocery store, or mass market retailer). Table 93 depicts the average elasticity estimates for each category.

Table 93. CY 2016 Average Elasticity Coefficient by Channel

Channel	Technology	Elasticity Coefficient
Club	LED	-1.38
DIY	LED	-1.86
Grocery	LED	-0.26
Large Hardware	LED	-0.55
Mass Market	LED	-1.76

The elasticity estimates largely fell within expected ranges within club, DIY, and mass market stores. However, at grocery and large hardware stores, the elasticities were lower than expected at -0.26 and -0.55, respectively.

Cadmus reviewed the data at grocery and large hardware stores thoroughly, but the data did not show a clear relationship between price and sales at the grocery and large hardware retailers. Table 94 provides an example, comparing the proportional change in sales from month to month for general service bulbs within the DIY channel, where the relationship between price and sales is clear and what we would expect, and the grocery channel, where there is no clear relationship.

Table 94. CY 2016 Percentage Change in Sales and Prices – Month-to-Month

Month	DIY - General Service		Grocery - General Service	
	Percentage Change Sales	Percentage Change Price	Percentage Change Sales	Percentage Change Price
January	-	-	-	-
February	86%	10%	895%	0%
March	3%	-9%	-3%	0%
April	-32%	-5%	37%	-3%
May	57%	-12%	475%	-14%
June	-4%	-4%	-60%	-1%
July	28%	0%	-28%	-19%
August	20%	-8%	90%	0%
September	131%	-33%	119%	-5%
October	306%	-42%	71%	-49%
November	326%	-38%	2%	13%

Within the DIY channel, the largest increases in sales occurred between September and November and coincided with the largest decreases in the average price per bulb. Within the grocery channel, the same pattern was not observed. The largest month-to-month increase in sales was between January and

February when there was no price change while the largest decrease in price (49%) within the grocery channel occurred between September and October and coincided with only a 71% increase in sales.

It is possible that purchasing behavior differed between grocery stores and DIY stores and that consumers were less likely to stock up on bulbs when prices were low, instead primarily purchasing bulbs when the need arose, such as an existing bulb burned out. It is also possible that elasticity estimates underestimated the Program effect because the model could not capture substitution between halogen bulbs and Program LEDs. Finally, because Program Implementer merchandising data was incomplete and the Evaluation Team was not able to include merchandising impacts in its model, it is possible that there were Program impacts separate from price that drove some of the sales peaks at grocery and large hardware stores. Store and product-specific display and merchandising information would increase the likelihood of being able to estimate separate Program impacts for price and merchandising.

Nevertheless, the Evaluation Team's analysis of the Program Implementer dataset showed that the grocery and large hardware retailer LED sales did not appear to have been very sensitive to changes in price.

Elasticity estimates are provided in more detail in Appendix I and show the differences between retail channels as well as bulb types, such as reflector, specialty, and standard bulbs.

Results

Table 95 shows the freeridership scores by measure. Overall, the demand elasticity modeling of the Program's freeridership averaged 35% for CFLs and LEDs.

Table 95. CY 2016 Demand Elasticity Modeling Freeridership Ratio Estimates by Measure

Measure	Freeridership
CFL	17%
LED	38%
Overall	**35%**

As stated above, the freeridership score for CFLs was carried over from the CY 2015 demand elasticity modeling results. Freeridership increased slightly for LEDs from CY 2015, from 29% up to 38% in CY 2016, and was probably because of naturally decreasing prices and the increasing prevalence of LEDs in the market.

Corporate Retailers and Manufacturer Surveys

The Evaluation Team fielded surveys with manufacturers and retailers to gain insight into what LED sales would have been without the incentives, marketing, education, and other Program influences. The corporate contacts, in particular, had unique knowledge of both Program and non-program LED sales at their companies and could estimate the impact of the Program on all of their company's LED sales.

The Evaluation Team used responses from the following questions to estimate attribution from the surveys:

- **Total number of LED bulbs sold.** Respondents estimated the percentage of total store-level LED sales the Program LEDs represented. The Evaluation Team combined that estimate with the Program Implementer's database to extrapolate store-level LED sales.[50]
- **Likelihood to sell LED bulbs in absence of the discount.** The Evaluation Team asked respondents about their likelihood of selling the same number of LEDs if they had not been discounted: "Do you think your sales of these LEDs would have been the same, lower, or higher without the Focus on Energy Program?"
- **Magnitude of impact.** For those that indicated sales would have been higher or lower in absence of the Program, the Team then asked "By what percentage would store sales of LED products have been higher/lower without the Program?"

Overall, the 71 storefront managers surveyed represented 27% of stores delivering CY 2016 year-to-date Program LED sales. Unfortunately, the Evaluation Team found that the majority of storefront managers (51 of 71) were unable to comment about the Program influence on LED sales at their store nor complete the NTG questions. Because only 20 storefront managers (representing less than 10% of Program LED sales) could provide responses, coupled with the high degree of uncertainty around the attribution estimate (responses varied from 0% to 100% attribution), the Evaluation Team did not use the storefront manager responses in the triangulation task.

Nevertheless, most storefront managers reported that the Program was responsible for at least some increase in LED sales.

The Evaluation Team also surveyed four corporate retailers and three manufacturers. Six provided responses to the key attribution questions about overall sales, Program percentage of sales, and percentage reduction if the Program had not been active. One was unsure of the answers and did not respond. All seven corporate contacts said LED sales would have been lower in the absence of the Program, verifying that all believed the Program had some level of impact on their LED sales.

The individual NTG estimates from the six corporate contacts are shown in Table 96. The lowest NTG score was 50%, while the highest was 150%. There is a clear delineation between the corporate retailer and manufacturer estimates: the corporate retailers were more conservative in their estimates (average of 66%), while manufacturers said the incentives had a considerably larger impact on their sales (average of 101%). The high manufacturer responses could be because these responses included

[50] For example, if the tracking database showed 1,000 LEDs rebated through the Program and the respondent estimated that 50% of their LED sales were through the Program, then their total LED sales would be 2,000. The Evaluation Team then asked the participating retailer to verify the accuracy of this total LED sales estimate.

significant nonparticipant spillover (i.e., nonparticipating retailers for which manufacturers supply product) and because of the manufacturers' close involvement in the Program.

Table 96. Corporate Retailer and Manufacturer Self-Report Results

Respondent	NTG	Weighted Average NTG	Percentage of CY 2016 Program LED Sales[1]
Corporate Retailer 1	50%	66%	20%
Corporate Retailer 2	67%		
Corporate Retailer 3	70%		
Manufacturer 1	150%	101%	79%
Manufacturer 2	100%		
Manufacturer 3	92%		

[1] This represents the percentage of Program sales sold by these respondents.

National Sales Data Modeling

The Evaluation Team developed a national lighting sales model to determine Program attribution for the Wisconsin efficient lighting market. The model quantified the relationship between Program intensity (e.g., Program spending per household) and efficient lighting sales (the percentage of light bulb purchases that are efficient). This section provides a high-level overview of the Team's analysis and findings. National sales data modeling findings are provided in more detail in Appendix I.

Data Sources

The Evaluation Team leveraged a variety of data sources for model development but relied primarily on 2015 sales data prepared by the Consortium for Retail Energy Efficiency Data (CREED) LightTracker initiative.[51,52] Most of these sales data were generated from two sources—point-of-sale (POS) state sales data (representing one group of retail channels) and National Consumer Panel state sales data (representing a different group of retail channels)—that collectively represent the majority of bulb sales across the United States. The model also included inputs from a combination of Program data collected

[51] CREED is a consortium of program administrators, retailers, and manufacturers that collect the necessary data to better plan and evaluate energy efficiency programs. LightTracker, CREED's first initiative, focused on acquiring full-category lighting data—including incandescent, halogen, CFL, and LED bulb types—for all distribution channels in the entire United States. As a consortium, CREED speaks as one voice for program administrators nationwide as they request, collect, and report on the sales data needed by the energy efficiency community. More details are available online: https://www.creedlighttracker.com. Note that 2015 data was the most recent year available at the time of this study.

[52] The information contained herein is based in part on data reported by IRI through its Advantage service, interpreted solely by LightTracker. Any opinions expressed herein reflect the judgement of LightTracker, Inc. and are subject to change. IRI disclaims liability of any kind arising from the use of this information.

by the Evaluation Team and household and demographic data collected through various publicly available websites.

The primary model input data sources were these:

- National bulb sales
  - POS data (grocery, drug, dollar, discount, mass merchandiser, and selected club stores)
  - Panel data (home improvement, hardware, online, and selected club stores)
- U.S. Census Bureau import data (CFLs)
- ENERGY STAR shipment data (imports and ENERGY STAR market share)
- North American Electrical Manufacturers Association shipment data
- American Community Survey (ACS) data (household characteristics and demographic data)
- Retailer square footage per state (based on the two primary retailer channel data sources)
- General population surveys, lighting saturation studies, and other primary data collection made publicly available through evaluation reports

Modeling Methods

The primary goal of the model was to quantify the impact of state-level program activity on the sales of efficient lighting. A number of factors influence the sales of efficient lighting and, as noted above, the Evaluation Team considered a number of demographics, household characteristics, and retail channel variables to capture and control for the unique characteristics of each state that could affect the uptake of efficient lighting products.

Using the results of the regression model, efficient bulb sales data, and the Program tracking databases, the Evaluation Team estimated NTG ratios for all efficient bulbs (CFLs and LEDs), CFLs only, and LEDs only in 2015. The Team derived NTG ratios by first using the model to predict the share of efficient bulbs with and without a program (determining the counterfactual of no program activity by setting the program variable to zero). This change in share represents the program lift, or net increase in the share of efficient bulbs resulting from program activity.

To then calculate NTG, the Team multiplied the change in share by the total number of bulbs—for all bulb types—sold in 2015. This value represents the net impact of the program (i.e., the total lift in the number of efficient bulbs sold), which the Team then divided by the total number of program bulbs sold (i.e., the gross number of bulbs) to determine NTG:

$$NTGR = \frac{(\#\ bulbs\ sold\ with\ program - \#\ bulbs\ sold\ with\ no\ program)}{\#\ of\ program\ incented\ bulbs\ sold}$$

Results

As shown in Table 97, the estimated 2015 NTG modeled ratio for CFLs and LEDs combined is 72%.

Table 97. Net-to-Gross Calculations

Calculation Term	Value
Total Wisconsin Bulbs Sold in 2015	32,830,300
Program $ per Household Actual	$4.80
Program $ per Household with Manufacturer Incentives	$5.29
Program $ per Household Counterfactual	$0.00
Energy Efficient Market Share Counterfactual	38.0%
Energy Efficient Market Share Modeled	50.6%
Energy Efficient Market Share Actual	53.6%
Efficient Bulbs Counterfactual	12,488,631
Efficient Bulbs Modeled	16,604,330
Efficient Bulbs Actual	17,602,011
Program Bulbs Sold in 2015	5,737,096
Net Bulbs Modeled	4,115,700
Net-to-Gross Ratio Modeled	**72%**

The Evaluation Team also developed separate models for CFLs and LEDs, but robustness of the models suffered because only 19 states had sufficiently granular data to estimate a lamp-specific model. This lack of data was largely due to LEDs still gaining market share in 2015, and it was challenging to gain technology-specific program spending for a number of states. As the LED market share increases in 2016 and 2017, and more states emphasize LEDs and phase out program CFL support, the findings from LED-only models will be more robust.

Triangulation

As shown in Table 98, the NTG results ranged from a low of 62% (demand elasticity modeling) to a high of 101% (manufacturer interviews). Although this appears to be a wide range, three of the four methods provided relatively similar results (62% to 72%). In addition, as shown in Table 99, demand elasticity modeling is the only method that does not include any form of spillover because it measures net-of-freeridership; therefore, it is expected to be the lowest estimate.

Table 98. Summary of Lighting Net-to-Gross Results

Method	Year Analyzed[1]	Technology	NTG
Demand Elasticity Modeling	2015 and 2016	LEDs	63%
National Sales Data Modeling	2015	CFLs and LEDs	72%
Corporate Retailer Interview	2016	LEDs	66%
Manufacturer Interviews	2016	LEDs	101%

[1]This represents the year the data was collected (e.g., sales data from 2015 or 2016); the actual analysis may have been completed in a subsequent year.

Table 99. Summary of Lighting Net-to-Gross Components

Evaluation Activity	Freeridership	Participant Spillover	Nonparticipant Spillover
Demand Elasticity Modeling	✓		
National Sales Modeling	✓	✓	✓
Corporate Retailer Interviews	✓	✓	
Manufacturer Interviews	✓	✓	✓

Strengths and Limitations

As noted above, each of the NTG methods has a number of strengths and limitations (or threats to validity). Table 100 summarizes each of these, and Appendix I provides additional details regarding the strengths and limitations for each method.

Table 100. Summary of Lighting Net-to-Gross Methods: Strengths and Limitations

Method	Strengths	Limitations
Demand Elasticity Modeling	• Based on actual sales data (not self-report) • Follows program theory (the relationship between the decrease in price and the increase in sales) • Stratification by sales channel and bulb style	• Not able to capture all variables that affect sale of efficient bulbs Lack of non-Program sales data • Does not measure spillover – only measures freeridership • Does not control for cross-price elasticities or how sales volume is affected by non-program substitute goods
National Sales Data Modeling	• Based on actual or estimated sales data (not self-report) • Measures all forms of spillover (total sales)	• Not able to capture all variables that affect sale of efficient bulbs • Must estimate sales for certain channels • Cannot account for cross-state effects of the Program • The model had combined CFL and LED 2015 results
Corporate Retailer/ Manufacturer Interview	• Captures participant spillover • Analogous to consumer self-report • No “black box”	• Respondent fatigue • Social desirability/gaming bias from retailers and manufacturers • Recall bias of sales estimates

Integrating Estimates to Determine Net-to-Gross

Upon weighing the comprehensiveness and strengths and limitations of each method, the Evaluation Team elected to use a data-driven approach to estimate the final NTG ratio. Specifically, the Team developed precision estimates for each of the selected methods and used these estimates to produce a weighted average NTG. Inverse-variance (precision) weighting is a common method of aggregating two or more estimates of the same metric of interest. This approach minimizes the variance of the weighted average. Each estimate is weighted in inverse proportion to its precision.

For the demand elasticity modeling and national sales data modeling approaches, the Evaluation Team used the precision output from the models. The corporate retailer and manufacturer interviews, although representing the majority of Program bulbs, were based on small samples, and thus a statistical precision estimate could not be developed. For these, the Team qualitatively selected a precision estimate of 50%, recognizing that the manufacturers, although having excellent knowledge of the Program, provided what appeared to be an outlier estimate compared to the other methods.

As shown in Table 101, the final weighted NTG ratio for LEDs is 68%. The demand elasticity modeling had the lowest precision, and thus it received the highest weight (50%), while the other methods each received weights of approximately 4% to 7%. The Team recognizes that this approach does emphasize the demand elasticity modeling over the other methods, but it believes this is reasonable based on a number of factors:

- The demand elasticity modeling is based on actual Program LED sales in CY 2015 and CY 2016, while the other methods incorporated combinations of technologies (such as CFLs and LEDs, combined) or estimated sales.
- The weighted NTG was robust even if the precision for the demand elasticity modeling was assumed to be much higher. For example, a three-fold increase in the CY 2016 demand elasticity modeling precision (from 7% to 21%) bumps the demand elasticity modeling weight down to only 14%, but the resulting NTG ratio only increases to 71%.
- The demand elasticity modeling had the lowest NTG estimates, but by incorporating the other methods the final NTG is still able to include a "bump" in the NTG ratio to account for the various forms of spillover.

Table 101. Summary of Lighting Net-to-Gross Results for LEDs

Method	NTG	Estimated Precision[1]	1/Precision Score	Weight[2]
Demand Elasticity Modeling – CY 2016	62%	7%	14.3	28%
Demand Elasticity Modeling – CY 2015	69%	10%	10.0	22%
National Sales Data Modeling	72%	35%	2.9	7%
Corporate Retailer Interview	66%	50%	2.0	4%
Manufacturer Interviews	101%	50%	2.0	6%
Weighted Average				**68%**

[1] Precision is an output from the demand elasticity modeling and national sales data models. For the corporate retailer and manufacturer interviews, which relied on small samples, the precision was estimated by the Evaluation Team.

[2] Weights are derived by taking the sum of 1/precision score and then dividing each value by the total. For example, the demand elasticity modeling had a precision of 7%, so 1/precision score = 1/7 = 14.3. The combined scores summed to 21, so 14.3/21 = 68%.

Because the Program discontinued CFLs by the end of CY 2016, the current research did not focus on CFLs, and the Evaluation Team recommended that the prior NTG value from the CY 2015 evaluation for CFLs (96%) be used for CY 2016 CFLs. This CY 2015 ratio included net-of-freeridership from the demand

elasticity modeling and spillover from the lighting saturation model. The Evaluation Team did not apply spillover from the lighting saturation model to the CY 2016 LED NTG ratio because spillover was captured through the national sales data modeling and corporate and manufacturer interviews. Therefore, applying the results from the lighting saturation model to the LED NTG ratio would double-count spillover.

CY 2016 Verified Net Savings Results

LED triangulation and CFL demand elasticity modeling yielded an overall NTG ratio estimate of 72% for the Program. Table 102 shows the annual net energy impacts (kWh, kW, and therms) by measure for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 102. CY 2016 Retailer Lighting and Appliance Program Annual Net Savings

Measure	Annual Net		
	kWh	kW	therms
CFL	20,568,275	2,399	0
LED	85,329,891	9,950	0
Total Annual	**105,898,165**	**12,349**	**0**

Table 103 shows the lifecycle net energy impacts (kWh, kW, and therms) by measure for the Program.

Table 103. CY 2016 Retailer Lighting and Appliance Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
CFL	150,295,866	2,399	0
LED	1,432,854,017	9,950	0
Total Lifecycle	**1,583,149,883**	**12,349**	**0**

Process Evaluation

The Evaluation Team focused its process evaluation on these key topics for the lighting component of the Retailer Lighting and Appliance Program:

- Program successes and challenges
- In-store outreach activities
- Motivations and barriers to adoption of efficient lighting technologies
- Lighting retailer and manufacturer Program experience and satisfaction
- Penetration and saturation of residential efficient lighting
- The Evaluation Team also reviewed a nationwide process evaluation conducted by ENERGY STAR for the RPP

Program Design, Delivery, and Goals

The Evaluation Team drew from interviews, surveys, and Program materials to document the Program's design and implementation process in CY 2016.

Program Design

Lighting Component

The Program Administrator and Program Implementer designed the Program to achieve energy savings by partnering with manufacturers and retailers to offer information on high-efficiency products and reduced pricing on qualified CFL and LED products for residential customers. The Program Implementer managed memorandums of understanding (MOUs) with partnering retailers and manufacturers to deliver lighting Program offerings.

The Program's lighting offerings became LED-exclusive in the second quarter of CY 2016. The Program Implementer said retailers did not express concern with the Program's discontinuation of CFL offerings and assumed the reason was that much of retailers' stock had changed to LED products. The Program Implementer, Program Administrator, and PSC approved a non-ENERGY STAR, "value" LED specification but opted not to offer incentives for this product in CY 2016.

Retail Products Platform

The Program Administrator launched the RPP in April 2016. The RPP delivers incentives directly to participating retailers for sales of qualified products, encouraging them to sell more efficient appliances through product placement and promotion and by increasing their assortment of energy-efficient models. The EPA's ultimate objective, by accelerating the stocking and sale of energy-efficient appliances (with the assistance of participating program implementers and retailers), is to transform the market so that the purchase of efficient appliances becomes standard practice.

Market transformation is a long-term process and can take considerably longer to produce measurable impacts than resource acquisition programs, such as the lighting component of the Program. The primary benefit of market transformation programs is that once they take effect, their effects persist much longer than other program designs. Key differences between resource acquisition and market transformation programs are presented in Table 104.

Table 104. Distinctions between Resource Acquisition and Market Transformation Programs

Measure	Resource Acquisition Program	Market Transformation Program
Scale	Program	Entire defined market
Target	Participants	All consumers
Goal	Near-term savings	Structural changes in the market leading to long-term savings
Approach	Save energy through customer participation	Save energy through mobilizing the market

Measure	Resource Acquisition Program	Market Transformation Program
Scope of Effort	Usually from a single program	Results from effects of multiple programs or interventions
Amount of Program Administrator's Control	Program Administrators can control the pace, scale, and geographic location and can identify participants	Markets are very dynamic, and the Program Administrators are only one set of actors. If, how, where, and when the impacts occur are usually beyond the control of the program administrators.
What is Tracked, Measured, and Evaluated	Energy use and savings, participants, and freeridership	Interim and long term indicators of market penetration and structural changes, attribution to the program, and cumulative energy impacts
Timeframe for Cost-Effectiveness	Usually based on first-year or lifecycle savings	Usually planned over a 5-to-10-year timeframe

Source: Keating, Ken. *Guidance on Designing and Implementing Energy Efficiency Market Transformation Initiatives*. California Public Utilities Commission. December 9, 2014. Available at: http://www.energydataweb.com/cpucFiles/pdaDocs/1206/Guidance%20on%20Designing%20and%20Implementing%20MT%20Initiatives_Dec9%202014%20Final.docx

Currently, 74 stores participate in the RPP in Wisconsin, distributed among three retailers:

- Best Buy (22)
- Home Depot (27)
- Sears/Kmart (25)

The Program Administrator and Program Implementer worked with retailers to include these products in CY 2016, all of which are at or above ENERGY STAR specifications (Table 105).[53]

[53] The full list of brand names and models for each product category that meet these qualifying criteria can be found at the ENERGY STAR website. ENERGY STAR. "Find and Compare Products." Available online: https://www.energystar.gov/productfinder/

Table 105. CY 2016 Retail Products Platform Qualified Products and Specifications

Qualifying Product	Tier	Specification
Sound Bar	Basic	ENERGY STAR v3 +15% additional savings
	Advanced	ENERGY STAR v3 +50% additional savings
Air Cleaner	Basic	ENERGY STAR v1.2
	Advanced	ENERGY STAR v.2 +30% additional savings
Freezer	Basic	ENERGY STAR v5
	Advanced	ENERGY STAR v5 +5% additional savings
Clothes Dryer	Basic	ENERGY STAR v1
	Advanced	2015 Emerging Tech Award (ENERGY STAR Heat Pump)
Room Air Conditioner	Basic	ENERGY STAR v4

Program Changes

The Program made the following changes in CY 2016:

- **Implementation contract changed.** ICF International replaced CLEAResult as the Program Implementer. The Program Implementer said the Program extended manufacturer and retailer MOUs through March 2016 to reduce the transition's impact on market activity. The Program Administrator said Program outreach was limited during the transition as the Program Implementer hired local staff and brought in its subcontractor, Crossmark, to perform store-level outreach. The Program Implementer confirmed it had difficulties in effectively reaching all participating stores during the transition, through site visits or other means, citing limited staff and reliance on manufacturers to communicate with independent stores.
- **LED incentive levels revised.** With new MOUs issued in April 2016, the Program Implementer introduced lower incentive levels for qualified LED products. For example, the Program reduced the offer for an A-line ENERGY STAR v1.1 bulb from $3.00 to $2.00 and reduced the ENERGY STAR v2.0 bulb from $3.00 to $1.50.
- **CFL offerings discontinued.** The Program withdrew its CFL offerings effective April 2016. The Program continues to co-fund CFL recycling for independent hardware stores.
- **Retail Products Platform offerings launched.** The Program partnered with the EPA and national retailers using the ENERGY STAR platform to pilot this market transformation approach for appliances and plug load products.
- **Web-based appliance tool launched.** The Program Implementer developed an online tool that helps residential customers compare appliance features, benefits, and potential savings.[54] The

[54] More information is available at the Focus on Energy website for "Finding Energy Saving Products Online." http://www.focusonsaving.com/products/list

tool launched in August 2016, and the Program Implementer plans to integrate the Platform's appliance buydown offers to the web-based tool as they become available.

- **"Find a Retailer" online tool launched.** This online tool, introduced at the end of 2016, allows a customer to search for participating Focus on Energy retail stores that carry LED bulbs, RPP appliances, smart thermostats, and offer CFL recycling, based on the customer's address.[55]

Program Management and Delivery Structure

In CY 2016, the Program Administrator was responsible for these activities:

- Overseeing the work of the Program Implementer and managing the Program's performance
- Developing brand standards and approving the Program Implementer's marketing materials
- Approving and signing MOUs with retail partners and manufacturers
- Coordinating Program activities with utilities, as appropriate
- Facilitating coordination with other Focus on Energy programs
- Communicating Program updates and financial statements to the Public Service Commission of Wisconsin

The Program Implementer was responsible for these activities:

- Developing Program MOUs
- Developing marketing materials (e.g., point-of-purchase [POP] display materials)
- Performing outreach and training to retail store staff and customers (conducted by a subcontractor, Crossmark)
- Negotiating incentive levels with retail partners
- Recruiting retail stores to participate in the Program (through a request for proposal [RFP] process)
- Processing and administering incentive payments
- Enrolling retailers and promoting product categories through a web-based tool that allows consumers to compare standard and efficient products

The Program Implementer and the Program Administrator noted some management challenges with the implementation contract transition, such as providing adequate internal and subcontracted staffing and establishing reporting needs, and said they worked through these challenges during the first quarter of CY 2016. They also revised the bulk upload process to track and process lighting retailer payments by retailer so they could track retailer lighting product activity. In the past, bulk uploads did not include retailer-level data.

[55] More information is available at the Focus on Energy website for "Find a Retailer." https://focusonenergy-findaretailer.com/

The Program Implementer said the Program experienced some delays in launching the RPP and implementing appliance product incentives because of the logistics of setting up Program offerings from a national partnership.

Program Goals

The Program's overall objective was to offer discounts and/or opportunities to promote energy-efficient lighting and appliances at a variety of retailers around the state and generate energy savings through the purchase and use of these products. The CY 2016 Program goals and achievements are shown in Table 106.

Table 106. Retailer Lighting and Appliance Program CY 2016 Goals and Achievements

Performance Metric	CY 2016 Goal	CY 2016 *Ex Ante* Actuals	CY 2016 Verified Gross Actuals
Lighting Component			
Lifecycle electric savings (kWh)	2,490,311,712	2,737,384,129	2,234,216,460
Demand savings (kW)	15,600	17,722	17,135
Lifecycle energy savings (MMBtu)	8,497,327	9,339,955	7,623,147
Retail Products Platform[1]			
Lifecycle electric savings (kWh)	15,541,865	n/a	n/a
Demand savings (kW)	n/a	n/a	n/a
Lifecycle energy savings (MMBtu)	63,514	n/a	n/a

[1]To maintain consistency with market transformation program mechanisms and expectations, the Program Implementer did not claim *ex ante* savings for the CY 2016 RPP. See the *Program Design* section for more detail.

The lighting component of the Program exceeded its CY 2016 *ex ante* goals, however, the verified gross kWh achievement came in slightly behind reported *ex ante* values. Although the Program Implementer and Program Administrator reported that lighting component activity had a slow start because of changes in the implementation contract, the Program Implementer attributed the success of the Program in CY 2016 to ramping up activity in the second half of 2016.

As discussed in the *Program Design* section, the goal of the RPP is to produce market transformation. Unlike the immediate energy savings and demand reductions that resource acquisition programs produce, market transformation programs take longer to develop and mature. The Public Service Commission expressed this understanding in its Quadrennial Planning Process Meeting on June 4, 2014, and identified a need for the development of alternative performance metrics:

> "As the EWG [Energy Working Group] stated, many of the effects of market transformation activities typically occur over a longer timeframe than the one-year and four-periods over which savings are currently tracked… Thus, to bolster the ability of Focus to meet both long-term and

short-term objectives, CUB recommended that the Commission establish performance metrics that reflect specific market development and transformation goals."[56]

Therefore, the Program Implementer measured several alternative market indicators in CY 2016 (shown in Table 107). Since CY 2016 is the first year of the RPP, these indicators are being used as baseline metrics for future years.

Table 107. CY 2016 Retail Products Platform Alternative Market Indicators

Metric	CY 2016 Result
Number of Participating Retailers	3
Number of Participating Stores	74
Number of Qualifying Product Models Offered	235
Number of Qualifying Units Sold	13,222

Key Performance Indicators

In addition to energy and participation achievements, the Program Administrator required the Program Implementer to track progress against several KPIs. Table 108 shows these KPIs and the CY 2016 results as reported by the Program Implementer and verified through SPECTRUM where possible. The Program Implementer reached most of its KPI goals.

[56] Public Service Commission of Wisconsin. "Quadrennial Planning Process II." June 4, 2014. Available at: http://psc.wi.gov/DL/document/ViewFile.aspx?id=78EEBA5BE122489A90EC9827CACB927

Table 108. Retailer Lighting and Appliance Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Maintain Program throughout implementation contract transition	Extend MOUs through March 2016	Reached goal	Reported by Program Administrator
Solicit retailer participation through request for proposals	New MOUs implemented by April 2016	Reached goal	Reported by Program Implementer
Launch online marketplace tool	Online appliance tool in place by April 2016	Web-based tool launched August 2016	Reported by Program Implementer
Introduce new program offerings	Launch additional product offerings in retail locations (RPP) by July 2016	Reached goal—new products offered April 2016 with all retail partners	Reported by Program Implementer
Explore opportunities for expansion of RPP	Program Implementer to provide Program Administrator regular updates to the RPP initiative, through: • Monthly reporting • Performance reviews	Reached goal	Reported by Program Administrator
Program Implementer and SPECTRUM database integration	Incentive reimbursement requests are bulk uploaded to SPECTRUM from Program Implementer's database	Reached goal—lighting data imports integrated February 2016, and RPP data imports integrated December 2016	Reported by Program Implementer

Data Management and Reporting

Lighting Component

The Program used SPECTRUM to track its savings goals and send incentive checks to participating manufacturers and retailers. Lighting manufacturers and retailers sent the Program Implementer data on bulb sales, which the Program Implementer uploaded into SPECTRUM twice a month. The Program Implementer validated the data to ensure that only qualified products were included and there were no errors in various fields (e.g., product number, quantities sold). The Program Administrator and Program Implementer reviewed and vetted these data uploads before cutting and sending checks to manufacturers and retailers.

In CY 2016, the Program Implementer worked with the Program Administrator to add detailed retailer account information into SPECTRUM. Previously, the Program Implementer performed bulk uploads that included a store location address but did not identify Program activity by store name. The Program

Administrator reported that this change in the upload process allowed Program staff to effectively perform retail-level analysis for most of CY 2016's Program activity.

To give the Program Administrator a clear understanding of Program outreach activities, the Program Implementer maintains an outreach tracking report that shows the schedule of retail location visits.

Retail Products Platform

All RPP participants upload their sales data to the RPP Data Portal. The Program Implementer downloads Wisconsin sales data from this Data Portal to complete the upload template for SPECTRUM. Procedures for uploading Program data were established by the Program Implementer and the Program Administrator.

Marketing and Outreach

The Program Implementer was primarily responsible for developing and executing marketing for the Program's lighting component. The Program Implementer rebranded the Program, creating new messaging and signage for its retail and media campaigns. The Program Implementer said the Program updated its lighting guide from a booklet to a trifold brochure that gave customers a more succinct summary of lighting choices. The Program Implementer also simplified web content, reducing and aligning the content with the point of sale materials. The Program Administrator said the Program Implementer had been proactive in developing website and social media content, including establishing a social media calendar of in-store demonstrations and posting recommendations.

Although the Program Implementer maintains an outreach schedule that is fulfilled by its subcontractor Crossmark, the Program did not specify an outreach goal as it had in CY 2015. The Program Implementer said Crossmark targeted stores and times when customer traffic was high. The Program tracked the number of customers reached and whether a customer was influenced by a lighting demonstration. In CY 2015, CLEAResult staff conducted 12,796 site visits to participating stores, while Crossmark performed 9,698 site visits.

The Program Implementer also reported hosting Program-sponsored sales opportunities during local events. The Program Implementer partnered with Techniart, which marketed and sold Program-eligible bulbs with an instant discount. Techniart hosted employee or community events at 14 locations throughout the state; these events contributed over 18,000,000 lifecycle kWh to the Program's energy savings goal.

Retail Storefront Manager, Corporate Retailer and Manufacturer Experience

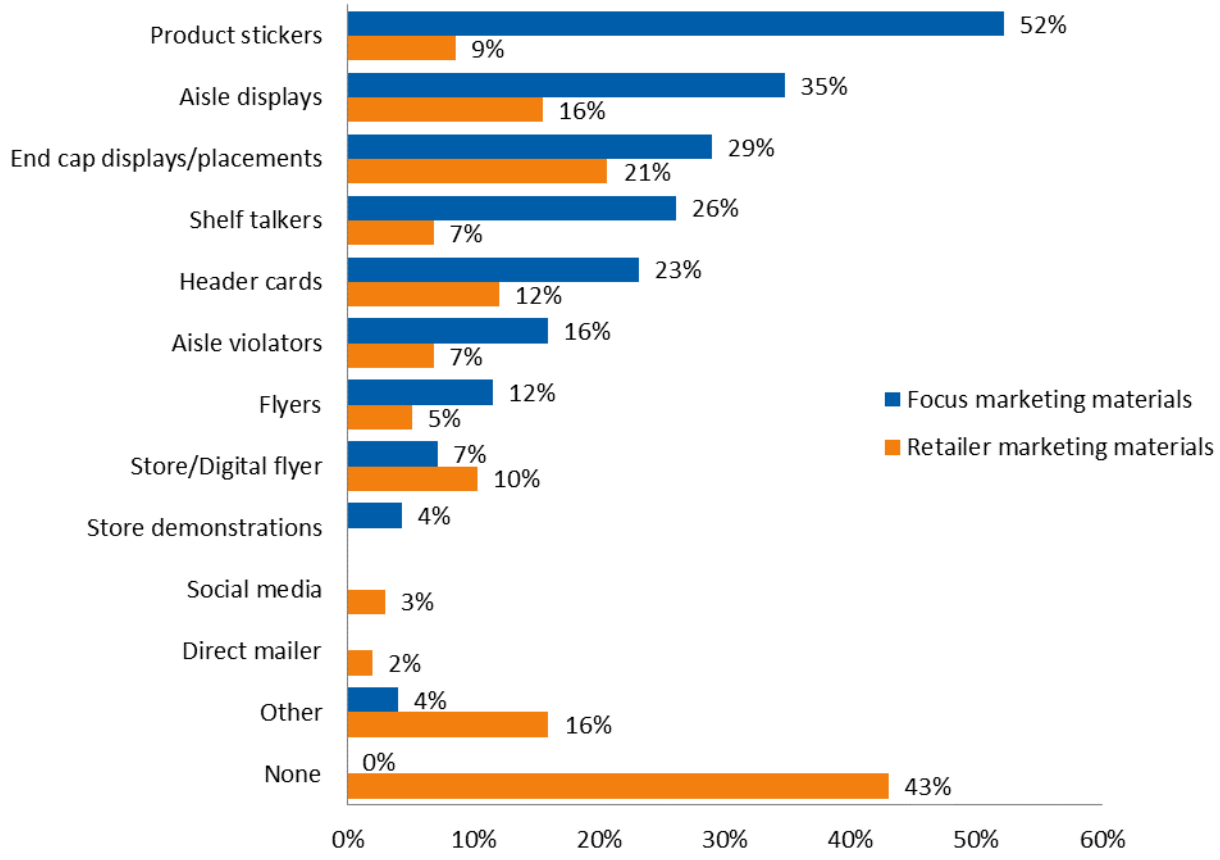
The following sections describe the results of the retail storefront manager, corporate retailer, and manufacturer surveys regarding satisfaction, staff activity and relationships with retailers, marketing, and the transition of the implementation contract for the lighting component of the Program. These surveys took place in July and August of 2016.

Marketing Efforts and Satisfaction

When promoting efficient lighting to customers, nearly all storefront managers (97%, 69 of 71) used at least one type of Program-provided marketing material in their store, whereas only 57% used their own marketing materials. Managers most frequently used Program product stickers (52%) and aisle displays (35%). Of materials supplied by the retailer, managers most frequently used end-cap displays (21%) and aisle displays (16%). Figure 64 shows the percentages of materials used by storefront managers.

The most effective Program marketing materials were also the most frequently used—product stickers, aisle displays, end cap displays, and shelf talkers. Managers said product stickers were the most effective because they "clearly display the cost savings" and are "located directly next to the product." Managers said aisle displays and shelf talkers were effective because they "catch people's attention and are more visible than other materials." In contrast, corporate contacts said signage and in-store demonstrations were the most effective marketing materials.

Figure 64. Marketing Efforts Employed by Storefront Managers



Source: CY 2016 Storefront Manager Survey Questions B2 and B6. "What advertising, materials, or promotions did Focus on Energy use in your store to promote the CFL and LED bulbs discounted through the Program?" (n=69) and "Thinking about lighting promotions that did not involve Focus on Energy, what types of advertising or materials have been effective?" (n=58; multiple responses allowed).

The Evaluation Team asked storefront managers to rate the overall effectiveness of Program marketing materials in driving efficient lighting sales. On a 10-point scale, where 10 is highly satisfied, storefront managers were *somewhat satisfied* with the Program marketing materials' effectiveness, with an average score of 6.9 (Table 109).

Table 109. Storefront Manager Satisfaction with Focus on Energy Marketing

Average Rating	Percentage Low/Moderate (Rating 0 to 7)	Percentage Satisfied (Rating 8 to 10)	n
6.9	55%	45%	69
Top Praises on Marketing			
Good materials and advertising (16%, 9 of 57)			
Top Critiques of Marketing			
Need to further increase consumer awareness of efficient lighting benefits (16%, 9 of 57)			
Could do more marketing (14%, 8 of 57)			
Customers don't read while shopping (4%, 2 of 57)			

Source: CY 2016 Storefront Manager Survey Questions B12 and B13. "On a scale of 0 to 10, where 0 is "not at all effective" and 10 is "extremely effective," how would you rate the effectiveness of the Focus on Energy lighting Program point of purchase materials, marketing, and promotional efforts in driving efficient lighting sales?" (n=69) and "Why do you say that?" (n=57)

Common critiques of Program marketing concerned the need to increase customer awareness of the benefits of efficient lighting. Of 57 storefront managers, two (4%) said the marketing materials were not getting through to customers because customers do not read while shopping, and three (5%) thought more signs and bigger signs could increase visibility. Eight storefront managers (14%) thought the Program could do more marketing; for example, one manager wanted to see television or radio advertisements added to Program promotions.

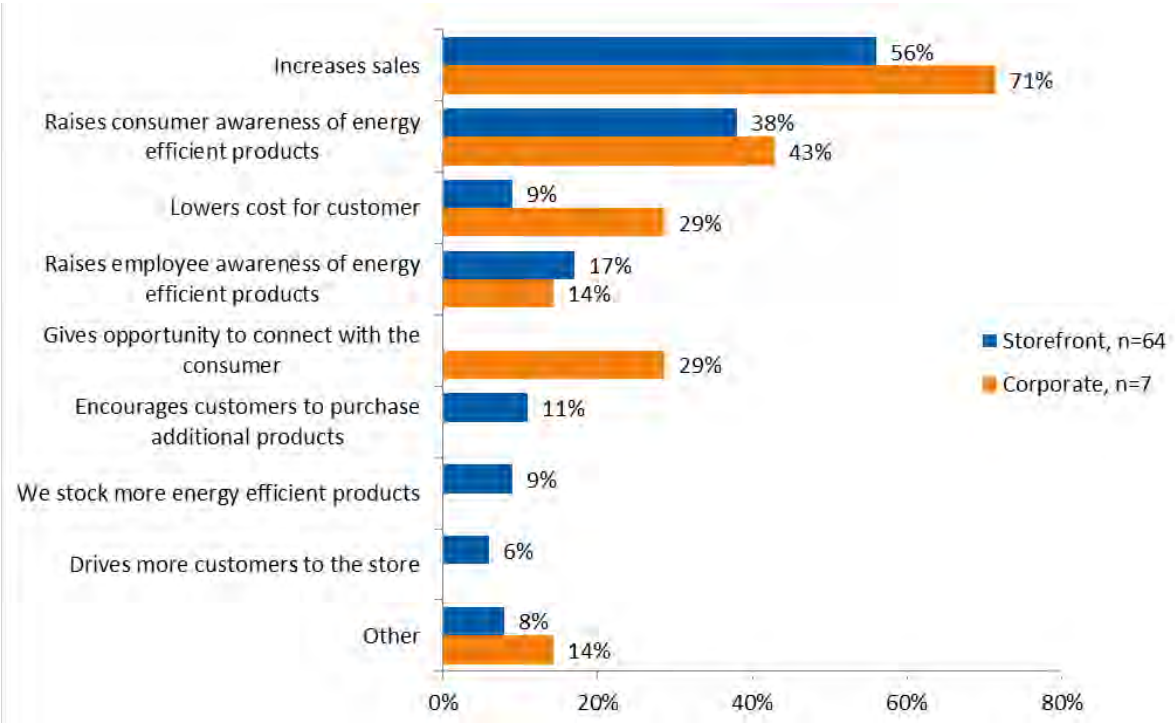
Corporate retailers expressed a higher level of satisfaction with Program marketing efforts than did storefront managers, with all four respondents rating the Program as an 8 or higher. However, two corporate contacts said the Program should invest more in local television or radio advertisements, and one said the Program could expand the features available on its websites.

Benefits to Participation

The largest benefit to participating in the Program was increased sales, reported by 56% of storefront managers (36 of 64). Storefront managers also saw the benefit of increased awareness of energy-efficient products with the consumer (38%) and with employees (17%). Similarly, of seven corporate contacts, five said the top benefit of participating was increased sales, and three said increased consumer awareness of energy-efficient products. Two corporate retailers said participation created an opportunity to "connect with the consumer" and "[the program] gives the message that we want to help save money on customers' electric bills." Figure 65 shows the benefits to participation according to storefront managers and corporate contacts.

On the negative side, three storefront managers saw no benefit to participating, and the one corporate contact who recommended changing the Program said consumers simply are not aware of the Program nor are they aware of the benefits of efficient lighting.

Figure 65. Benefits to Participation



Source: CY 2016 Storefront Manager Survey Question B1. "In general, what benefits, if any, did you see from participating in the program?" (multiple responses allowed)

Satisfaction with the Program

The corporate retailers and manufacturers were extremely satisfied with the Program, giving an average satisfaction rating of 9.0 (n=6), and provided the following praise:

- "It's been very progressive and very successful."
- "In general, this Program is run very well."
- "From a corporate standpoint, we really appreciate the Program. It a very powerful Program for Wisconsin."
- "Wisconsin Focus is very effective; we are happy to participate. Often you see a lag time between invoice and payment, but for Wisconsin Focus, that hasn't been an issue."
- "They are doing a great job managing the Program."

The storefront managers were *somewhat satisfied* with the Program, giving an average satisfaction rating of 7.7. The top praise concerned Program representatives; 16% of storefront managers gave

positive feedback about the frequency of the representatives' visits or the helpfulness and ease of working with them (Table 110). However, one-third of storefront managers reported moderate to lower levels of satisfaction (rating the Program as a 7 or lower). Their top critique was that Program representatives did not visit stores as much as they had previously or, likewise, the representatives should visit more often (12%, 7 of 57).

Other critiques of the Program concerned pricing disparities and inconsistences among rebated products and, as noted above, the continued need to increase consumer awareness of efficient lighting. On the other hand, several storefront managers said the Program is good or great and praised the Program advertising.

Table 110. Storefront Manager Satisfaction with Focus on Energy Retailer Lighting and Appliance Program

Average Rating	Percentage Low/Moderate (Rating 0-7)	Percentage Satisfied (Rating 8-10)	n
7.7	33%	67%	69
Top Praises on Program			
Program representatives (16%, 9 of 57)			
The Program is good/great (11%, 6 of 57)			
Good advertising of Program (5%, 3 of 57)			
Top Critiques of Program			
Program representatives should visit more frequently (12%, 7 of 57)			
Increase consumer awareness of the Program and benefits (7%, 4 of 57)			
Pricing disparities and inconsistencies (5%, 3 of 57)			

Source: CY 2016 Storefront Manager Survey Questions B8 and B9. "On a scale of 0 to 10, where 0 is "not at all satisfied" and 10 is "extremely satisfied," how would you rate your overall satisfaction with the residential lighting program over the last six months?" (n=69) and "Why do you say that?" (n=57)

Relationship with Program Representatives

In the survey, the Evaluation Team asked questions about the relationship with Program representatives and assessed the overall satisfaction in working with Program representatives in more depth. Despite the recommendation that Program representatives visit more often, offered by seven storefront managers (12%, n=57) and discussed in the *Satisfaction with the Program* section, when asked directly, storefront managers said they were *very satisfied* (as shown in Table 111), citing that these Program representatives were friendly (27%, 14 of 52), knowledgeable (23%, 12 of 52), and helpful (10%, 5 of 52).

Of the 25% of storefront managers who reported moderate to low satisfaction with Program representatives, four said they were not familiar with the representatives. The remaining 10 said the new representative "doesn't visit as much as the previous one," the representative could be involved more, or the retailer did not see the representative "that much." These critiques may be a response to the transition between the previous implementation firm and the current one.

Table 111. Storefront Manager Satisfaction with Program Representative

Average Rating	Percentage Low/Moderate (Rating 0-7)	Percentage Satisfied (Rating 8-10)	n
8.3	25%	75%	61
Top Praises of Program Representatives			
Nice/friendly (27%, 14 of 52)			
Wise/knowledgeable (23%, 12 of 52)			
Helpful (10%, 5 of 52)			
Top Critiques of Program Representatives			
Manager not familiar with representative (8%, 4 of 52)			
Former representative visited more (6%, 3 of 52)			
Need more involvement/visits (4%, 2 of 52)			

Source: CY 2016 Storefront Manager Survey Questions B10 and B11. "On a scale of 0 to 10, where 0 is "not at all satisfied" and 10 is "extremely satisfied," how would you rate your overall satisfaction in working with Focus on Energy representatives?" (n=61) and "Why do you say that?" (n=52)

As previously noted, the Evaluation Team reviewed the number of Program representative visits and found there were significantly more store visits in CY 2015 (12,796) than in CY 2016 (9,698). The storefront manager critiques reflected this difference. The Program Implementer said the lower number of visits was primarily because of the timing of the transition between implementation firms and that store visits were more frequent starting in April 2016. Of the store visits that Crossmark conducted in CY 2016, 64% occurred in the second half of the year. The Evaluation Team reviewed the CY 2015 and CY 2016 participating store lists from the Focus on Energy website and found 724 stores listed on the website in CY 2015 and 1,032 listed stores in CY 2016,[57] which averages to 18 visits per store in CY 2015 and nine visits per store in CY 2016.

Although all interviewed corporate retailers and manufacturers viewed their relationship with Program representatives positively, one suggested that the Program should "narrow communication down to one contact and one coordinator" to simplify participation.

Implementer Transition

In CY 2016, the Program Implementer changed from CLEAResult to ICF International. This change could have affected the relationships between Program representatives and corporate retailers and manufacturers. None of the corporate contacts had issues with the transition, although one said "there was no interruption in sales, but the old representative was more active." Only 16 storefront managers were even aware of the transition (23%, n=70), and all of these were from either club/warehouse or large home improvement store types. All managers of dollar, grocery, small home improvement, and other store types were unaware of the transition.

[57] The Evaluation Team excluded Target and Walgreens stores from this analysis because the Program Implementer's agreements with these stores did not include site visits.

Of the 16 storefront managers who were aware of the transition, eight experienced an issue or concern. Four said the issue was in stocking inventory and that there was a need for more inventory or an expansion of the product mix (to include multipacks and 100-watt equivalent bulbs). The other four said they had less interaction with the current representative than with their prior representative. Although this feedback was informative, it is important to note that only eight of 70 storefront managers (11%) had an issue with the transition. The majority were either unaware or had no concerns with the new Program Implementer, which suggests to the Evaluation Team that the transition was smooth.

Recommendations for Program Improvements

The survey asked storefront managers to provide recommendations to improve the Program and concluded with one last opportunity to provide any additional comments. These were three common themes:

- Storefront managers continued to emphasize the need to increase consumer awareness of the energy and cost savings of switching to efficient lighting, through more signage or other promotions (24%, 17 of 71).
- Almost one-quarter of storefront managers are interested in increasing the quantity already in stock and expanding the product list to include more multipacks and 100-watt equivalent bulbs (21%, 15 of 71).
- A few storefront managers recommended increasing communication and visits from Program representatives (10%, 7 of 71).

Corporate retailers' and manufacturers' recommendations to improve the Program generally aligned with storefront managers. Of seven respondents, these were their recommendations:

- One recommended that the Program direct marketing and education toward the customer
- One recommended more promotional opportunities
- One recommended expanding the product mix to include LED downlights and retrofit kits
- Three recommended reviewing incentive levels more closely
- One corporate retailer recommended that the Program "consider allowing stores to have more discretion when it comes to product limits" (i.e., the number of bulbs a consumer can purchase)

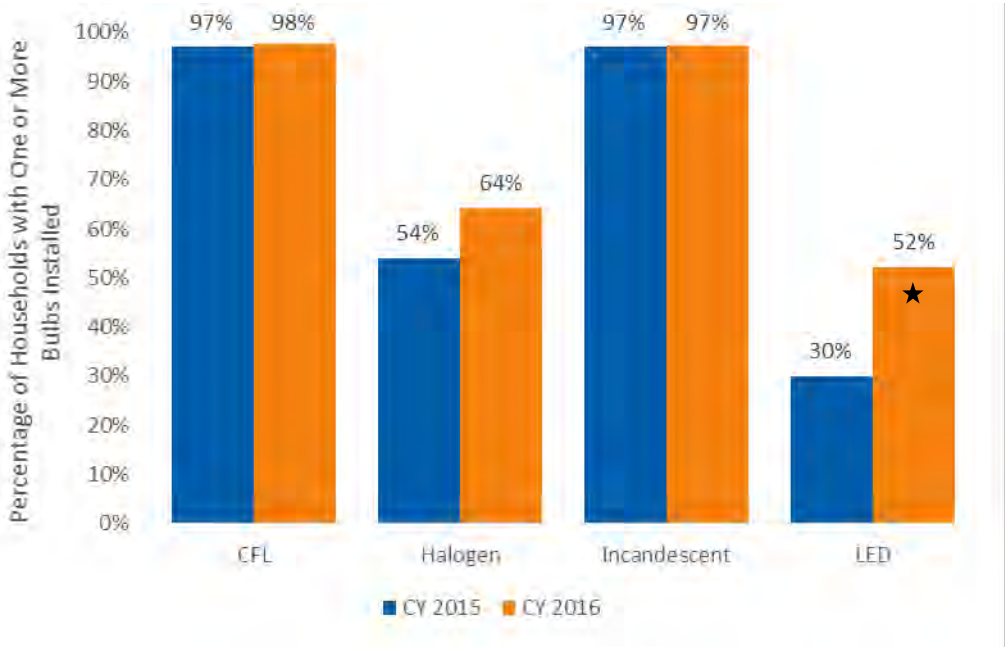
Penetration and Saturation of Lighting Products

The objective of the in-home audits was to characterize the composition of lighting in the average home in Wisconsin and to understand shifts in residential lighting composition, socket penetration, and saturation of efficient lighting products. This section summarizes these findings.

Efficient lighting penetration is an indication of how widespread the adoption of technology has been across the population, particularly for emerging technologies such as LEDs—the higher the penetration, the greater the adoption of that technology.

Figure 66 shows the penetration rate (proportion of participating homes where residents installed at least one bulb of a specified type) by year for each bulb type. LED penetration nearly doubled, from 30% in CY 2015 to 52% in CY 2016. Halogen penetration continued to increase, from 54% to 64%, which was not a statistically significant increase.[58] CFL and incandescent penetration stabilized over the two-year period (at 98% and 97%, respectively). Every household (100%) in CY 2016 had at least one efficient bulb installed (either an LED or CFL).

Figure 66. In-Home Audit Bulb Penetration



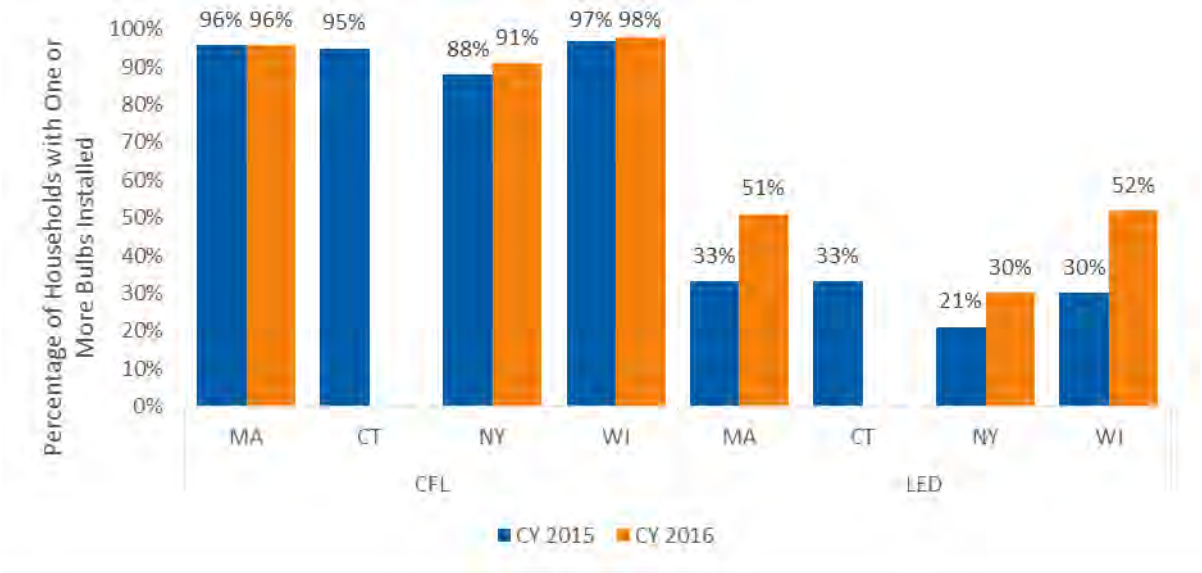
CY 2015 audit population: n=124, CY 2016 audit population: n=120

★ This finding is statistically different between CY 2015 and CY 2016.

The significant increase in LED penetration in Wisconsin is similar to other areas of the country. For example, LED penetration in Massachusetts had a nearly identical increase, from 33% in 2015 to 51% in 2016 (Figure 67). CFL penetration has also leveled in Massachusetts, with 96% of households having at least one CFL.

[58] The Evaluation Team conducted all statistical tests at the 90% confidence level.

Figure 67. Benchmarking of Residential CFL and LED Bulb Penetration

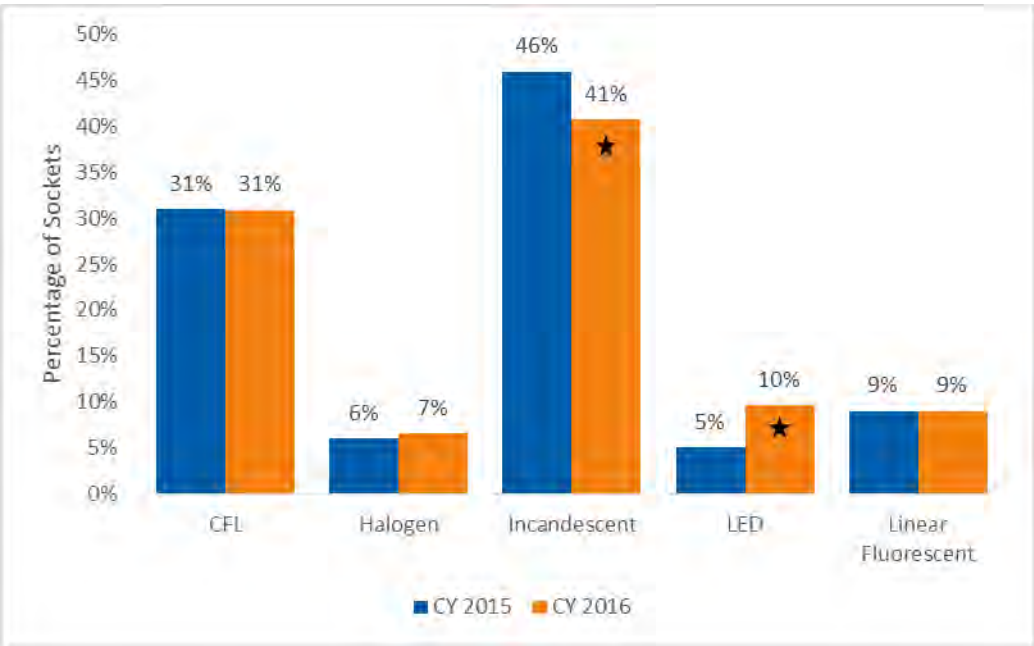


CY 2015 audit population: n=124; CY 2016 audit population: n=120

Penetration measures the dispersion of a technology, but saturation measures just how prevalent the technology is in each home. Figure 68 shows weighted household saturations (proportion of total installed bulbs) by bulb type. LED saturation increased significantly from CY 2015 to CY 2016, doubling from 5% to 10% of all sockets. CFL and halogen saturation of all sockets has remained largely unchanged over the past year; CFLs remained at 31% in both CY 2015 and CY 2016, and halogens moved from 6% to 7% during the same period.[59] Incandescent lighting has shown the greatest decline, from 46% of all sockets in CY 2015 to 41% in CY 2016.

[59] Note that many screw-based halogens can be difficult to distinguish from incandescents, so changes in halogen and incandescent saturation should be interpreted with caution.

Figure 68. Saturation of All Household Sockets by Bulb Type



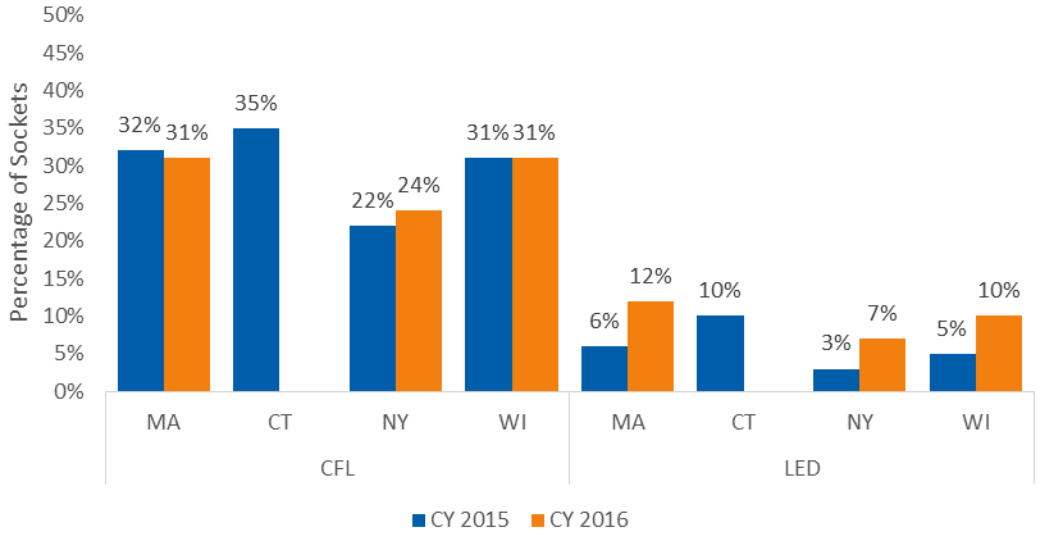
CY 2015 audit population: n=124; CY 2016 audit population: n=120

★These differences are statistically different between CY 2015 and CY 2016.

Efficient bulb saturation in Wisconsin aligns with other jurisdictions over the same period (Figure 69). Specifically, CFL saturation remained largely unchanged in both Wisconsin and Massachusetts between CY 2015 and CY 2016, while LED saturation doubled in both states.[60]

[60] NMR Group, Inc. "2015-16 Lighting Market Assessment Consumer Survey and On-Site Saturation Study." Prepared for The Electric and Gas Program Administrators of Massachusetts. August 2016. Available online: http://ma-eeac.org/wordpress/wp-content/uploads/MA-2015-16-Lighting-Market-Assessment-Final-Report-08August2016.pdf

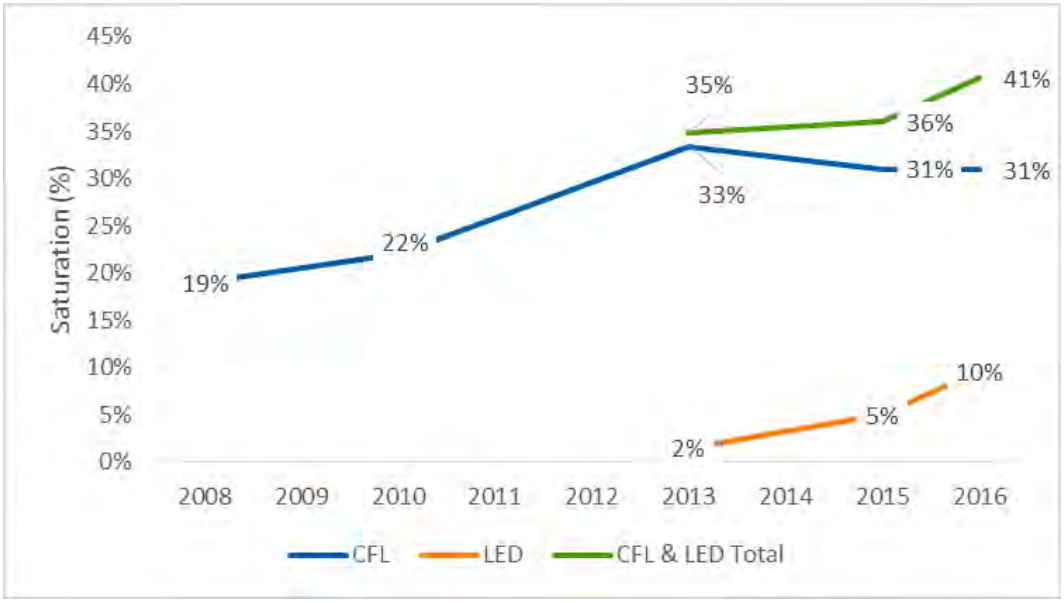
Figure 69. Benchmarking of Residential CFL and LED Bulb Saturation



CY 2015 audit population: n=124; CY 2016 audit population: n=120

The Focus on Energy longitudinal study's residential efficient lighting saturations explain the evolving purchasing patterns and demand of consumers in Wisconsin. As shown in Figure 70, CFL saturation increased considerably between CY 2010 and CY 2013 but has plateaued in the last two years at 31%. LED saturation more than doubled between CY 2013 and CY 2015, and doubled again in CY 2016. Efficient lighting (CFLs and LEDs) now comprise 41% of all sockets in residential homes in Wisconsin.

Figure 70. In-Home Audit CFL and LED Longitudinal Saturation



CY 2015 audit population: n=124; CY 2016 audit population: n=120. Historical CFL saturation from Focus on Energy Calendar Year 2013 Evaluation Report Appendices, Appendix O Lighting Use Findings.

ENERGY STAR Retail Products Platform Process Evaluation Findings

From August to October 2016, the EPA conducted interviews with 19 RPP stakeholders: 14 merchants, two marketers, and three sustainability specialists. The following sections provide a brief overview of the results of these surveys, including current practices, the influence of energy efficiency on retailers, and the impact of the RPP.

Current Practices

Retailers were asked questions regarding product selection, marketing and promotion, and sales trends. Although retailers take a number of factors into account when deciding what products to stock, profitability is the most influential. With regards to marketing, retailers tend to review their national market strategies on an annual basis. These strategies may contain some regional variation, but are rarely differentiated at the local level. Overall, sales are increasing due to consumer interest in "smart," connected appliances, but energy-efficient appliance sales remain challenged by higher prices and comparatively low monetary savings.

Influence of Energy Efficiency Programs on Retailers

Retailers reported having some previous experience with midstream programs. However, they also indicated that these programs have a limited amount of influence over business strategy because of varying internal opinions regarding their benefits. Typically, decisions regarding which energy-efficient programs to feature are based on a combination of customer needs and financial benefits to the retailer. Retailers place particular value on offering ENERGY STAR products because they help customers quickly identify efficient products and provide powerful brand recognition.

Impact of the Retail Products Platform

Stocking practices have not yet been affected by the RPP due to its limited scope, scale, and the long lead times on product orders. Retailers reported some limited interest in the RPP on the part of senior managers; this interest may grow as the Pilot increases in size. Participants suggested that increasing the scale of the Pilot, providing better sharing of data, and ensuring greater consistency would improve the Pilot from a retailer perspective.[61]

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

[61] ENERGY STAR. "ESRPP Pilot Interview Findings." October 24, 2016.

Table 112 lists the CY 2015 and CY 2016 incentive costs for the Retailer Lighting and Appliance Program.

Table 112. Retailer Lighting and Appliance Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$8,439,351	$8,299,005

The Evaluation Team found the CY 2016 Program was cost-effective (4.51). Table 113 lists the evaluated costs and benefits. Due to broader market shifts from CFLs to LEDs with higher incremental measure costs, the Retailer Lighting and Appliance program cost effectiveness dropped from 9.37 to 4.51.

Table 113. Retailer Lighting and Appliance Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$982,240	$772,876
Delivery Costs	$2,239,945	$1,762,503
Incremental Measure Costs	$27,050,675	$7,799,306
Total Non-Incentive Costs	**$30,272,860**	**$10,334,685**
Benefits		
Electric Benefits	$115,493,355	$80,312,783
Gas Benefits	$0	$0
Emissions Benefits	$20,972,436	$16,566,153
Total TRC Benefits	**$136,465,790**	**$96,878,936**
Net TRC Benefits	**$106,192,931**	**$86,544,251**
TRC B/C Ratio	**4.51**	**9.37**

Evaluation Outcomes and Recommendations

The Evaluation Team compiled the following outcomes and recommendations to improve the Program.

Outcome 1: Retailers are engaging in limited lighting marketing activities outside of Program-sponsored marketing and said consumers need more education on the benefits of energy-efficient lighting. When promoting efficient lighting to customers, nearly all storefront managers (97%, 69 of 71) used at least one type of Program-provided marketing material in their store, whereas only 57% reported using their own marketing materials. The Program materials appear to be driving much of the marketing around energy-efficient lighting products.

Recommendation 1: It is important that the Program continue its marketing efforts and consider the educational components of the benefits of energy-efficient lighting as part of its marketing message. Consumers often cite energy and cost savings of LED bulbs, their long life, and appealing light as positive aspects.[62] Messages that emphasize these benefits will probably resonate among consumers and should

[62] Cadmus. *Massachusetts Spring 2014 Survey Results: Final Report*. January 2015.

be considered. Product stickers, aisle displays, end cap displays, and shelf talkers should be considered for future marketing materials, as retailers reported these are the most effective marketing methods.

Outcome 2: Corporate contacts reported higher satisfaction with the Program (giving an average rating of 9.0 out of 10) than storefront managers (7.7 out of 10). Although storefront managers reported high praise for Program representatives, many wanted them to visit more frequently. The Program Implementer and Program Administrator did not establish a KPI for number of site visits in CY 2016, and the Program Implementer said it had experienced delays in ramping up its outreach staff. The Evaluation Team reviewed the number of Program representative visits in CY 2015 and CY 2016 and found that there were over 3,000 more store visits in CY 2015 (12,796 visits, 18 visits per store annually) than in CY 2016 (9,698 visits, nine visits per store annually). The storefront manager critiques, who were surveyed during July and August, reflected this early-2016 reduction in visits.

Recommendation 2: The Program Implementer should continue to recruit and maintain high-quality representatives and consider more frequent store visits. In CY 2015, the Program Implementer averaged over 1,000 store visits each month to participating stores, and an average of 18 visits per store annually. These visits are especially useful to train retail staff about the Program and about features of energy-efficient lighting. Based on the number of site visits performed in the second half of CY 2016, it is likely that the Program Implementer intends to maintain the store visit frequency retailers experienced in CY 2015 now that it has completed the implementation contract transition.

Outcome 3: Most stores currently stock both ENERGY STAR and non-ENERGY STAR LEDs and, even with the new ENERGY STAR 2.0 lighting specification, expect to stock both options for the foreseeable future. There will probably be continued competition between the two LED options. The Program Implementer and Program Administrator continue to assess introducing non-ENERGY STAR LEDs into Program offerings.

Recommendation 3a. The Program Implementer and Program Administrator should continue to monitor the prevalence of non-ENERGY STAR LEDs in the Wisconsin lighting market to determine which retail channels and bulb types pose the least competition to Program bulbs. Lower cost, non-program LEDs may reduce the impact of Program incentives, particularly if a significant price difference remains even with Program incentives. For example, if a particular retail channel has a high prevalence of non-ENERGY STAR general service LEDs but few reflector or specialty bulbs, the Program could focus on specialty and reflector bulbs sold at that retailer to help mitigate freeridership.

Recommendation 3b. If Focus on Energy continues to rebate ENERGY STAR LEDs exclusively, it could consider educating customers on the additional benefits of the ENERGY STAR brand through a mix of social media marketing, traditional media marketing, and in-store signage. For example, to qualify for ENERGY STAR, LED lighting products must pass a variety of tests to prove that the light output remains constant over time, comes on instantly, does not flicker, and meets the claimed lifetime estimates. This certification can increase confidence among consumers that this technology is high quality and will meet their needs.

Over time, if the quality of non-ENERGY STAR LEDs catches up to that of ENERGY STAR LEDs, then Focus on Energy should consider offering incentives for non-ENERGY STAR LEDs to mitigate possible increased freeridership. As non-ENERGY STAR LEDs increase in quality and reliability, the demand for ENERGY STAR LEDs will be less elastic because customers may be able to purchase non-ENERGY STAR LEDs at lower prices than ENERGY STAR LEDs even with Program discounts applied.

Simple Energy Efficiency Program

In CY 2016, Focus on Energy introduced the Simple Energy Efficiency Program. The Program mails no-cost and low-cost energy-saving packs containing various combinations and quantities of LEDs, faucet aerators, high-efficiency showerheads, and/or smart strips directly to residential customers living in residential properties with one to three units.[63] CB&I is the Program Administrator and EFI is the Program Implementer.

The Simple Energy Efficiency Program replaced the Express Energy Efficiency Program, which ran until December 31, 2015. The Program Administrator decided to end the Express Energy Efficiency Program because its delivery structure—which involved having contractors install no-cost measures—was expected to be less cost-effective and not reach as many customers across the state as a delivery structure in which packs are mailed to customers. Specifically, the mailed pack delivery structure allowed Focus on Energy to reach rural areas more easily and cost-effectively than through the Express Energy Efficiency Program, which was focused on densely populated areas to minimize delivery costs.

The Simple Energy Efficiency Program served 70,978 customers and had a benefit/cost ratio of 6.01 in CY 2016. In CY 2015, the Express Energy Efficiency Program served 15,726 customers and had a benefit/cost ratio of 2.22.

Table 114 compares the actual Simple Energy Efficiency Program spending, savings, participation, and cost-effectiveness to the CY 2015 Express Energy Efficiency Program.

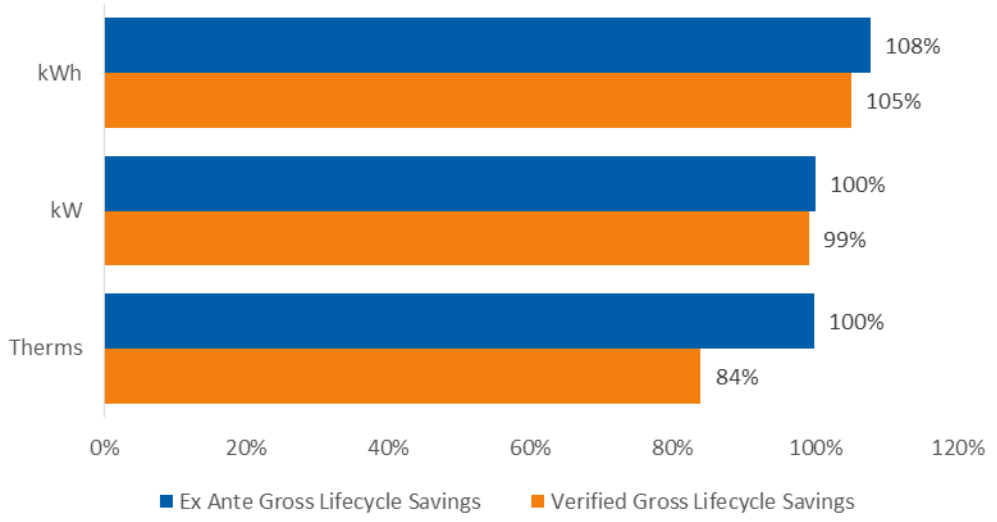
[63] The Simple Energy Efficiency Program is comparable to kit programs offered in other states, but Focus on Energy uses the term “pack” to distinguish the Program from other Wisconsin utility programs that offer energy-saving kits.

Table 114. CY 2016 Simple Energy Efficiency Program Summary Compared to CY 2015 Express Energy Efficiency Program

Item	Units	CY 2016 Simple Energy Efficiency Program	CY 2015 Express Energy Efficiency Program
Incentive Spending	$	$1,155,598	$549,439
Participation	Number of Participants	70,978	15,726
Verified Gross Lifecycle Savings	kWh	152,789,675	56,722,160
	kW	866	653
	therms	6,886,124	4,383,879
Verified Gross Lifecycle Realization Rate	% (MMBtu)	88%	94%
Net Annual Savings	kWh	11,248,334	6,306,339
	kW	865	653
	therms	688,045	365,693
Annual Net-to-Gross Ratio	% (MMBtu)	100%	100%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	6.01	2.22

Figure 71 shows the percentage of gross lifecycle savings goals achieved by the Simple Energy Efficiency Program in CY 2016. The Program exceeded its CY 2016 kWh goals for both *ex ante* and verified gross savings. Although the Program met its CY 2016 *ex ante* gross savings goal for therms and kW, it fell slightly short of its verified gross savings goals. This is because of lower ISRs for faucet aerators and showerheads, as detailed in the *Verified Unit Energy Savings* section.

Figure 71. Simple Energy Efficiency Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Simple Energy Efficiency Program in CY 2016. The Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance. Table 115 lists the specific data collection activities and sample sizes the Team used for the evaluations.

Table 115. Simple Energy Efficiency Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant Surveys	192
Ongoing Customer Satisfaction Surveys[1]	7,587

[1] The Program Implementer used data collected during ongoing customer satisfaction surveys to assess performance and help meet contractual obligations related to satisfaction key performance indicators.

Program Actor Interviews

In August 2016, the Evaluation Team interviewed the Program Administrator and the Program Implementer to assess the current Program status. During the interviews, the Team covered topics such as Program design and goals, marketing strategies, and data tracking to gain a better understanding of high-level processes, successes, and any Program concerns.

Tracking Database Review

The Evaluation Team reviewed a census of the Program SPECTRUM tracking data, which included these tasks:

- Thoroughly reviewing the data to ensure that the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to measure names
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Participant Surveys

The Evaluation Team conducted telephone surveys with 192 customers who participated in the Program during CY 2016. Survey topics included Program awareness, measure installation and removal, cross-program participation, energy-saving actions, freeridership and spillover, and demographics.

The Team determined the survey samples according to the number of customers with each type of pack. To achieve 90% confidence at ±10% precision, the Team surveyed 70 customers who received Smart Strip Packs and 70 with customers who received either Express Packs or Focus Packs. The Evaluation Team attempted to survey a census of customers who received Decorative Light Upgrade, Flood Light

Upgrade, Globe Light Upgrade, and Showerhead Upgrade packs because of the small number of participants. (Details about pack contents and pricing are discussed in the *Program Design* section.) Table 116 shows the participant population at the time the survey was conducted and the number of completed surveys by pack type.

Table 116. Simple Energy Efficiency Program Completed Surveys by Pack Type

Pack Type	Number of Participants as of September 2016	Completed Surveys
Express Pack	2,856	12
Focus Pack	18,555	59
Smart Strip Pack	1,263	71
Decorative Light Upgrade Pack	13	2
Flood Light Upgrade Pack	73	25
Globe Light Upgrade Pack	8	3
Showerhead Upgrade Pack	61	20
Total	**22,829**	**192**

Ongoing Customer Satisfaction Surveys

The PSC requested that the Evaluation Team conduct ongoing customer satisfaction surveys beginning in CY 2015 for the 2015-2018 quadrennial. The goal of these surveys is to provide a quick and easy feedback opportunity to recent program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow-up information to interested participants.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2016 participants with email addresses within two weeks of their completing participation in the program. The Evaluation Team gathered online survey results via SPECTRUM, and sent, received, and scanned mail survey responses, which were combined with the online results for quarterly and annual reporting.

In CY 2016, 7,587 Simple Energy Efficiency Program participants responded to the ongoing customer satisfaction survey.

Impact Evaluation

This chapter provides impact evaluation findings for the Simple Energy Efficiency Program, based on the tracking database review and participant surveys.

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data and ISRs from participant surveys and applied the results to the gross savings.

Tracking Database Review

The Evaluation Team reviewed the census of CY 2016 Simple Energy Efficiency Program data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EULs in adherence with the Wisconsin TRM or other deemed savings sources.

The Evaluation Team found no issues with unit-level savings and EULs in the tracking database, but did have to make manual adjustments to some measure names. Specifically, both no-cost and upgrade showerheads had the measure name "Showerhead, 1.5 GPM, Pack-based," rendering them impossible to distinguish. The Program Implementer supplied the Evaluation Team with the number of upgrade showerheads (554), and the Team manually updated the measure names of 554 showerheads in order to apply upgrade-specific showerhead results from the ISR and NTG analyses.

In-Service Rates

In CY 2016, the Evaluation Team conducted participant surveys to verify the installed measures and estimate the ISR at the measure level.

As stated above, the Simple Energy Efficiency Program replaced the Express Energy Efficiency Program because the original delivery structure—which involved having contractors install no-cost measures—was expected to be less cost-effective and not reach as many customers across the state as the new delivery structure, in which packs are mailed to customers. However, since contractors are no longer directly installing these measures, ISRs were expected to be lower for the Simple Energy Efficiency Program. The Program Administrator was aware of this possibility, but anticipated that the Program would reach more customers across the state and achieve higher cost-effectiveness even with lower ISRs from the pack-based delivery structure.

As expected, the ISR decreased from the CY 2015 Express Energy Efficiency Program to the CY 2016 Simple Energy Efficiency Program. Table 117 compares the first-year ISRs by measure.[64]

[64] The first-year in-service rate represents the percentage of products still installed, in use, and operating properly within 12 months of receiving the products.

Table 117. First-Year Measure-Level In-Service Rates

Measure	CY 2016 Simple Energy Efficiency Program ISRs	CY 2015 Express Energy Efficiency Program ISRs
A19 LEDs	82%	100%
Kitchen Faucet Aerators	43%	93%
Bath Faucet Aerators	49%	93%
No-Cost Showerheads	57%	93%
Upgrade Showerheads	75%	n/a
CFLs	92%	97%
Smart Strips	71%	n/a
Specialty LEDs[1]	81%	n/a

[1] Specialty LEDs include candle LEDs, flood LEDs, and globe LEDs.

The Evaluation Team also calculated lifetime ISRs for lighting measures (A19 LEDs, CFLs, and specialty LEDs). For these measures, the first-year ISR helps explain the installations during the first year but does not account for the eventual installations in subsequent years. A common approach is to adopt factors in the trajectory of installations, which is documented in the UMP.[65] The Team did not apply this approach to non-lighting measures because there is not a similar evaluation protocol for these products.

The trajectory of lighting installations is imputed annually between year one and year four, after which the UMP recommends either claiming savings in the year in which the bulbs are installed or—if all savings are claimed in the program year in which the bulbs are sold—discounting the future savings to properly account for installations in the cost-effectiveness calculations. The UMP-based four-year bulb installation trajectory values, along with a single four-year discounted installation rate, are shown in Table 118. The Evaluation Team applied these lifetime ISRs to CY 2016 lighting measures, as shown in Table 119.

[65] National Renewable Energy Laboratory. The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. "Chapter 21: Residential Lighting Evaluation Protocol." Prepared by Apex Analytics, LLC. February 2015. Available online: http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter21-residential-lighting-evaluation-protocol.pdf

Table 118. Lifetime Lighting In-Service Rates[1]

Bulb Type	First-Year ISR	Second-Year ISR	Third-Year ISR	Fourth-Year ISR	Lifetime ISR
A19 LEDs[2]	82%	88%	92%	97%	96%
CFLs	92%	94%	95%	97%	97%
Specialty LEDs[2]	81%	87%	92%	97%	96%

[1] The Evaluation Team applied a discount rate of 2% to its lifetime ISR analysis. Information on the discount rate can be found in Volume I of the *Focus on Energy Calendar Year 2016 Evaluation Report*.

[2] Note that the UMP includes only CFL-based trajectories. To provide a similar analysis for LEDs, the Evaluation Team applied the same relative percentage trajectory as used for CFLs, assuming a 100% installation after four years: this is a reasonable assumption due to the higher cost and fewer LED bulbs sold per package compared to CFLs.

From the results of the first-year and lifetime ISR analyses, Table 119 shows the ISRs applied to the CY 2016 verified gross savings by measure.

Table 119. CY 2016 Simple Energy Efficiency Program Measure-Level In-Service Rates

Measure	In-Service Rate	In-Service Rate Type
A19 LEDs	96%	Lifetime
Kitchen Faucet Aerators	43%	First-year
Bath Faucet Aerators	49%	First-year
No-Cost Showerheads	57%	First-year
Upgrade Showerheads	75%	First-year
CFLs	97%	Lifetime
Smart Strips	71%	First-year
Specialty LEDs[1]	96%	Lifetime

[1] Specialty LEDs include candle LEDs, flood LEDs, and globe LEDs.

Verified Unit Energy Savings

To calculate verified per-unit energy savings and realization rates, the Evaluation Team performed these activities:

- Removed the TRM ISR for each measure by dividing the *ex ante* per-unit energy savings by the TRM ISR
- Applied the evaluated ISR from the participant surveys by taking the adjusted per-unit savings from Step 1 and multiplying each measure by its evaluated ISR

Table 120 shows the TRM ISRs compared to the ISRs calculated by the Evaluation Team.

Table 120. TRM vs. Evaluated In-Service Rates

Measure	TRM In-Service Rate	Evaluated In-Service Rate
A19 LEDs	92%	96%
Kitchen Faucet Aerators	54%	43%
Bath Faucet Aerators	54%	49%
No-Cost Showerheads	65%	57%
Upgrade Showerheads	65%	75%
CFLs	76%	97%
Smart Strips	70%	71%
Specialty LEDs[1]	92%	96%

[1] Specialty LEDs include candle LEDs, flood LEDs, and globe LEDs.

Evaluated ISRs for A19 LEDs, upgrade showerheads, CFLs, smart strips, and specialty LEDs were higher than the TRM ISRs, leading to realization rates over 100%. Evaluated ISRs for kitchen faucet aerators, bath faucet aerators, and no-cost showerheads were lower, leading to realization rates under 100%. Table 121 shows the *ex ante* unit savings, verified gross unit savings, and realization rates by measure.

Table 121. CY 2016 Simple Energy Efficiency Program Unit Savings by Measure

Measure Name	*Ex Ante* Unit Savings			Verified Gross Unit Savings			Realization Rate		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
A19 LEDs	25	0.0023	0	26	0.0024	0	105%	105%	n/a
Kitchen Faucet Aerators	39	0.0014	6	31	0.0011	5	79%	79%	79%
Bath Faucet Aerators	10	0.0007	1	9	0.0006	1	91%	91%	91%
No-Cost Showerheads	49	0.0021	7	43	0.0018	6	87%	87%	87%
Upgrade Showerheads	49	0.0021	7	56	0.0024	9	115%	115%	115%
CFLs, 13 Watt	19	0.0016	0	24	0.0020	0	127%	127%	n/a
CFLs, 23 Watt	31	0.0028	0	39	0.0036	0	127%	127%	n/a
Smart Strips	53	0.0069	0	54	0.0070	0	102%	102%	n/a
Candle LEDs	26	0.0024	0	27	0.0025	0	105%	105%	n/a
Flood LEDs	41	0.0038	0	43	0.0040	0	105%	105%	n/a
Globe LEDs	15	0.0014	0	16	0.0015	0	105%	105%	n/a

CY 2016 Verified Gross Savings Results

Overall, the Simple Energy Efficiency Program achieved an evaluated realization rate of 88%, weighted by MMBtu (Table 122).[66]

[66] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

Table 122. CY 2016 Simple Energy Efficiency Program Annual and Lifecycle Realization Rates by Measure Type

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
A19 LEDs	105%	105%	n/a	105%	105%	105%	n/a	105%
Kitchen Faucet Aerators	79%	79%	79%	79%	79%	79%	79%	79%
Bath Faucet Aerators	91%	91%	91%	91%	91%	91%	91%	91%
No-Cost Showerheads	87%	87%	87%	87%	87%	87%	87%	87%
Upgrade Showerheads	115%	115%	115%	115%	115%	115%	115%	115%
CFLs	127%	127%	n/a	127%	127%	127%	n/a	127%
Smart Strips	102%	102%	n/a	102%	102%	102%	n/a	102%
Specialty LEDs	105%	105%	n/a	105%	105%	105%	n/a	105%
Total	**95%**	**99%**	**84%**	**88%**	**97%**	**99%**	**84%**	**89%**

Table 123 lists the *ex ante* and verified annual gross savings for the Simple Energy Efficiency Program for CY 2016.

Table 123. CY 2016 Simple Energy Efficiency Program Annual Gross Savings Summary by Measure Type[1]

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
A19 LEDs	4,607,550	424	0	4,829,533	444	0
Kitchen Faucet Aerators	2,745,342	99	401,896	2,178,843	78	318,965
Bath Faucet Aerators	706,603	51	95,376	641,917	47	86,645
No-Cost Showerheads	2,107,603	90	318,688	1,840,318	79	278,273
Upgrade Showerheads	27,112	1	4,100	31,283	1	4,730
CFLs	142,850	13	0	181,953	16	0
Smart Strips	1,411,620	186	0	1,440,429	189	0
Specialty LEDs	115,600	11	0	121,137	11	0
Total Annual	**11,864,279**	**874**	**820,059**	**11,265,413**	**866**	**688,612**

[1] Differences to the Simple Energy Efficiency Program due to water adjustment measures were equivalent to 462,603 annual kWh (4.1%).

Table 124 lists the *ex ante* and verified gross lifecycle savings by measure for the Simple Energy Efficiency Program in CY 2016.

Table 124. CY 2016 Simple Energy Efficiency Program Lifecycle Gross Savings Summary by Measure Type[1]

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
A19 LEDs	92,151,000	424	0	96,590,665	444	0
Kitchen Faucet Aerators	27,453,418	99	4,018,956	21,788,427	78	3,189,648
Bath Faucet Aerators	7,066,026	51	953,758	6,419,171	47	866,447
No-Cost Showerheads	21,076,027	90	3,186,884	18,403,183	79	2,782,726
Upgrade Showerheads	271,122	1	40,996	312,833	1	47,303
CFLs	857,100	13	0	1,091,717	16	0
Smart Strips	5,646,480	186	0	5,761,714	189	0
Specialty LEDs	2,311,262	11	0	2,421,965	11	0
Total Lifecycle	**156,832,434**	**874**	**8,200,594**	**152,789,675**	**866**	**6,886,124**

[1] Differences to the Simple Energy Efficiency Program due to water adjustment measures were equivalent to 4,635,303 lifecycle kWh (3.0%).

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for low-cost measures offered through the Simple Energy Efficiency Program. The Team applied net adjustments to the specialty LED and upgrade showerhead measures that required a purchase by the participant, and, consistent with other analyses (including the CY 2015 Express Energy Efficiency Program evaluation), the Evaluation Team applied a NTG ratio of 1.0 to CFLs, A-19 LEDs, faucet aerators, and no-cost showerheads.

Refer to Appendix I for a detailed description of the NTG analysis methodology and findings for the low-cost Program measures.

Freeridership

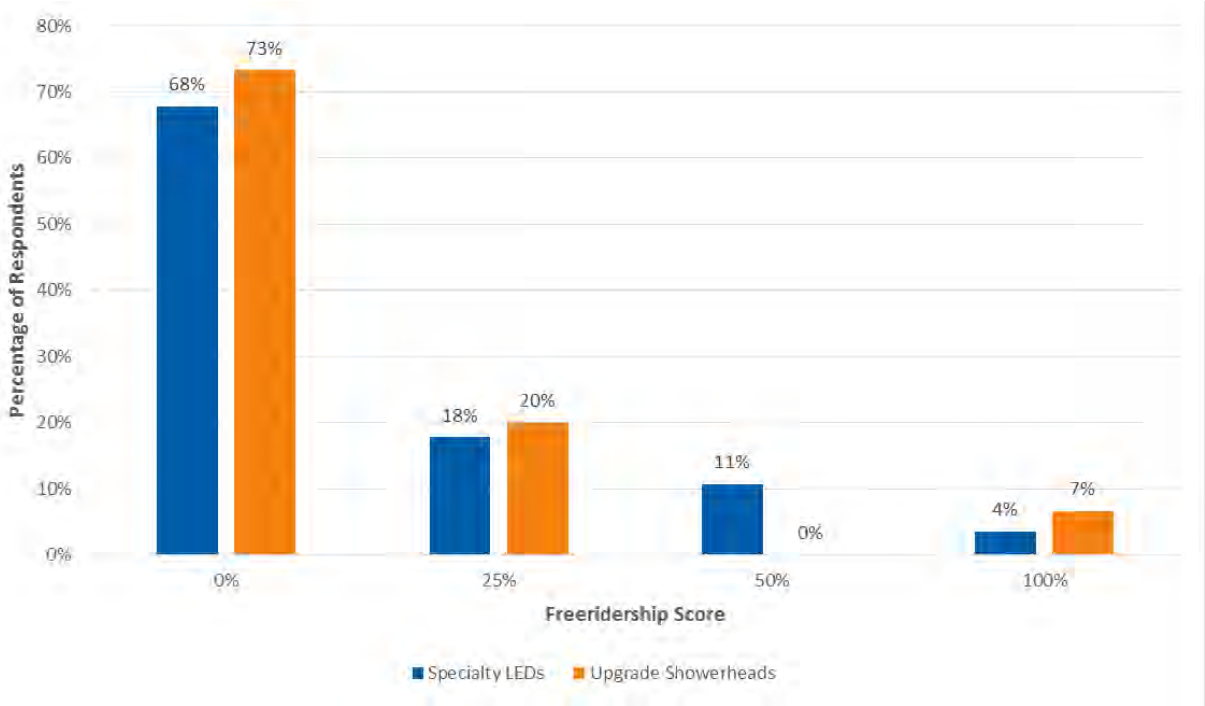
After surveying participants who paid for packs that included specialty LEDs or upgrade showerheads, the Evaluation Team studied responses from three survey questions to estimate a freeridership score for each participant, using the scoring approach described in Appendix I. Freeridership questions were focused on whether the participant had plans to purchase the measure within one year of signing up to receive the pack and whether the participant was already using a similar measure in their home before participating in the Program—these are indicators of freeridership. Table 125 shows CY 2016 average freeridership, weighted by evaluated savings, for the Program measures.

Table 125. CY 2016 Self-Reported Freeridership Estimates by Program Component

Measure	n	Self-Reported Freeridership
Specialty LEDs	28	11%
Upgrade Showerheads	15	12%

Figure 72 shows the distribution of specialty LED and upgrade showerhead participants' freeridership scores. Approximately 4% of specialty LED respondents and 7% of upgrade showerhead respondents were estimated as full freeriders (100% freeridership). An additional 29% of specialty LED respondents and 20% of upgrade showerhead respondents were estimated as partial freeriders (25% or 50% freeridership). Sixty-eight percent of specialty LED respondents and 73% of upgrade showerhead respondents were estimated as non-freeriders (0% freeridership).

Figure 72. Distribution of CY 2016 Self-Reported Specialty LED and Upgrade Showerhead Freeridership Scores



Spillover

The Evaluation Team determined that there was no participant spillover for the Program based on self-report survey data. No surveyed participants who purchased specialty LEDs or upgrade showerheads attributed additional energy-efficient equipment purchases (for which they did not receive an incentive) to their participation in the Program.

CY 2016 Verified Net Savings Results

To calculate the Program NTG ratio, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG estimate of 100% for the Program, due to the fact that most measures had a stipulated NTG of 100% and that specialty LEDs and upgrade showerheads made up a very small portion of the Program measure population. Table 126 shows total net-of-freeridership savings, participant

spillover savings, total net savings in MMBtu by Program component, and overall NTG ratio for the Program.

Table 126. CY 2016 Simple Energy Efficiency Program Annual Net Savings and NTG Ratio

Net-of-Freeridership Savings (MMBtu)	Participant Spillover (MMBtu)	Total Annual Net Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Program NTG Ratio
107,184	0	107,184	107,299	100%

Table 127 shows the annual net energy impacts (kWh, kW, and therms) by measure for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 127. CY 2016 Simple Energy Efficiency Program Annual Net Savings

Measure	Annual Net		
	kWh	kW	therms
A19 LEDs	4,829,533	444	0
Kitchen Faucet Aerators	2,178,843	78	318,965
Bath Faucet Aerators	641,917	47	86,645
No-Cost Showerheads	1,840,318	79	278,273
Upgrade Showerheads	27,529	1	4,163
CFLs	181,953	16	0
Smart Strips	1,440,429	189	0
Specialty LEDs	107,812	10	0
Total Annual	**11,248,334**	**865**	**688,045**

Table 128 shows the lifecycle net energy impacts (kWh, kW, and therms) by measure for the Program.

Table 128. CY 2016 Simple Energy Efficiency Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
A19 LEDs	96,590,665	444	0
Kitchen Faucet Aerators	21,788,427	78	3,189,648
Bath Faucet Aerators	6,419,171	47	866,447
No-Cost Showerheads	18,403,183	79	2,782,726
Upgrade Showerheads	275,293	1	41,627
CFLs	1,091,717	16	0
Smart Strips	5,761,714	189	0
Specialty LEDs	2,155,549	10	0
Total Lifecycle	**152,485,719**	**865**	**6,880,447**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities for the Simple Energy Efficiency Program. The Team focused on these key topics:

- Measure first-year ISRs
- Customer satisfaction with measures and other Program components
- Customer cross-participation in other Focus on Energy programs
- Effective marketing and outreach methods
- Customers' energy-saving actions after participating in the Program
- Program tracking processes and coordination among the Program Administrator and Program Implementer

Program Design, Delivery, and Goals

The Evaluation Team drew from interviews, surveys, and Program materials to document the Program design and implementation process in CY 2016.

Program Design

Through the Simple Energy Efficiency Program, launched January 1, 2016, Focus on Energy offers customers of participating Wisconsin utilities no-cost and low-cost packs containing energy-efficient products. Customers are eligible for the Program if they live in residential properties with one to three units and had not participated in the Express Energy Efficiency Program within the last three years.

Table 129 lists the items in each of the various packs offered to customers who participated in the Program in CY 2016.

Focus on Energy offered the energy-saving packs at different times during CY 2016. Beginning January 1, 2016, it offered Focus Packs to all eligible Wisconsin residents. The Program Implementer sent Express Packs between January and May to customers who had signed up for a discontinued CY 2015 program (the Express Energy Efficiency Program, Appliance Recycling Program, or Manufactured Homes Pilot). Focus on Energy offered the Smart Strip Pack and upgrade packs—Decorative Light Upgrade Pack, Flood Light Upgrade Pack, Globe Light Upgrade Pack, and Showerhead Upgrade Pack—beginning July 1, 2016.

Customers order packs either through the Focus on Energy website (using the online ordering platform) or by calling the Program Implementer's customer call center. Customers must provide their name, mailing address, phone number, email address, and utility account number to receive a pack. The Program Implementer vets customers by confirming that they do not live in multifamily dwellings with four or more units and that their electric and/or natural gas provider participates in Focus on Energy. The Program Implementer batches and processes pack shipments once or twice a month, depending on customer demand, with the goal of delivering packs four to six weeks after customers order them.

Table 129. CY 2016 Simple Energy Efficiency Program Packs

Pack Name	Contents					Cost to Customer
	A19 LEDs	Kitchen Faucet Aerator	Bath Faucet Aerator	Efficient Shower-head	Other Measures	
Express Pack	3	1	1	1	One 13 watt CFL and one 23 watt CFL	No cost
Focus Pack[1]	3	1	1	1		No cost
Smart Strip Pack	2	1	1	-	Smart strip	No cost
Decorative Light Upgrade Pack	-	1	1	1	Three 5 watt candle LEDs	$3.00
Flood Light Upgrade Pack	-	-	-	-	Four 10 watt flood LEDs	$5.75
Globe Light Upgrade Pack	-	1	1	1	Three 5 watt globe LEDs	$6.95
Showerhead Upgrade Pack[1]	3	1	1	1		$8.95

[1] Focus Packs and Showerhead Upgrade Packs have the same quantity of measures, but provide different types of showerheads. The showerhead in the Showerhead Upgrade Packs has a water-saving trickle button.

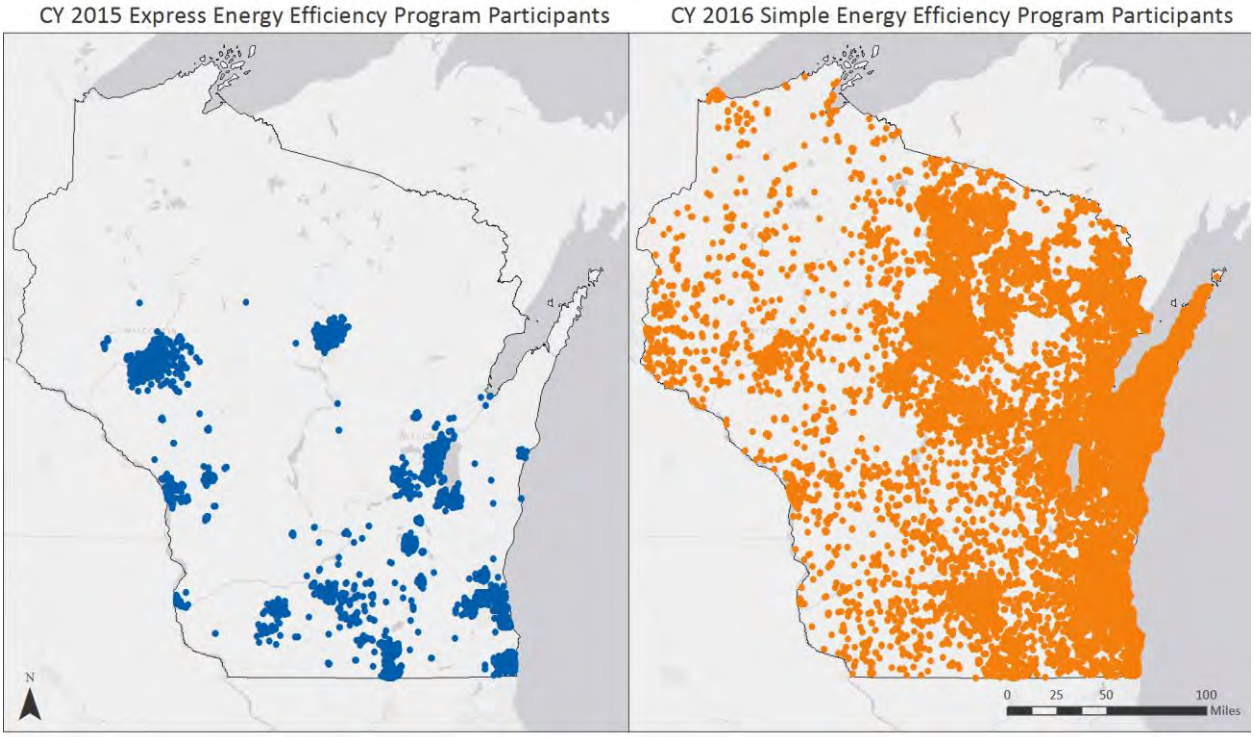
Program Management and Delivery Structure

CB&I, the Program Administrator, oversees the Program Implementer and Program activity over the year. EFI, the Program Implementer, contributes to Program design and tracking, assists in Program marketing activities, processes and fulfills customer orders, and manages the customer call center.

The Program Administrator and Program Implementer noted that, overall, the Program ran smoothly in CY 2016, despite issues uploading data to SPECTRUM (discussed in the *Data Management and Reporting* section). The Program Administrator and the Program Implementer reported that their communication was successful overall, with frequent contact.

As mentioned above, one of the main reasons Focus on Energy made the transition from the Express Energy Efficiency Program (which had a direct-install delivery structure) to the Simple Energy Efficiency Program (which has a mailed pack delivery structure) was to reach customers more equitably and cost-effectively across the state. The Simple Energy Efficiency Program was successful in this endeavor. It served 70,978 customers in CY 2016 compared to 15,726 customers being served by the Express Energy Efficiency Program in CY 2015. The Simple Energy Efficiency Program also served more customers across the state of Wisconsin, as shown in Figure 73.

Figure 73. Geographic Reach of CY 2015 Express Energy Efficiency Program vs. CY 2016 Simple Energy Efficiency Program



The Simple Energy Efficiency Program served 720 cities within all 72 counties, while the Express Energy Efficiency Program had served 102 cities within 40 counties. The counties with the highest participation in the CY 2016 Simple Energy Efficiency Program were Brown County (10,873 participants), Dane County (7,544 participants), Marathon County (5,481 participants), Winnebago County (4,746 participants), and Sheboygan County (4,584 participants). For the CY 2015 Express Energy Efficiency Program, the county with the highest participation was Milwaukee County (2,719 participants). The CY 2016 Simple Energy Efficiency Program counties with the highest percentage of Program participation compared to their populations were Forest County (6.8%, 631 Program participants of 9,279 people), Oneida County (6.4%, 2,327 of 36,208), Vilas County (6.3%, 1,374 of 21,662), Door County (6.1%, 1,707 of 28,127) and Marinette County (6.0%, 2,477 of 41,413).[67]

Table 130 shows the five counties with the highest participation in the CY 2015 Express Energy Efficiency Program compared with participation in the CY 2016 Simple Energy Efficiency Program. As stated above, one requirement to participate in the Simple Energy Efficiency Program was that a customer could not have participated in the Express Energy Efficiency Program within the last three years. Despite this

[67] Wisconsin Department of Administration. Wisconsin Population & Housing Estimates. Available online: http://doa.wi.gov/Divisions/Intergovernmental-Relations/Demographic-Services-Center/Wisconsin-Population-Housing-Estimates/

limitation, the Simple Energy Efficiency Program still realized more participants in two of the five counties with highest participation in the Express Energy Efficiency Program.

Table 130. County Participation of CY 2015 Express Energy Efficiency Program vs. CY 2016 Simple Energy Efficiency Program

Wisconsin County	CY 2015 Express Energy Efficiency Program Participants	CY 2016 Simple Energy Efficiency Program Participants
Milwaukee	2,719	3,834
Kenosha	2,015	584
Waukesha	1,858	1,751
Winnebago	1,655	4,746
La Crosse	1,575	265

Program Goals

In CY 2016, the Program exceeded its CY 2016 kWh and kW goals for both *ex ante* and verified gross savings. While the Program met its CY 2016 *ex ante* gross savings goal for therms, it fell slightly short of its verified gross savings goal. This is due to lower ISRs for faucet aerators and showerheads, as was detailed in the *Verified Unit Energy Savings* section above.

The Program Administrator and Program Implementer also tracked four KPIs through monthly progress reports. The Program met all of its CY 2016 KPI goals. Table 131 shows these KPIs and their results.

Table 131. Simple Energy Efficiency Program CY 2016 Key Performance Indicators

KPI	Metric	CY 2016 Result	CY 2016 Result Source
Launch online store by April 1, 2016	Expand opportunity for customer engagement and education	Met KPI	Reported by Program Administrator
Offer additional pack configurations by July 1, 2016	Expansion of Simple Energy Efficiency Program beyond its initial offerings (two packs)	Met KPI (offered seven packs)	Confirmed by Program Implementer tracking data
Advise on other innovative measures	Continuous improvement and Program innovation	Met KPI	Reported by Program Administrator
SPECTRUM integration of number of days the incentive is outstanding	Establish a baseline and maintain or reduce the number of days the incentive is outstanding	Met KPI	Reported by Program Administrator

Data Management and Reporting

The Program Administrator and Program Implementer designed the Program to collect participant data through an enrollment process and report back to SPECTRUM through a bulk uploading process after batch orders were shipped. However, it took the Program Implementer four months to complete a bulk upload, which delayed Program status tracking and reimbursement for shipped packs. The main

problem was that, although the process was intended to allow for the upload of data on up to 250 packs at a time, SPECTRUM could not support it because the Program Implementer was listed as the payee for every pack. The Program Implementer had to enter pack information manually instead, and with thousands of packs shipped per month, this became very time consuming.

The PSC, Program Administrator, and Program Implementer worked together to improve the bulk uploading process by allowing the Program Implementer to submit a worksheet of data containing multiple projects into SPECTRUM instead of manually entering application data. The Program Implementer was able to upload all CY 2016 records and will continue to work with the PSC and Program Administrator to further improve the bulk uploading process in CY 2017.

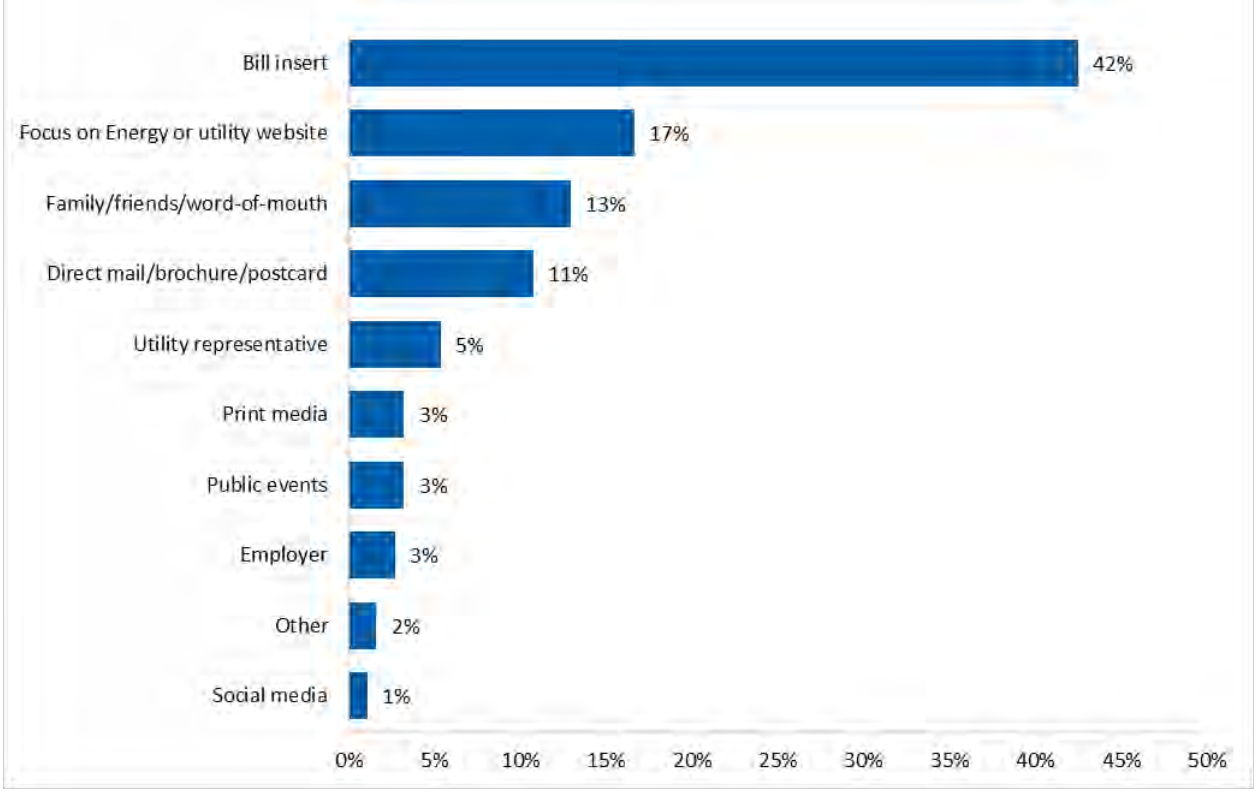
Marketing and Outreach

In CY 2016, in partnership with the Program Administrator and Program Implementer, utilities marketed the Program across the state through bill inserts, direct mail campaigns, radio, newspaper and website advertisements, newsletters, and social media posts. For example, Madison Gas and Electric sent targeted marketing messages to its highest energy users about the benefits of reducing energy by ordering a pack of products through the Simple Energy Efficiency Program.

The Program Administrator was cautious of ramping up Program participation too quickly, so it conducted limited marketing efforts and relied on word-of-mouth for the first four months of CY 2016. During the second part of CY 2016, the Program Administrator and Program Implementer collaborated with a larger number of utilities to drive engagement through widespread direct mail, bill insert, and newsletter marketing campaigns.

Results from the participant survey correlated with Program marketing efforts. Survey participants answered where they most recently learned about the Program, and bill inserts was the most common source of participant awareness (42%, 79 of 186), followed by the Focus on Energy or utility website (17%, 31 of 186), word-of-mouth (13%, 24 of 186), and direct mail, brochures, and postcards (11%, 20 of 186). Figure 74 shows these results.

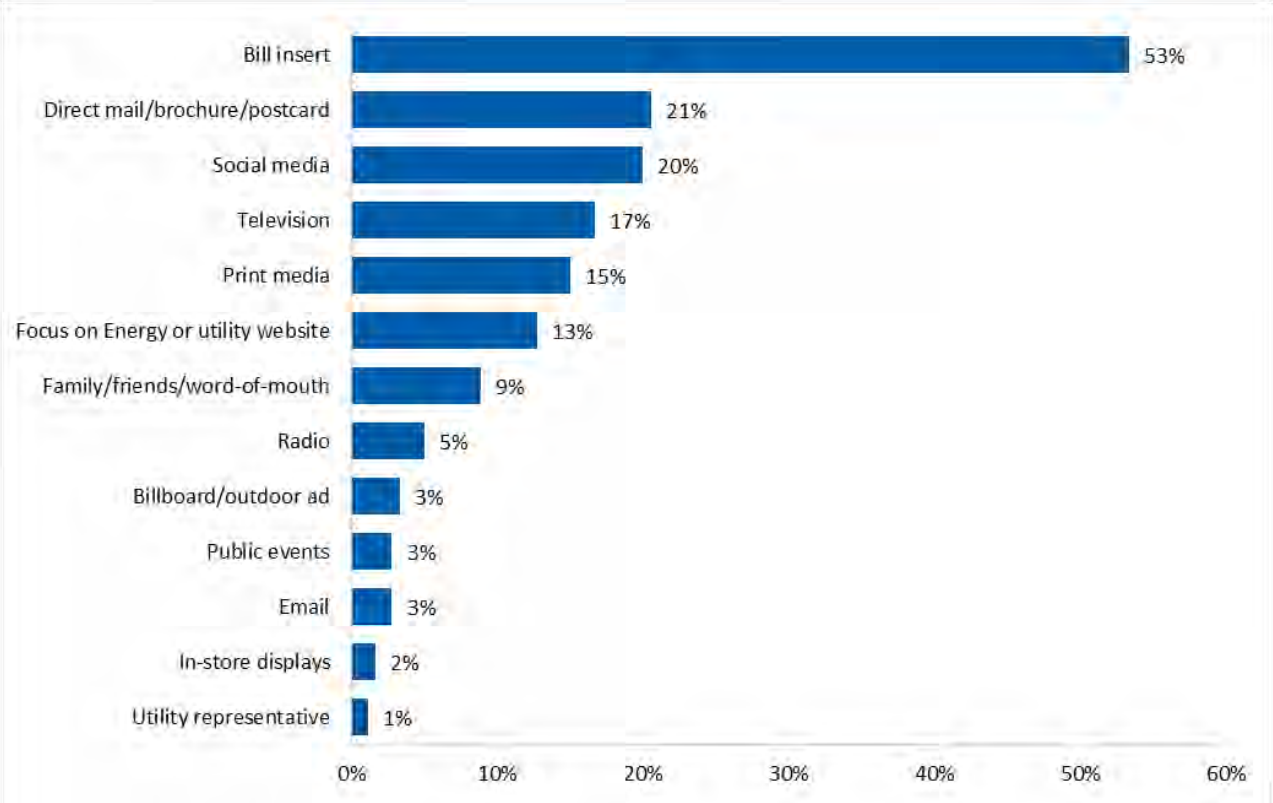
Figure 74. Customer Sources for Simple Energy Efficiency Program Awareness



Source: CY 2016 Simple Energy Efficiency Participant Survey Question B1. "Where did you most recently hear about the Focus on Energy pack program?" (n=186)

Similar to how participants heard about the Program, over half of the respondents stated that bill inserts are the best way to market Focus on Energy programs (53%, 96 of 180), followed by direct mail, brochures, and postcards (21%, 37 of 180). Respondents also recommended that Focus on Energy promote its programs through social media (20%, 36 of 180), television (17%, 30 of 180), and print media (15%, 27 of 180). Figure 75 shows these results.

Figure 75. Best Methods for Focus on Energy Programs to Contact Participants



Source: CY 2016 Simple Energy Efficiency Participant Survey Question B3. "What do you think is the best way for Focus on Energy to inform the public about energy-efficiency programs?" Multiple responses allowed (n=180)

Cross-Promotion of Other Focus on Energy Programs

Through the Simple Energy Efficiency Program, the Program Administrator promotes other Focus on Energy residential programs using an insert included in each pack. The insert lists other ways customers can save energy, from small changes like washing laundry in cold water, to large changes that customers can supplement with Focus on Energy rebates and services.

To assess the effectiveness of the Program's cross-promotion strategy, participants shared their awareness of and participation in other Focus on Energy programs. Table 132 shows these results. Overall, one-fourth of respondents (46 of 191) reported that they were aware of other Focus on Energy programs, which is the same result as found in the CY 2015 Express Energy Efficiency Program (24%, 34 of 142). Seven percent (14 of 191) of CY 2016 respondents had participated in other Focus on Energy programs.

Table 132. Customer Awareness of and Participation in Other Focus on Energy Programs

Program	Aware of Other Programs[1]	Participated in Other Programs[2]
Home Performance with ENERGY STAR	17%	6%
New Homes	1%	1%
Appliance Recycling	4%	1%
Residential Lighting	5%	0%
Multifamily	1%	0%

[1] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Question F2. "Which programs or rebates are you aware of?" Multiple responses allowed (n=191)

[2] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Question F4. "Which programs, rebates, or projects [have you participated in]?" Multiple responses allowed (n=191)

Customer Experience

The Evaluation Team used the participant surveys and ongoing customer satisfaction surveys, supported by the Program Actor interviews, to assess customer experience of these Program components:

- Overall Program satisfaction
- Satisfaction with Program processes
- Measure satisfaction
- Reasons for removing or not installing measures
- Measure installation practices
- Energy-saving actions
- Barriers to participation

Annual Results from Ongoing Customer Satisfaction Survey

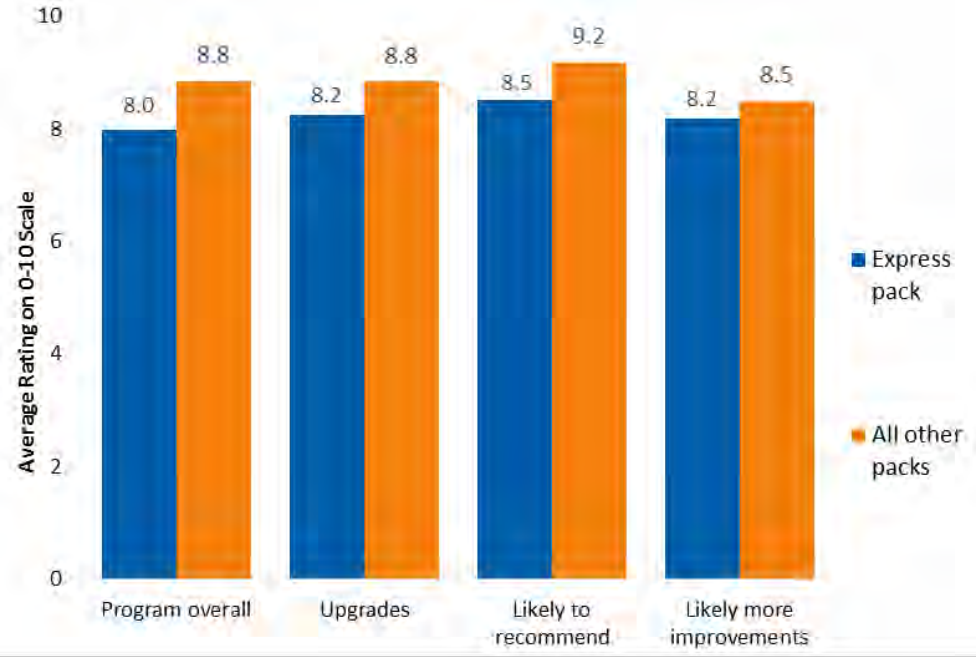
Ongoing customer satisfaction survey participants measured their satisfaction with various aspects of the Simple Energy Efficiency Program. Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.

Figure 76 shows that the average overall satisfaction rating with the Program was 8.0 among participants who received an Express Pack, and was 8.8 among those who received all other packs.[68]

[68] The Evaluation Team randomly selected 12% of non-Express Pack Program survey responses for the analysis and reporting of satisfaction ratings. The Team conducted this sampling task so that the sample size for the Program, and the associated error terms used in significance testing, would be in the same range as the other programs' surveys. If all 7,339 non-Express Pack survey responses were included in the analysis, then the high precision of this Program's results overwhelms the impact of other Focus on Energy programs when they are combined, as there were nearly four times as many Simple Energy Efficiency Program survey responses that of all other programs combined. Mean ratings reported for the Program random sample are identical to the first decimal place with mean ratings for the entire Program survey sample.

Note that Express Pack satisfaction is not included in the final program score (8.8), as Express Packs were only offered on a limited basis to customers who could not participate in programs that were discontinued in 2015 (i.e. Appliance Recycling and Express Energy Efficiency). Participants who received an Express Pack gave statistically lower ratings for the upgrades they received and the Program overall, and were less likely to recommend the Program.[69] The average rating for Program satisfaction among non-Express pack participants was statistically equivalent to the portfolio baseline of 8.8. [70]

Figure 76. CY 2016 Satisfaction and Likelihood Ratings for the Simple Energy Efficiency Program



Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Questions: "Overall, how satisfied are you with the Simple Energy Efficiency program?" (Express Pack n=242, all other packs n=881); "How satisfied are you with the energy-efficient pack you received?" (Express Pack n=245, all other packs n=876); "How likely is it that you would recommend this program to others?" (Express Pack n=245, all other packs n=872); and "How likely are you to initiate another energy-efficiency improvement in the next 12 months?" (Express Pack n=230, all other packs n=818)

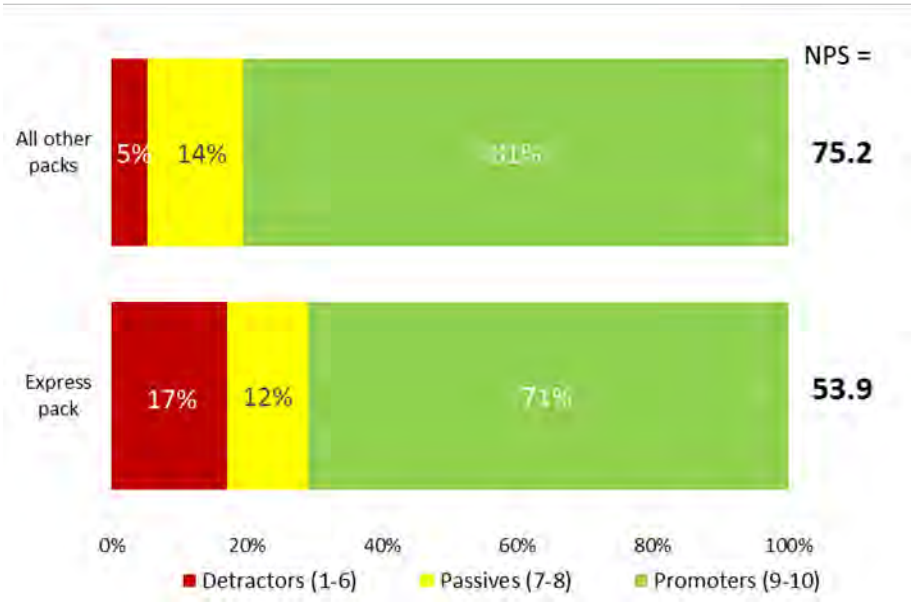
Using these survey data, the Evaluation Team calculated an NPS based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10)

[69] $p < 0.05$ using binomial t-tests.

[70] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015-2018 quadrennium).

and detractors (respondents giving a rating of 0 to 6). The NPS for Express Pack participants is +54, while the NPS for all other packs is +75. Figure 77 shows the distribution of promoters and detractors.

Figure 77. CY 2016 Likelihood of Recommending the Simple Energy Efficiency Program

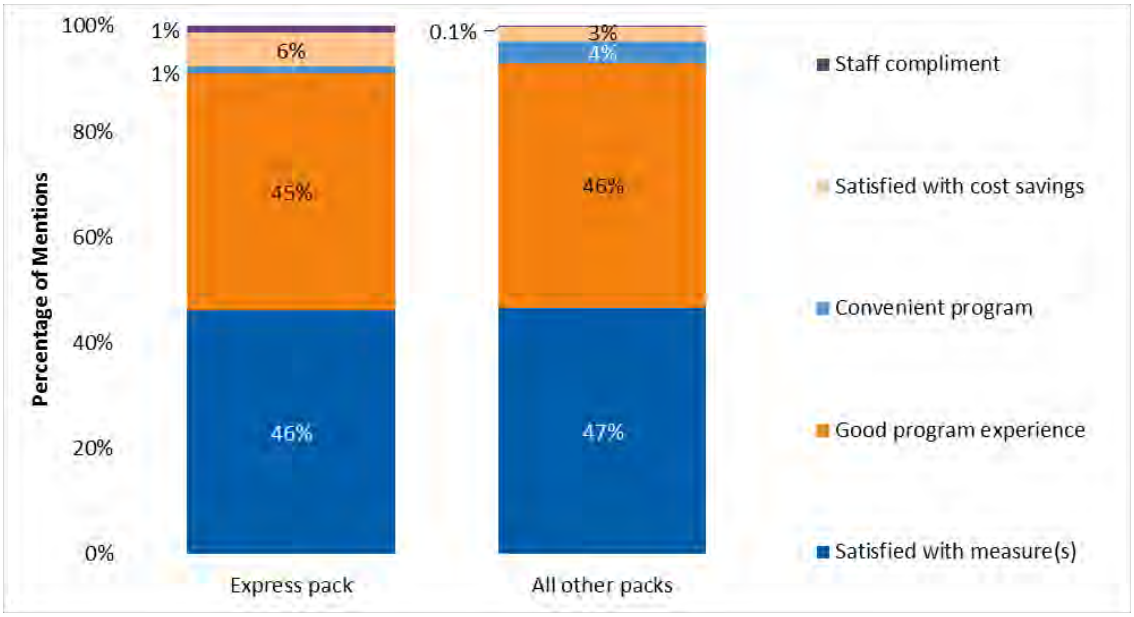


Source: Simple Energy Efficiency Program Ongoing Participant Satisfaction Survey Question: "How likely is it that you would recommend this program to others?" (Express Pack n=245, all other packs n=818)

Ongoing customer satisfaction survey respondents answered whether they had any comments or suggestions for improving the Program. Of the 248 Express Pack participants who responded to the survey, 125 (or 50%) provided open-ended feedback, which the Evaluation Team coded into a total of 176 mentions. Of the 7,339 participants who received all other types of packs and responded to the survey, 2,610 (or 36%) provided open-ended feedback, which the Evaluation Team coded into a total of 3,705 mentions. Of the mentions from Express Pack participants, 44% (78 mentions) were positive or complimentary, while 58% of mentions from all other participants (2,134 mentions) were positive. The remaining comments (56% of Express Pack mentions and 42% of mentions about all other packs) were suggestions for improvement.

The positive responses are shown in Figure 78, with satisfactions with measures and general satisfaction with their experience dominating for Express Pack participants (46% and 45%, respectively) and for those with all other types of packs (47% and 46%, respectively).

Figure 78. CY 2016 Positive Comments About the Program

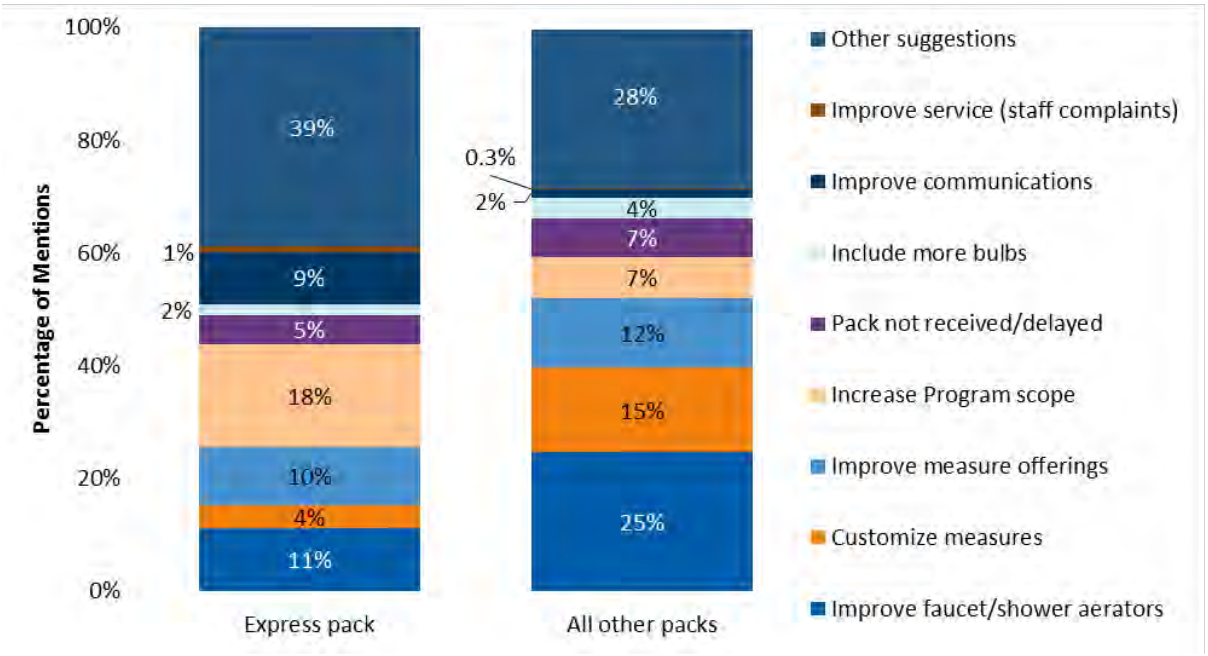


Source: Simple Energy Efficiency Program Ongoing Customer Satisfaction Survey Question: "Please tell us more about your experience and any suggestions for improvement." (Total positive mentions: Express Pack n=78, all other packs n=2,134)

Suggestions for improvement are shown in Figure 79. Participants who received an Express Pack were the most likely group to suggest increasing the Program scope (18%), while those who received the other packs were the most likely group to mention improving the water measures (25%). The most common suggestions for increasing Program scope were focused on including more types of lighting (recessed, three-way) and weatherization measures (in particular to seal leaky windows). Comments about the water measures supplied in the packs most often stated that these were not installed because the measures were not compatible, or because their installation would not improve on the faucets and showerheads currently installed: participants preferred features of their currently installed items, preferred them for aesthetic reasons, or did not want to alter their water flow.

Express Pack participants were also more likely than other groups to mention communications issues (9% compared to 2% of all other pack recipients). Most of these comments indicated that the customer had been given conflicting information at different times about the availability of Focus on Energy programs, measures, and rebates. Participants who received kits other than Express Pack were more likely to suggest customizing packs (4% of Express Pack respondents compared to 15% of all other packs respondents), usually meaning that they would like to order a pack that only includes the items they want, and to choose the number of items.

Figure 79. CY 2016 Suggestions for Improving the Program



Source: Simple Energy Efficiency Program Ongoing Customer Satisfaction Survey Question: "Please tell us more about your experience and any suggestions for improvement." (Total suggestions for improvement mentions: Express Pack n=98, all other packs n=1,571)

Some participants also mentioned wanting to be able to choose between different versions of an item (types of lighting or different colored aerators). About one in 10 mentions from both groups were about improving measure offerings (10% Express Pack respondents and 12% of all other pack respondents): these comments sometimes referred to items that did not work or stopped working soon after installation, as well as items that could not be installed because they did not fit. Comments about smart strips sometimes mentioned confusion about how they work. Some comments about the light bulbs mentioned a preference for different types or colors of light.

Participants made a number of comments coded as miscellaneous "other suggestions." Among Express Pack participants, many of these comments expressed disappointment about not having received a home audit (as the direct-install delivery method used by the Express Energy Efficiency Program had ended). More generally, many miscellaneous comments expressed support for Focus on Energy's programs, and suggested ways that Focus on Energy and utilities could do more to promote and expand these programs.

Satisfaction with Program Processes

Although the ongoing customer satisfaction survey included broad questions that were applicable across most residential programs, the survey for the Simple Energy Efficiency Program participants included more specific questions related to customer experience and satisfaction with the sign-up process, the time it took to receive the pack, and the measures.

Approximately three-fourths of respondents (139 of 189) signed up for the Program using the Focus on Energy website, about one-fourth (45 of 189) called the Program Implementer customer call center, and 3% (five respondents) signed up for a pack through their utility company.

The ongoing customer satisfaction survey included questions about respondents' ease with the sign-up process when enrolling through the Focus on Energy website. The vast majority of these respondents (98%, 136 of 139) found the sign-up process to be *very easy* or *somewhat easy*. Three respondents rated that the sign-up process was *not very easy* because they "did not read the directions," "had some trouble with the shopping cart," or the web page "kept blinking off."

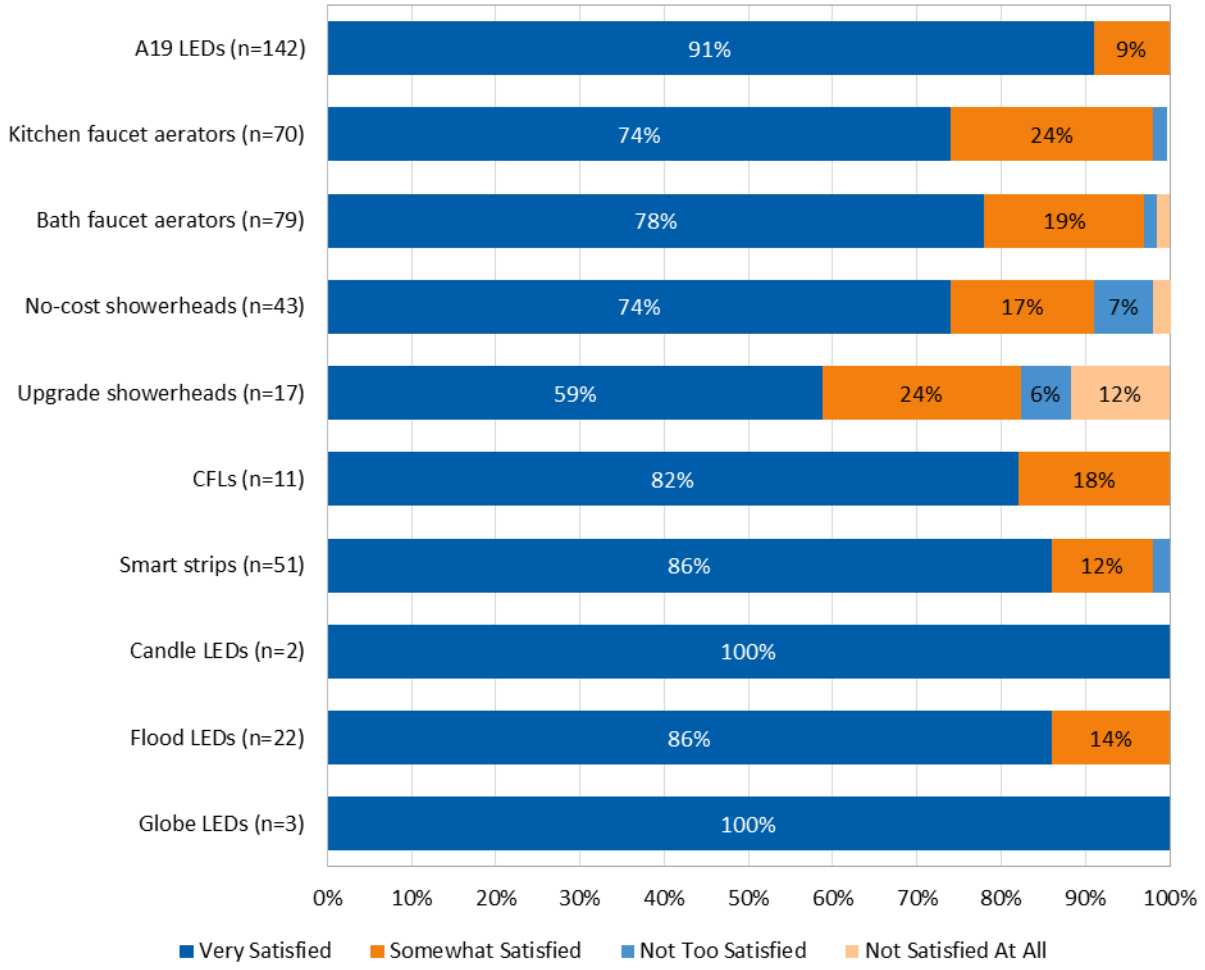
The survey then had questions about how long it took to receive the pack. Three-fourths or respondents (134 of 177) said it took less than four weeks, while one-fourth (40 of 177) said it took between four and eight weeks, and 1% (three respondents) said it took more than eight weeks. Most respondents (97%, 182 of 187) rated themselves as *very satisfied* or *somewhat satisfied* with the time it took to receive the pack.

Measure Satisfaction

Survey respondents rated their satisfaction with each measure in their pack, as shown in Figure 80. Although the findings for candle LEDs and globe LEDs were anecdotal because of small response rates, the survey revealed that these bulb types had the highest satisfaction scores—100% of respondents were *very satisfied* with the bulbs. Showerheads offered in the Showerhead Upgrade Pack had the lowest satisfaction, with 83% of respondents being *very satisfied* or *somewhat satisfied* (14 of 17). Of all products in the packs, respondents were least satisfied with the showerheads and kitchen and bath aerators.

Respondents who were *not too satisfied* or *not satisfied at all* answered a survey question about their reasons for the satisfaction rating. All nine respondents who were not satisfied with the bathroom faucet aerators or the showerheads offered in Upgrade Showerhead Pack did not like the water pressure. The two respondents who were not satisfied with the smart strip or the kitchen faucet aerator simply did not like these measures. Of the respondents who received showerheads (n=60), three did not like the water pressure and one preferred their previous showerhead.

Figure 80. Simple Energy Efficiency Program Customer Satisfaction by Measure



Source: CY 2016 Simple Energy Efficiency Participant Survey Questions C10, C20, C30, C44, C58, C72, C82, C92, and C108: "How satisfied were you with the [measure] you received?"

Reasons for Removing or Not Installing Measures

The Evaluation Team assessed the percentage of survey respondents who removed measures or did not install measures and their reasons. Establishing these percentages can provide insight into successes and barriers of the Program, as does determining the reasons a measure is not installed or is removed after installation: these items can signal, for example, that a particular measure is faulty. Table 133 shows that removal rates were between 0% and 10%, while rates for not installing certain measures ranges from 0% to 55%.

Table 133. Simple Energy Efficiency Program Measure Removal or Non-Install Rates

Measure	Percentage of Respondents Removing Measures[1]	Percentage of Respondents Not Installing Measures[2]
A19 LEDs (n=162)	2%	14%
Kitchen Faucet Aerators (n=162)	2%	55%
Bath Faucet Aerators (n=159)	3%	48%
Showerheads (n=74)	5%	38%
Upgrade Showerheads (n=20)	10%	15%
CFLs (n=24)	0%	8%
Smart Strips (n=70)	1%	27%
Candle LEDs (n=2)	0%	0%
Flood LEDs (n=24)	0%	29%
Globe LEDs (n=3)	0%	One respondent

[1] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Questions C3, C13, C23, C37, C51, C65, C75, C85, and C101: "Of the [measure] that is/are not currently installed, [was this/were either of these measure(s)] ever installed in your home and then removed?" and "Was the [measure] ever installed in your home and then removed?"

[2] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Questions C6, C16, C26, C40, C54, C68, C78, C88, and C104: "Of the [measure](s) that [is/are] not currently installed, [was this measure/were either of these measures] never installed?" and "To confirm, the [measure] was never installed?"

The few respondents who had removed measures gave their reasons for removal, as shown in Table 134. Respondents who removed faucet aerators and showerheads consistently said water pressure was the reason for removal. Other responses were anecdotal.

Table 134. Participant Reasons for Measure Removal[1]

Reasons for Removal	Number of Mentions
A19 LEDs	
Brightness	1
Did not fit application	1
Kitchen Faucet Aerators	
Did not like the water pressure	2
Uninstalled faucet	1
Bathroom Faucet Aerators	
Did not like the water pressure	2
"Did not see any difference"	1
Difficult to install	1
No-Cost Showerheads	
Did not like the water pressure	3
Liked previous showerhead more	1

Reasons for Removal	Number of Mentions
Upgrade Showerheads	
Did not like the water pressure	2
Smart Strips	
Simply did not like it	1

[1] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Questions C5, C15, C25, C39, C53, C67, C77, C87, and C103: "Why did you remove the [measure]?" Multiple responses allowed (n≥1)

Respondents also answered why they did not install the measures they received; their responses are shown in Table 135. Overwhelmingly, respondents said they already had the measure installed in every possible location, had difficulty installing it, or had not gotten around to installing it yet.

Table 135. Participant Reasons for Not Installing Measure[1]

Reasons for Not Installing	Number of Mentions
A19 LEDs	
Already has bulbs installed in every possible location/waiting for current bulbs to burn out	21
Does not fit properly	2
Kitchen Faucet Aerators	
Already has aerators installed in every possible location	35
Difficult to install/could not install	18
Have not gotten around to installing it	15
Does not fit current faucet/not compatible with faucet design	10
Does not like the look/design	4
Does not like the water pressure	3
Waiting until current sink is replaced	3
Refused to answer	1
Bathroom Faucet Aerators	
Already has aerators installed in every possible location	36
Have not gotten around to installing it	17
Difficult to install/could not install	9
Waiting until current sink is replaced	5
Does not like the water pressure	4
Does not fit current faucet/not compatible with faucet design	2
Does not like the look/design	2
Aerator broke	1
Refused to answer	1

Reasons for Not Installing	Number of Mentions
No-Cost Showerheads	
Already has showerheads installed in every possible location	11
Have not gotten around to installing it	6
Does not like the look/design	4
Difficult to install/could not install	3
Waiting until current shower is replaced	2
Does not fit properly	1
Does not like the water pressure	1
Upgrade Showerheads	
Already has showerheads installed in every possible location	2
Have not gotten around to installing it	1
CFLs	
Already has bulbs installed in every possible location/waiting for current bulbs to burn out	2
Smart Strips	
Already has smart strips installed in every possible location	9
Have not gotten around to installing it	4
Do not know where to install it	3
Does not like the look/design	2
Does not know	1
Flood LEDs	
Already has bulbs installed in every possible location/waiting for current bulbs to burn out	6
Difficult to install/could not install	1
Globe LEDs	
Does not know	1

[1] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Questions C8, C18, C28, C42, C56, C70, C80, C90, and C106: "Why did you not install the [measure]?" Multiple responses allowed (n≥1)

The Program Implementer and Program Administrator made an effort to reduce the number of customers who simply did not get around to installing measures by including messages in the pack to install items right away and to "start saving money today." They are also collaborating to offer opt-out packs in CY 2017, in which customers can select to remove measures they do not want and therefore will not install.

Measure In-Service Rates

One of the main goals of the participant survey was to estimate first-year ISRs to identify areas where the Program is succeeding in maximizing savings and where it can increase savings. Table 136 shows the first-year ISRs estimated by measure for the Program. See the *In-Service Rates* section above for a detailed explanation of Program first-year and net present value ISRs.

Table 136. CY 2016 Simple Energy Efficiency Program Measure First-Year In-Service Rates

Measure	Measures Received	Measures Installed	First-Year ISR
A19 LEDs	407	332	82%
Kitchen Faucet Aerators	161	69	43%
Bath Faucet Aerators	159	78	49%
No-Cost Showerheads	74	42	57%
Upgrade Showerheads	20	15	75%
CFLs	24	22	92%
Smart Strips	70	50	71%
Specialty LEDs[1]	115	93	81%

[1] Specialty LEDs include candle LEDs, flood LEDs, and globe LEDs.

The Evaluation Team compared the Program's first-year ISRs with those of other mailed kit programs from PacifiCorp Idaho, Ameren Missouri, and two Midwest utilities (Table 137). This comparison of ISRs can provide insight into successes and barriers of the Program by signaling if customers in other utility territories are installing similar measures more or less often than in the Program's territory.

Table 137. Mailed Kit Program First-Year In-Service Rates by Measure

Measure	PacifiCorp Idaho 2013-2014[1]	Ameren Missouri 2014[2]	Midwest Utility 1 2015	Midwest Utility 2 2016	Focus on Energy 2016
A-line LEDs	88%	92%	n/a	90%	**82%**
Kitchen Faucet Aerators	59%	52%	54%	53%	**43%**
Bath Faucet Aerators	55%	52%	66%	52%	**49%**
Showerheads	57%	47%	48%	51%	**57%**
CFLs	75%	75%	77%	85%	**92%**
Smart Strips	n/a	78%	n/a	n/a	**71%**

[1] Source: Cadmus. *2013-2014 Idaho Home Energy Savings Program Evaluation*. September 27, 2016. Available online: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2016/2013-2014_Idaho_HES_Evaluation_Report.pdf

[2] Source: Cadmus. *Ameren Missouri Efficient Products Impact and Process Evaluation: Program Year 2014*. May 15, 2015. Available online: https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935933387

At 92%, the Program has the highest CFL ISR of any utility. The Program showerhead ISR of 57% aligns with the other utility programs (47% to 57%). For all other measures (LEDs, bath faucet aerators, kitchen faucet aerators, and smart strips), the Simple Energy Efficiency Program has lower ISRs than programs at other utilities.

Like the Simple Energy Efficiency Program, all utilities operated their programs using online ordering platforms. Midwest Utility 1 also required that customers complete an online energy audit before receiving a kit. Kit designs varied across utilities. PacifiCorp Idaho and Ameren Missouri offered multiple kit combinations, including low-cost options, while Midwest Utility 1 and Midwest Utility 2 each offered one no-cost kit. Unlike Focus on Energy, none of the utilities offered specialty LEDs. Table 138 shows the number of measures in each utility's kits.

Table 138. Mailed Kit Program Contents

Measure	PacifiCorp Idaho 2013–2014	Ameren Missouri 2015	Midwest Utility 1 2015	Midwest Utility 2 2016	Focus on Energy 2016
A-line LEDs	4[1]	4	0	1	2-3
Kitchen Faucet Aerators	1	1	1	1	1
Bath Faucet Aerators	1-2	1	2	1	1
Showerheads	1-2	1	2	1	1[2]
CFLs	4	2	6	1	2
Smart Strips	0	1[1]	0	0	1
Specialty LEDs	0	0	0	0	3-4[3]

[1] The customer must pay $4.95 for these measures.

[2] The customer must pay $8.95 to receive an upgraded showerhead.

[3] The customer must pay between $3.00 and $6.95 for this measure, depending on the type of specialty LED.

Energy-Saving Actions

The Simple Energy Efficiency Program includes an insert in each pack that lists other ways customers can save energy, such as by washing laundry in cold water or changing the furnace filter. The survey first includes the question, "You should have received a pamphlet with information on actions you can take to save energy in your pack. Have you taken any of these actions?" One-fourth of respondents (45 of 192) answered "yes," nearly half (88 of 192) answered "no," and nearly one-third (59 of 192) answered "don't know" or could not recall receiving the insert.

The respondents who answered "yes" then shared which actions they took that were listed on the insert. Table 139 shows their responses. Twelve respondents (27%, n=45) who answered "yes" listed actions that were not included in the insert; these respondents are not listed in Table 139.

Table 139. Energy-Saving Actions Listed on the Insert that Participants Implemented

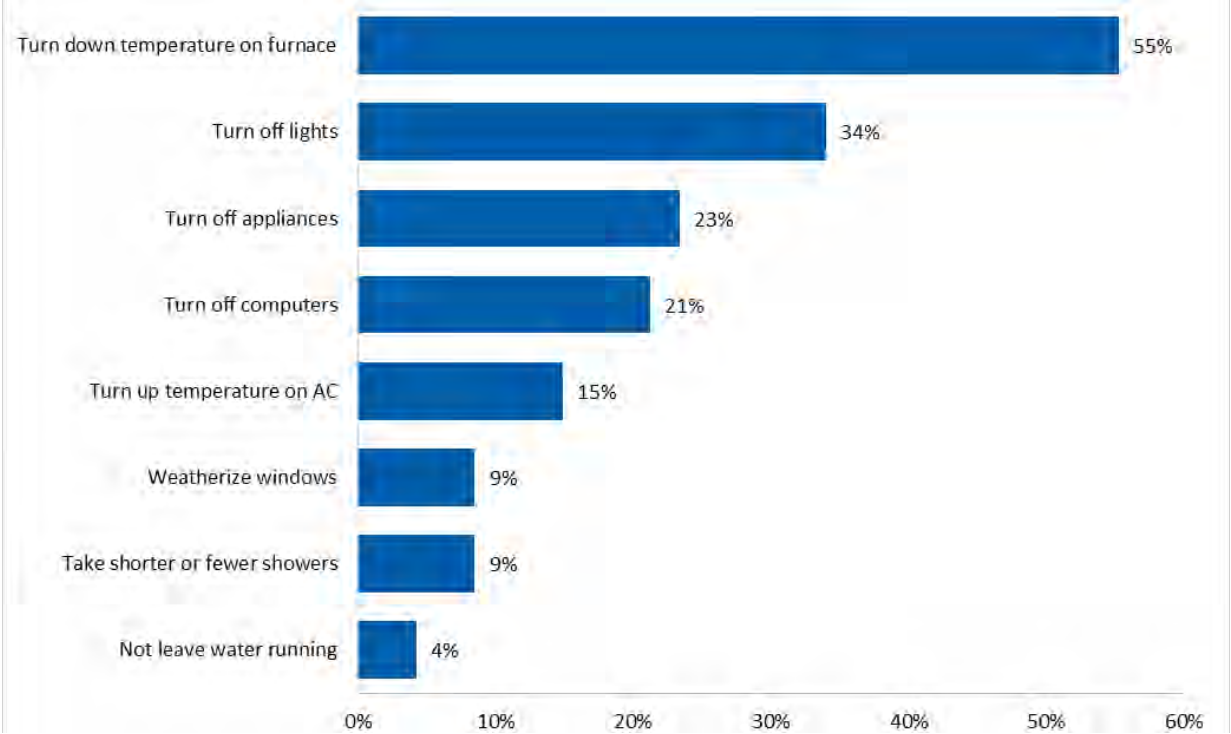
Energy-Saving Action	"Yes" Responses
Reduce water heater temperature to 120°F	16
Change the furnace filter	16
Use dimmers on indoor lighting to lower light levels	15
Leave shades open during the day to heat my home	15
Always wash laundry in cold water	13
Keep the freezer full	8

[1] Source: CY 2016 Simple Energy Efficiency Program Participant Survey Question E1. "You should have received a pamphlet with information on actions you can take to save energy in your pack. Have you taken any of these actions?" Multiple responses allowed (n=33)

Two-thirds of respondents (21 of 33) implemented two or more of the energy-saving actions listed on the insert, nearly half (14 of 33) implemented three or more of the energy-saving actions, and three respondents (9%) implemented five energy-saving actions.

Survey respondents shared if they had taken any other energy-saving actions since participating in the Program. One quarter (47 of 190) said they had taken other energy-saving actions, as listed in Figure 81. Turning down the temperature on the furnace was the most popular energy-saving action (55%, 26 of 47), followed by turning off the lights (34%, 16 of 47).

Figure 81. Other Energy-Saving Actions That Participants Implemented



Source: CY 2016 Simple Energy Efficiency Participant Survey Question E3. "Specifically, what actions have you taken?" Multiple responses allowed (n=47)

Survey respondents rated the importance of the Program in their decision to implement the energy-saving actions reported. Eight-five percent of respondents (68 of 80) rated the Program as *very important* or *somewhat important* in their decision to implement energy-saving actions, while 8% of respondents rated it as *not too important* and 8% of respondents rated it as *not important at all*.

Overall, 37% of respondents (71 of 192) took energy-saving actions, either ideas listed on the Program insert, ideas they came up with on their own, or both. Every respondent who implemented any of the energy-saving actions listed on the insert said they had continued to take those actions. Of respondents that took energy-saving actions *not* listed on the insert, only one respondent who installed plastic on their home windows stated that they did not continue to implement this energy-saving action.

Barriers to Participation

The Program Administrator said the main barrier to participation was qualifying for the Program, and that multifamily customers (living in residences with four or more units) wanted to participate in the Program. The Program Implementer had also received inquiries from multifamily customers. To mitigate this barrier, the Program Implementer refers these customers to the Multifamily Direct Install Program, which offers similar services to multifamily customers.

The Program Administrator said customers in nonparticipating Focus on Energy utility territories and customers who had participated in the Express Energy Efficiency Program within the last three years were interested in participating in the Program.

The Program Implementer also said some customers were hesitant to provide their utility account number because it is personally identifiable information. However, despite this barrier, the Program Implementer must require the utility account number to confirm that the customer qualifies for the Program.

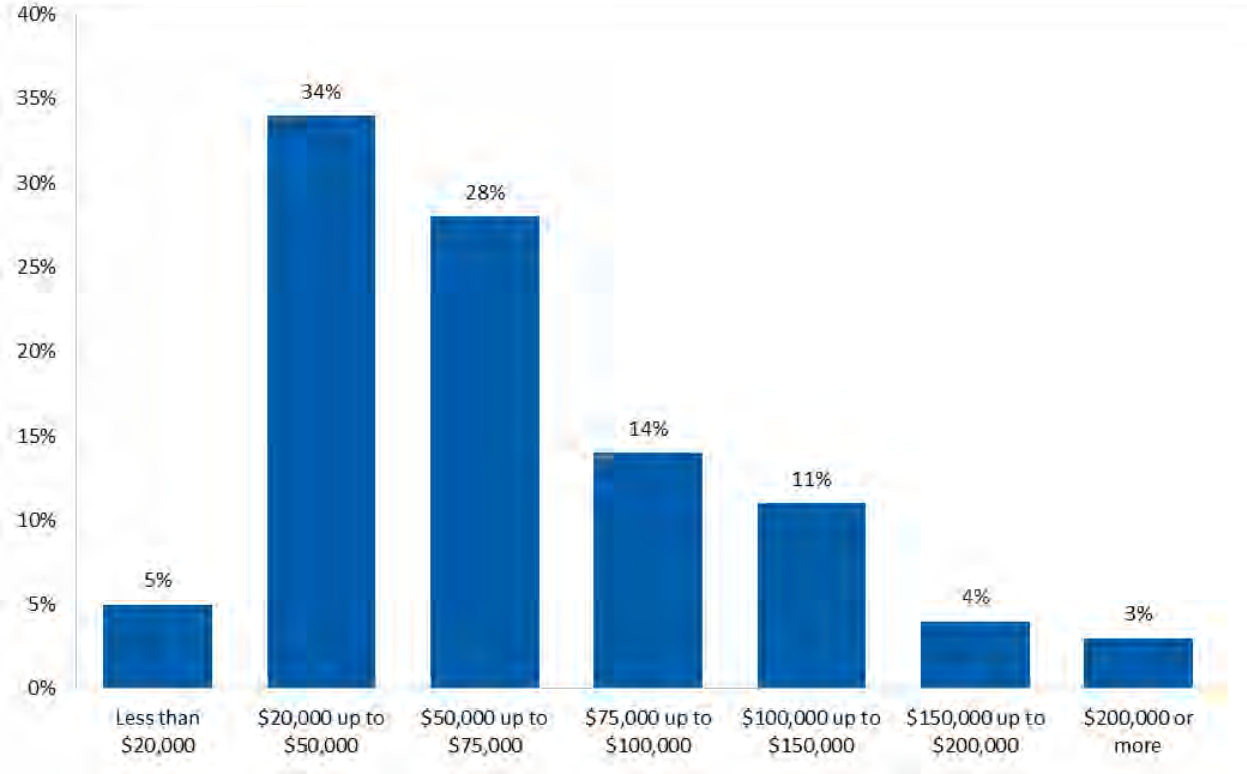
Participant Demographics

The CY 2016 participant survey included questions to collect demographic information from each respondent. The survey revealed that most respondents (88%, 168 of 192) live in a single-family, detached home, and 8% of respondents (16 of 192) live in an attached home (townhouse, row house, or duplex).

Figure 82 shows participants' total household income in CY 2016. Program participants' median income was $50,000 up to $75,000, which aligns with the Census Bureau's 2015 Wisconsin median household income of $53,357.[71]

[71] U.S. Census Bureau. QuickFacts Wisconsin. Available online: http://www.census.gov/quickfacts/table/PST045215/55

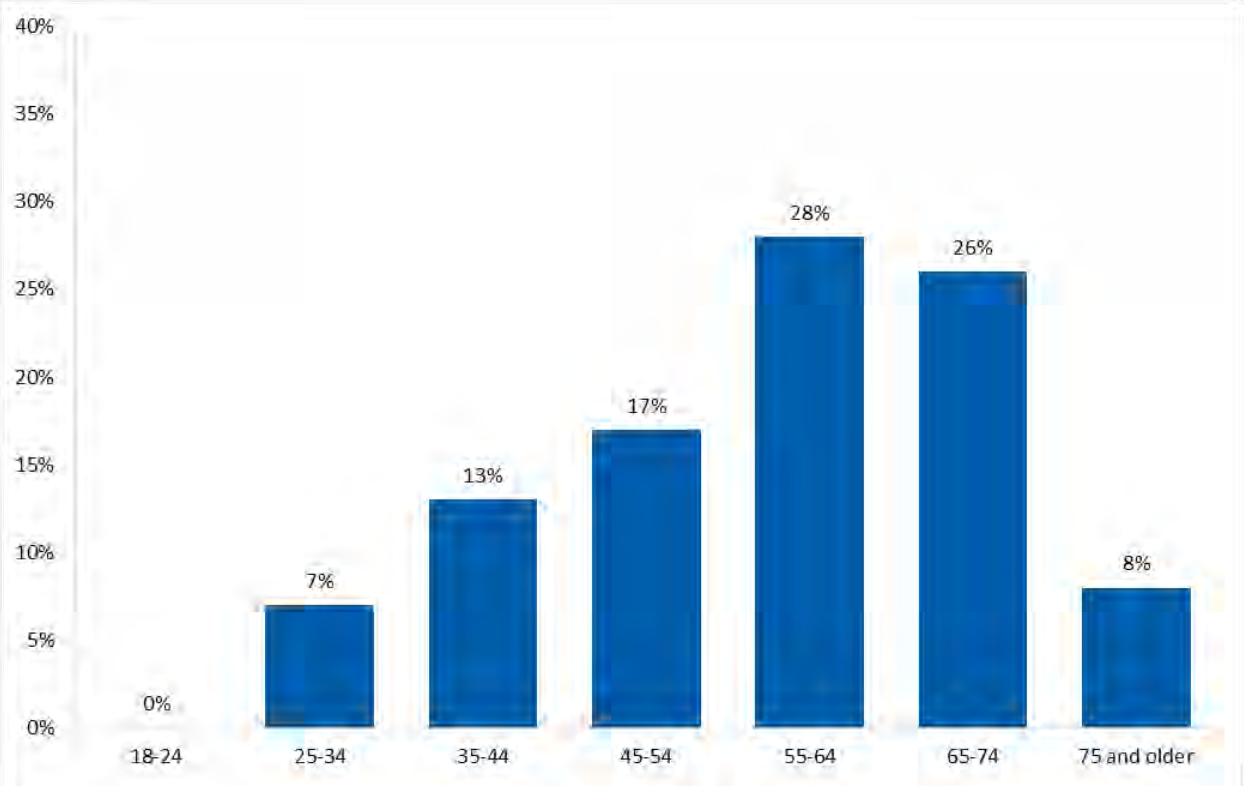
Figure 82. Simple Energy Efficiency Program Participant Total Household Income



Source: CY 2016 Simple Energy Efficiency Participant Survey Question H6. "Which category best describes your total household income in 2016 before taxes? Please stop me when I get to the appropriate category." (n=164)

Participants' median age was between 55 and 64 in CY 2016, as seen in Figure 83. Thirty-four percent of Program participants were 65 years old and over, which is higher than the U.S. Census Bureau's 2015 estimate that 15.6% of the Wisconsin population was 65 years old and over.

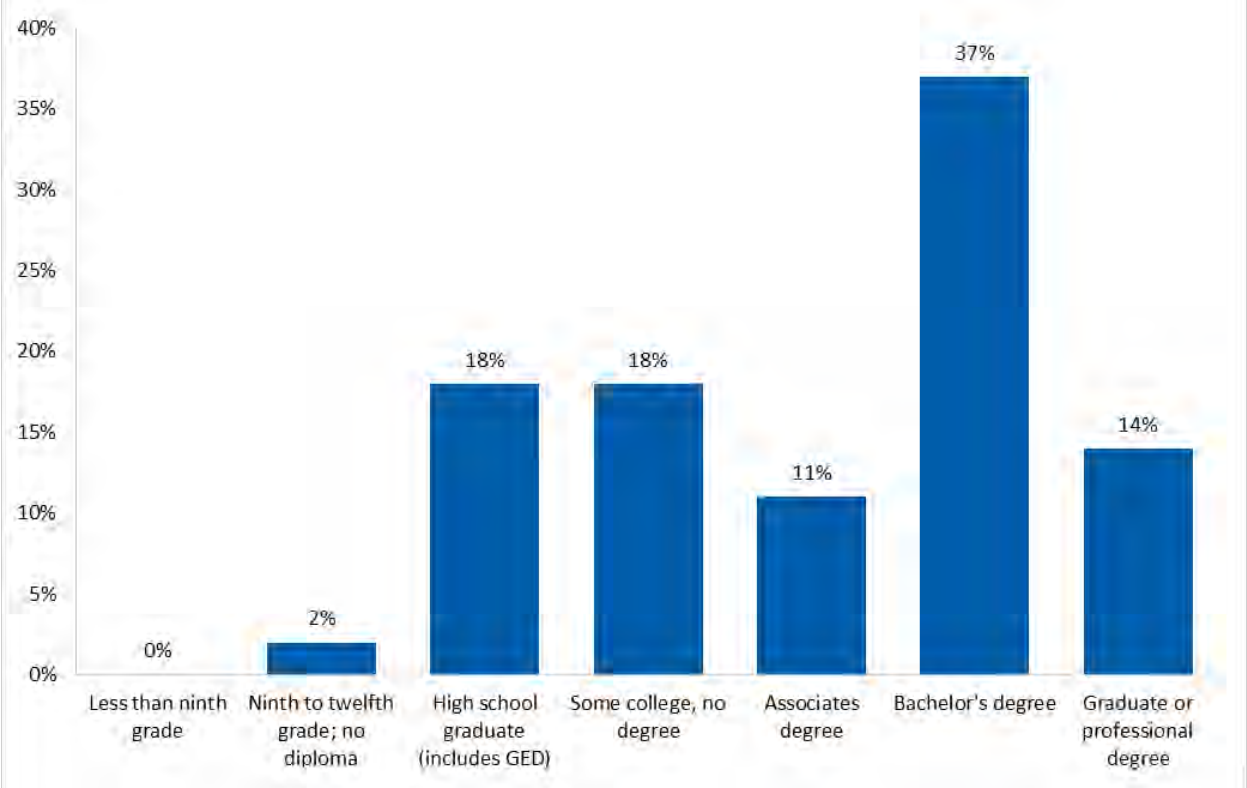
Figure 83. Simple Energy Efficiency Program Participant Age Categories



Source: CY 2016 Simple Energy Efficiency Participant Survey. Question H5: "Which of the following categories best represents your age? Please stop me when I get to the appropriate category." (n=190).

The median education level for CY 2016 participants was having a bachelor's degree, as shown in Figure 84. Fifty-one percent of Program participants held a bachelor's degree or higher, which is a higher percentage than the U.S. Census Bureau's 2011-2015 estimate for this of 27.8% for the Wisconsin population.

Figure 84. Simple Energy Efficiency Program Participant Highest Level of School Completed



Source: CY 2016 Simple Energy Efficiency Participant Survey Question H4. "What is the highest level of school that you have completed?" (n=190)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 140 lists the incentive costs for the Simple Energy Efficiency Program for CY 2016.

Table 140. Simple Energy Efficiency Program Incentive Costs

	CY 2016
Incentive Costs	$1,096,464

The Evaluation Team found the CY 2016 Program was cost-effective (6.01). Table 141 lists the evaluated costs and benefits.

Table 141. Simple Energy Efficiency Program Costs and Benefits

Cost and Benefit Category	CY 2016
Costs	
Administration Costs	$458,265
Delivery Costs	$1,045,049
Incremental Measure Costs	$1,154,398
Total Non-Incentive Costs	**$2,656,054**
Benefits	
Electric Benefits	$8,697,039
Gas Benefits	$4,950,201
Emissions Benefits	$2,306,966
Total TRC Benefits	**$15,954,206**
Net TRC Benefits	**$13,298,152**
TRC B/C Ratio	**6.01**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. Overall, the Simple Energy Efficiency Program's first year of implementation was a success.

Both the Program Implementer and Program Administrator stated that, overall, the Program ran smoothly in its first year of implementation and it achieved all of its KPIs. The Program served 70,978 participants in CY 2016, compared to 15,726 participants through the CY 2015 Express Energy Efficiency Program. Participants expressed high satisfaction with the measures (83% to 100% were *very satisfied* or *somewhat satisfied*) and with the sign-up process (98% were *very satisfied* or *somewhat satisfied*). The average overall satisfaction rating with the Program was 8.0 among participants who received an Express Pack, and was 8.8 among those who received all other packs. One-third of participants persisted in taking energy-saving actions after participating in the Program. Although the Program Implementer was unable to use the bulk uploading process, by the end of the year it was able to upload all CY 2016 data into SPECTRUM.

Outcome 2. The Simple Energy Efficiency Program's first-year ISRs were higher than or comparable to similar mailed kit programs for CFLs and showerheads. First-year ISRs for A-line LEDs, bath faucet aerators, kitchen faucet aerators, and smart strips were somewhat lower than in other comparable jurisdictions.

The Evaluation Team found that the Program had lower first-year ISRs for LEDs, bath faucet aerators, kitchen faucet aerators, and smart strips compared to similar mailed kit programs. Based on responses

to the participant survey, few participants removed measures, so the issue was not faulty measures. Instead, most customers did not install these measures because they already had them installed in every possible location, had difficulty installing them, or just did not get around to installing them. These responses are common for water-saving measures, which are typically the least popular measures amongst customers, whether offered in pack programs, direct-install programs, or home performance programs.

Recommendation 2a: Offer an opt-out choice for measures in CY 2017 to mitigate the number of respondents who do not install measures because they already have them or do not have enough interest in the measures to get around to installing them. The Program Administrator is already exploring the possibility of offering this service in CY 2017.

Recommendation 2b: Conduct an in-depth benchmarking review of similar pack programs to understand their success in achieving higher first-year ISRs. For example, explore how other utilities persuade customers to install the measures and what types of measures they offer that customers are most interested in installing.

Recommendation 2c: Consider reviewing the Program marketing collateral to ensure that messaging is as effective as possible in inviting participants to install measures and that installation instructions are as clear and simple as possible.

Recommendation 2d: Quantify the Program Implementer's KPI to advise on other innovative measures, such as hosting quarterly meetings or conducting routine benchmarking assignments, to ensure that Program staff are aware of the most popular, innovative measures that customers want to install.

Outcome 3. Overall, 24% of respondents reported that they were aware of other Focus on Energy programs, which is the same result as in the CY 2015 Express Energy Efficiency Program.

Cross-promotion of other programs was a primary goal of the Express Energy Efficiency Program, which the Program staff achieved by having installation technicians conduct walk-through assessments and point out energy-savings opportunities to customers. When the Program Administrator made the transition to the Simple Energy Efficiency Program, it recognized that customer awareness of other programs might dip because of the lack of direct customer interaction. The steady rate of customer awareness shows that the Simple Energy Efficiency Program is as effective as the Express Energy Efficiency Program was in promoting other Focus on Energy programs.

Recommendation 3: Continue to include the pack insert of energy-saving actions customers can take and how they can participate in other programs. Explore other opportunities for the Simple Energy Efficiency Program to cross-promote other Focus on Energy programs. For example, when utilities mail bill inserts promoting the Program, include text that leads customers to the Focus on Energy website to explore additional energy-saving opportunities.

Outcome 4. The Evaluation Team had to make manual adjustments to the SPECTRUM database because no-cost and upgrade showerheads were classified under the same measure name. In SPECTRUM, both no-cost and upgrade showerheads had the measure name "Showerhead, 1.5 GPM, Pack-based," rendering them impossible to distinguish. The Program Implementer supplied the Evaluation Team with the number of upgrade showerheads (554), and the Team manually updated the measure names of 554 showerheads in order to apply upgrade-specific showerhead results from the ISR and NTG analyses.

Recommendation 4. Create unique measure names in SPECTRUM for each measure. Just as CFLs have unique measure names in the SPECTRUM database based their wattages, the showerhead measures should have unique measure names to distinguish between no-cost showerheads and upgrade showerheads.

Multifamily Energy Savings and Multifamily Direct Install Programs

Through the Multifamily Energy Savings Program and Multifamily Direct Install Program (collectively referred to as the Multifamily Programs), Focus on Energy provides education and energy-saving opportunities to multifamily customers by offering incentives for energy-efficient upgrades and free direct install measures. In CY 2016, the Multifamily Programs continued to be administered by CB&I (Program Administrator) and implemented by Franklin Energy (Program Implementer).

Focus on Energy offers two types of rewards through the Multifamily Energy Savings Program: prescriptive rebates for eligible measures, including an emphasis on discounts for common area lighting, and custom incentives for performance-based projects. Through the Multifamily Direct Install Program, Focus on Energy offers free direct installation of LEDs, specialty CFLs, pipe insulation, pre-rinse sprayers, faucet aerators, and showerheads, as well as water heater temperature set-back services. For multifamily owners and managers, the Program also offers vending misers and LED retrofits for exit signs in common areas.

The Program performed well relative to its *ex ante* goals. The Multifamily Energy Savings Program achieved 100% of all its *ex ante* savings goals and fell just short of its verified savings goals. The Multifamily Direct Install Program achieved 99% to 101% of all its *ex ante* savings goals and similarly fell just short of achieving its verified savings goals. Realization rates were relatively high for both program offerings (between 86% to 98% for Multifamily Energy Savings Program, and between 94% to 96% for Multifamily Direct Install Program, across various parameters), and the majority of sampled Program measures were aligned between claimed and evaluated savings values.

Table 142 lists the actual Program spending, savings, participation, and cost-effectiveness.

Table 142. Multifamily Programs Summary

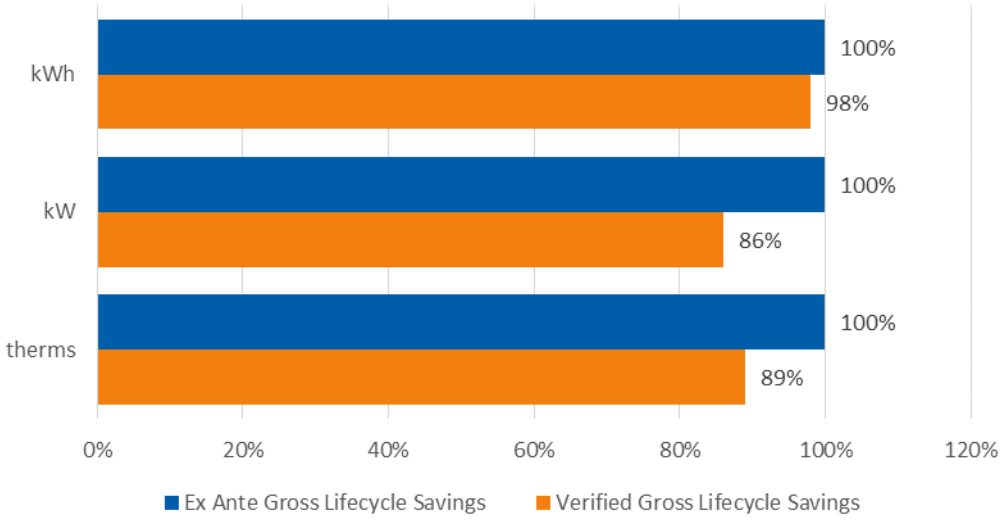
Item	Units	CY 2016	CY 2015
Multifamily Energy Savings Program			
Incentive Spending	$	$1,266,039	$1,195,153
Participation[1]	Number of Participants	341	472
Verified Gross Lifecycle Savings	kWh	144,210,468	152,842,241
	kW	1,104	1,132
	therms	5,424,269	6,039,574
Verified Gross Lifecycle Realization Rate	MMBtu	93%	94%
Net Annual Savings	kWh	8,885,067	9,484,683
	kW	872	928
	therms	278,942	314,608
Annual Net-to-Gross Ratio	MMBtu	79%	82%
Cost-Effectiveness[2]	Total Resource Cost Test: Benefit/Cost Ratio	2.57	2.11

Item	Units	CY 2016	CY 2015
Multifamily Direct Install Program			
Incentive Spending	$	$286,026	$400,205
Participation[1]	Number of Participants	129	124
Verified Gross Lifecycle Savings	kWh	58,743,089	35,983,696
	kW	268	200
	therms	1,459,536	1,136,700
Verified Gross Lifecycle Realization Rate	MMBtu	95%	94%
Net Annual Savings	kWh	3,868,738	3,119,305
	kW	268	200
	therms	142,638	114,398
Annual Net-to-Gross Ratio	MMBtu	100%	100%
Cost-Effectiveness[2]	Total Resource Cost Test: Benefit/Cost Ratio	3.81	2.97

[1] The total number of participants represents the sum of unique participants for both Programs in each year. Participants are defined as the multifamily building owners or managers.
[2] The cost-effectiveness test represents results across both the Multifamily Program offerings in CY 2015.

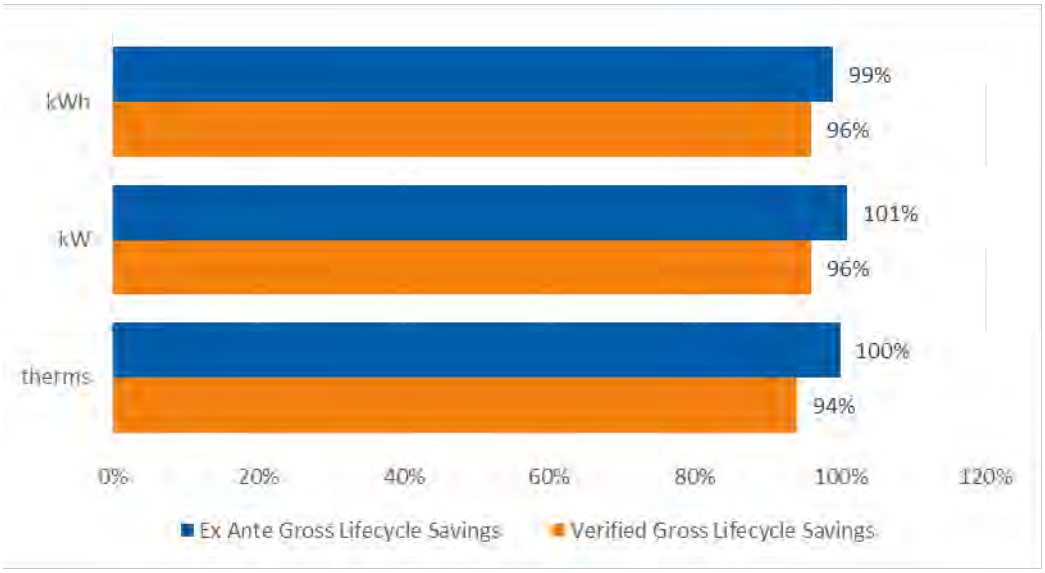
Figure 85 and Figure 86 show the percentage of gross lifecycle savings goals achieved by the Multifamily Programs in CY 2016. The Multifamily Energy Savings Program and Multifamily Direct Install Program exceeded all but one of its CY 2016 *ex ante* savings goals but fell short of all verified savings goals.

Figure 85. Multifamily Energy Savings Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Figure 86. Multifamily Direct Install Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Multifamily Programs in CY 2016, designed to answer these key questions:

- What are the gross and net electric and natural gas savings?
- How can the Programs increase energy savings and demand reduction?
- How satisfied are participant end-users with Program-eligible measures?

Specific to the Multifamily Energy Savings Program, the Evaluation Team sought to answer these key questions:

- What are the barriers to increased customer participation? Are these barriers different for condominium owners/associations or owners of mixed-use properties? How effectively are the Program stakeholders reaching those customers and addressing their barriers?
- Are Trade Allies satisfied with the support and communication from, and their overall experience with, Focus on Energy?
- How effectively does the Multifamily Direct Install Program generate interest in the Multifamily Energy Savings Program? Is the Multifamily Direct Install Program creating opportunities to promote deeper energy savings per building and unit?
- How familiar are electrical Trade Allies with the Common Area Lighting Package (CALP)? Is the Program Implementer expanding CALP adoption as a business practice by expanding Trade Ally awareness or by creating a similar package for HVAC measures?

The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing the Programs' performance. Table 143 lists the specific data collection activities and sample sizes used in the evaluations, specific to each Program.

Table 143. Multifamily Programs' Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)	Multifamily Energy Savings Program	Multifamily Direct Install Program
Program Actor Interviews	2	✓	
Tracking Database Review	Census	✓	
Participating Trade Ally Surveys	17	✓	-
Property Manager or Owner Surveys	70	✓	
Ongoing Participant Satisfaction Survey[1]	Varies by Program	✓ (n=35)	✓ (n=16)
Partial Participant Interviews	12	✓	
Engineering Desk Review	85	✓ (n=43)	✓ (n=42)
Verification Site Visits	50	✓ (n=8)	✓ (n=42)

[1] The Evaluation Team used survey data to assess the Program Implementer's performance in meeting contractual obligations related to satisfaction KPIs.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and Program Implementer during the summer of CY 2016 to learn about the status of the Multifamily Programs, assess related objectives and performance, and investigate challenges and solutions to implementation. The interview topics emphasized changes to the Programs' design, including improvements in the application process and marketing and outreach strategies.

Tracking Database Review

The Evaluation Team conducted a census review of the Multifamily Programs' tracking database, SPECTRUM, which included the following tasks:

- Thoroughly reviewing the data to ensure that the totals in SPECTRUM matched the totals reported by the Program Administrator
- Reassigning savings from a number of database adjustment measures to the corresponding program measures
- Checking for complete and consistent application of information across data fields (measure names, application of lifetime savings, application of effective useful lives, etc.)

Participating Trade Ally Surveys

The Evaluation Team conducted an online survey of participating Trade Allies. The Team sourced the population frame from SPECTRUM and included a sample of registered contractors associated with the Multifamily Energy Savings Program in CY 2016. Due to overlap between the nonresidential Focus on Energy programs, some Trade Allies also may have worked on projects with participants in other

programs. To avoid response confusion, the Evaluation Team structured the first half of the online survey to ask general questions pertaining to Focus on Energy, and the second half of the survey to ask questions specific to the Multifamily Energy Savings Program. Of 83 registered Multifamily Energy Savings Program Trade Allies, the Evaluation Team e-mailed a sample of 67 and received 17 responses, for a response rate of 25%.

Property Manager or Owner Surveys

The Evaluation Team conducted telephone surveys with 70 building owners and managers who participated in the Multifamily Energy Savings Program (some respondents may have also participated in the Multifamily Direct Install Program). Respondents provided input on their experiences, awareness, participation motivations, and satisfaction, and also answered questions to help the Evaluation Team determine freeridership and spillover, as well as a program-level ISR for the Multifamily Energy Savings Program offering.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the 2015-2018 quadrennial. The goal of these surveys is to provide a quick and easy feedback opportunity to recent Program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow up to interested participants.

The Program Administrator deploys online surveys through SPECTRUM to all CY 2016 participants with an e-mail address within two weeks of completing participation in the Program. The Evaluation Team gathers online survey results via SPECTRUM, and sends, receives, and scans mail survey responses, combining them with the online results for quarterly and annual reporting.

Sixteen Multifamily Direct Install Program participants and 35 Multifamily Energy Savings Program participants responded to the participant satisfaction survey in CY 2016.

Partial Participant Interviews

To gather feedback on participants' experience with the Multifamily Direct Install Program, and to understand why direct install participants did not pursue Program-recommended energy-saving opportunities through the Multifamily Energy Savings Program, the Evaluation Team conducted partial participant interviews in September 2016. The Team interviewed 12 property managers and owners

from a population of 78 CY 2015 Multifamily Direct Install Program participants who had not pursued energy-saving opportunities through the Multifamily Energy Savings Program.[72]

Engineering Desk Review

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 43 program measures from Multifamily Energy Savings Program and 42 program measures from Multifamily Direct Install Program. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Evaluation Team relied on the applicable TRMs (dated October 2015 and February 2016) and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue). For prescriptive measures in Wisconsin, the Focus on Energy TRM and associated workpapers were the primary sources used by the Evaluation Team to determine methodology and data in nearly all cases. For custom and hybrid measures, the Evaluation Team reviewed the Focus on Energy TRM and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation. The evaluation sample for these reviews is selected using a weighted, random stratified sampling approach known as PPS (Probability Proportional to Size, here lifecycle total energy savings).

Verification Site Visits

The Evaluation Team conducted eight verification site visits for the CY 2016 Multifamily Energy Savings Program and 42 verification site visits for the CY 2016 Multifamily Direct Install Program. Site visits involved verifying the type and quantity of equipment installed, determining how the installed equipment is controlled, and documenting the operating hours of the installed equipment.

The Team leveraged on-site observations of various key parameters in order to determine how best to apply approved Wisconsin methodology. For the Multifamily Direct Install Program, the Team collected data to calculate a measure-specific ISR. The ISR for the Multifamily Direct Install Program offering can be impacted by a number of factors, including a miscount of installed equipment in the provided documentation, or the removal/migration of equipment by residents (residents might remove their showerhead and give to their neighbor, or take with them when their lease is up).

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Programs:

- Tracking database review
- Participant surveys

[72] Because the Program Implementer recruits some participants to the Multifamily Direct Install Program following their Multifamily Energy Savings Program participation, the Evaluation Team also checked the SPECTRUM database for Multifamily Energy Savings Program participation by site address before and after CY 2015, from CY 2013 through July 2016. The final population is based on unique "primary application contact."

- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data to determine reported installations, then applied the results from participant surveys (n=70), engineering desk reviews (n=85), and verification site visits (n=50) to calculate verified gross savings.

As a part of the tracking database review, the Team evaluated the census of CY 2016 Multifamily Energy Savings Program and Multifamily Direct Install Program data contained in SPECTRUM to verify appropriate and consistent application of unit-level savings values and EUL values in alignment with the applicable TRM (October 2015 or February 2016). Cadmus found that the overall accounting of demand and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices.

One notable exception to the general accounting of SPECTRUM relates to steam trap measures. The Evaluation Team identified measure performance issues with this measure, which will be relevant to verified savings achievement in future years. The Multifamily Energy Savings Program offering was marginally impacted by a measure definition issue for steam trap measures. The Strategic Evaluation Plan provides some guidance as to how to deal with this type of circumstance, which notes that findings related to prescriptive measures with deemed savings will generally be applied on a prospective basis. Therefore, to stay consistent with the plan and the precedent from previous evaluations, the Team did not make any adjustments to the deemed values and used the ex ante SPECTRUM deemed savings values to calculate the final verified savings.

It should be noted that the steam trap savings reported in SPECTRUM for CY 2016 are significantly higher than values calculated using new TRM updates (to be released in early CY 2017). Consequently, savings being reported for these measures in future program years will be substantially lower than CY 2016 and the Program and Program Administrator should plan accordingly.

Site visits generally confirmed that program measures were installed and operating as planned. Any observed deviations were minor and captured in the realization rates for the program. One exception was two sites receiving boiler measures (MMID #3276) where two of the five units at each site were serving the domestic hot water system and not the HVAC system as planned. There was insufficient data to estimate any potential savings for these two units and this mischaracterization resulted in a lower measure-specific realization rate for those two sites. Another Multifamily Direct Install Program site received a domestic hot water temperature turn-down (MMID #2141), and once on-site the Evaluation Team determined that three out of fifteen units had been returned to the original operating state.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating properly following installation by the Program Implementer. For the CY 2016 Multifamily Energy Savings Program, the Evaluation Team conducted participant surveys with a verification battery to support a program-level ISR. For Multifamily Energy Savings Program, the Team also conducted site visits to verify the installed measures and calculate a site-specific ISR. The Evaluation Team applied a combined, weighted ISR of 92.6% from these surveys to all Multifamily Energy Savings Program engineering reviews without a completed site visit. The Evaluation Team applied a site-specific ISR to all Multifamily Energy Savings Program measures where verification site visits were performed.

For the Multifamily Direct Install Program offering, the Team conducted on-site verifications which supported an ISR for each measure category. Table 144 shows the verified ISR for each observed measure category in the evaluation sample. Of note, the 104% ISR for handheld showerheads could be a consequence of a number of different scenarios: measure migration from unobserved apartments to those that were sampled by the Evaluation Team; data collection errors by the Implementation or Evaluation teams; or same make/model unit spillover installation by occupants.

Table 144. CY 2016 Multifamily Programs In-Service Rates by Category

Measure Category	ISR
LED, 9.5 Watt	95%
LED, 6 Watt	96%
LED, 5.3 Watt, Candelabra	100%
Showerhead	100%
Showerhead, Handheld	104%
Kitchen Aerator	93%
Bathroom Aerator	97%
Domestic Hot Water Temperature Turn Down	80%
Domestic Hot Water Pipe Insulation	100%

CY 2016 Verified Gross Savings Results

Table 145 and Table 146 present the annual and lifecycle realization rates for the CY 2016 Multifamily Program offerings. Overall, the Multifamily Programs achieved first-year evaluated realization rates below 100%, weighted by total (MMBtu) energy savings.[73] First-year and lifecycle realization rates are generally the same for a given demand reduction or energy savings type unless they are influenced by the EUL adjustments.

[73] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 145. CY 2016 Multifamily Energy Savings Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
97%	86%	90%	92%	98%	86%	89%	92%

Table 146. CY 2016 Multifamily Direct Install Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
96%	95%	95%	96%	96%	95%	94%	96%

Table 147 and Table 148 list the *ex ante* and verified annual gross savings for the CY 2016 Multifamily Programs.

Table 147. CY 2016 Multifamily Energy Savings Program Annual Gross Savings Summary

Measure Category	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	79,173	4	17,156	77,062	3	15,447
Air Sealing	995	0	1,759	968	0	1,584
Boiler	0	0	173,770	0	0	156,460
Chiller	124,569	1	0	121,247	1	0
Clothes Washer	61,369	2	858	59,733	2	773
Controls	138,349	0	4,033	134,660	0	3,631
Delamping	17,136	2	0	16,679	2	0
Dishwasher, Residential	2,349	0	44	2,287	0	40
Energy Recovery	-3,244	16	22,295	-3,157	13	20,074
Fluorescent, Compact (CFL)	408,665	64	0	397,767	55	0
Fluorescent, Linear	328,860	38	0	320,090	33	0
Furnace	89,300	38	13,027	86,919	32	11,729
Insulation	59,741	9	27,211	58,148	8	24,501
Light Emitting Diode (LED)	9,357,929	996	0	9,108,375	852	0
Other	154,579	17	31,995	150,457	15	28,808
Packaged Terminal Unit (PTAC, PTHP)	436,926	-3	0	425,274	-3	0
Refrigerator / Freezer - Residential	5,472	1	0	5,326	1	0
Rooftop Unit / Split System A/C	30,455	90	0	29,643	77	0
Scheduling	0	0	17,116	0	0	15,411
Steam Trap	0	0	81,714	0	0	73,574
Variable Speed Drive	261,802	16	0	254,820	14	0
Water Heater	0	0	128	0	0	115
Window	641	0	1,050	624	0	945
Total Annual	**11,555,067**	**1,291**	**392,155**	**11,246,920**	**1,104**	**353,092**

Table 148. CY 2016 Multifamily Direct Install Program Annual Gross Savings Summary

Measure Category	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	845,828	45	74,856	815,877	43	70,797
Controls	14,846	0	3,464	14,320	0	3,276
Fluorescent, Compact (CFL)	87,305	10	0	84,213	10	0
Insulation	98,158	0	4,818	94,682	0	4,556
Light Emitting Diode (LED)	2,184,428	197	0	2,107,077	187	0
Pre-Rinse Sprayer	0	0	42	0	0	40
Showerhead	780,196	29	67,637	752,569	28	63,969
Total Annual	**4,010,760**	**282**	**150,816**	**3,868,738**	**268**	**142,638**

Table 149 and Table 150 list the *ex ante* and verified gross lifecycle savings by measure category for the Multifamily Programs in CY 2016.

Table 149. CY 2016 Multifamily Energy Savings Program Lifecycle Gross Savings Summary

Measure Category	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	757,469	4	172,178	743,429	3	153,493
Air Sealing	19,900	0	35,180	19,531	0	31,362
Boiler	0	0	3,475,394	0	0	3,098,243
Chiller	2,491,380	1	0	2,445,203	1	0
Clothes Washer	694,621	2	10,100	681,746	2	9,004
Controls	1,106,508	0	20,171	1,085,999	0	17,982
Delamping	171,360	2	0	168,184	2	0
Dishwasher, Residential	32,891	0	616	32,282	0	549
Energy Recovery	-48,660	16	334,425	-47,758	13	298,133
Fluorescent, Compact (CFL)	4,434,602	64	0	4,352,407	55	0
Fluorescent, Linear	4,938,936	38	0	4,847,393	33	0
Furnace	1,751,280	38	251,742	1,718,820	32	224,423
Insulation	1,493,628	9	644,086	1,465,944	8	574,190
Light Emitting Diode (LED)	115,755,007	996	0	113,609,500	852	0
Other	2,318,469	17	479,402	2,275,497	15	427,377
Packaged Terminal Unit (PTAC, PTHP)	6,553,890	-3	0	6,432,414	-3	0
Refrigerator / Freezer - Residential	65,664	1	0	64,447	1	0
Rooftop Unit / Split System A/C	456,853	90	0	448,385	77	0
Scheduling	0	0	148,070	0	0	132,001
Steam Trap	0	0	490,284	0	0	437,078
Variable Speed Drive	3,927,254	16	0	3,854,463	14	0
Water Heater	0	0	1,920	0	0	1,712
Window	12,820	0	21,000	12,582	0	18,721
Total Lifecycle	**146,933,872**	**1,291**	**6,084,568**	**144,210,468**	**1,104**	**5,424,269**

Table 150. CY 2016 Multifamily Direct Install Program Lifecycle Gross Savings Summary

Measure Category	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	8,460,794	45	748,555	8,142,041	43	705,166
Controls	75,720	0	52,020	72,867	0	49,005
Fluorescent, Compact (CFL)	797,778	10	0	767,722	10	0
Insulation	1,275,912	0	72,188	1,227,843	0	68,004
Light Emitting Diode (LED)	42,630,664	197	0	41,024,589	187	0
Pre-Rinse Sprayer	0	0	210	0	0	198
Showerhead	7,801,959	29	676,368	7,508,027	28	637,163
Total Lifecycle	**61,042,827**	**282**	**1,549,341**	**58,743,089**	**268**	**1,459,536**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Multifamily Energy Savings Program, calculating a NTG percentage of 79%. For the Multifamily Direct Install Program, the Team used a deemed NTG value of 100% in CY 2016.

Freeridership

The Evaluation Team used the self-report survey method to determine freeridership in the Multifamily Energy Savings Program for CY 2016. The Team estimated an average self-reported freeridership of 23%, weighted by evaluated savings.

In CY 2016, the Evaluation Team relied solely on the self-reported freeridership, which the Team applied to all the Program measure categories. The three CY 2016 respondents with the greatest savings accounted for 32% of the total analysis sample gross savings, with an average weighted freeridership rate of 23%. This compares with the two CY 2015 respondents with the greatest savings accounting for 46% of the total analysis sample gross savings, and both were estimated as 0% freeriders.

As a direct comparison with consistent methods, Table 151 lists the CY 2015 and CY 2016 self-reported freeridership estimates, weighted by participant-level gross evaluated energy savings.

Table 151. CY 2015 and CY 2016 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	60	18%
CY 2016	70	23%

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Multifamily Energy Savings Program and who rated their Program participation as *very important* in their decision. The

Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers' said they had installed as a result of their Program participation, presented in Table 152.

Table 152. CY 2016 Multifamily Energy Savings Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	150	678.57
Motion Switches	6	139.86

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 2% spillover estimate, rounded to the nearest whole percentage, for the Multifamily Energy Savings Program respondents (Table 153).

Table 153. CY 2016 Multifamily Energy Savings Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	818.43
Program Savings	45,444.65
Spillover Estimate	**2%**

CY 2016 Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG estimate of 79% for the Program. Table 154 shows total net-of-freeridership savings, participant spillover savings, and total net savings in MMBtu, as well as the overall Program NTG.[74]

[74] Although nonparticipant spillover was measured through Trade Ally interviews in CY 2016, these savings will be reviewed by the EWG and a determination of if and how these savings should be applied will occur at the end of the CY 2015–CY 2018 quadrennial, consistent with broader sampling practices design to draw full-quad conclusions.

Table 154. CY 2016 Multifamily Energy Savings Program Annual Net Savings and NTG

Net-of-Freeridership Savings (MMBtu)	Participant Spillover Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
56,736	1,474	73,684	58,210	79%

Table 155 shows the annual net demand and energy impacts (kWh, kW, and therms) by measure category for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 155. CY 2016 Multifamily Energy Savings Program Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Aeration	60,879	2	12,203
Air Sealing	765	0	1,251
Boiler	0	0	123,604
Chiller	95,785	0	0
Clothes Washer	47,189	1	610
Controls	106,381	0	2,869
Delamping	13,176	2	0
Dishwasher, Residential	1,807	0	31
Energy Recovery	-2,494	11	15,859
Fluorescent, Compact (CFL)	314,236	43	0
Fluorescent, Linear	252,871	26	0
Furnace	68,666	25	9,266
Insulation	45,937	6	19,355
Light Emitting Diode (LED)	7,195,616	673	0
Other	118,861	12	22,758
Packaged Terminal Unit (PTAC, PTHP)	335,967	-2	0
Refrigerator / Freezer - Residential	4,208	0	0
Rooftop Unit / Split System A/C	23,418	61	0
Scheduling	0	0	12,175
Steam Trap	0	0	58,124
Variable Speed Drive	201,308	11	0
Water Heater	0	0	91
Window	493	0	747
Total Annual	**8,885,067**	**872**	**278,942**

Table 156 lists the lifecycle net demand and energy impacts (kWh, kW, and therms) by measure category for the Program.

Table 156. CY 2016 Multifamily Energy Savings Program Lifecycle Net Savings

Measure Category	Lifecycle Net Savings		
	kWh	kW	therms
Aeration	587,309	2	121,260
Air Sealing	15,430	0	24,776
Boiler	0	0	2,447,612
Chiller	1,931,710	0	0
Clothes Washer	538,580	1	7,113
Controls	857,939	0	14,206
Delamping	132,865	2	0
Dishwasher, Residential	25,503	0	434
Energy Recovery	-37,729	11	235,525
Fluorescent, Compact (CFL)	3,438,401	43	0
Fluorescent, Linear	3,829,441	26	0
Furnace	1,357,868	25	177,294
Insulation	1,158,095	6	453,610
Light Emitting Diode (LED)	89,751,505	673	0
Other	1,797,642	12	337,628
Packaged Terminal Unit (PTAC, PTHP)	5,081,607	-2	0
Refrigerator / Freezer - Residential	50,913	0	0
Rooftop Unit / Split System A/C	354,224	61	0
Scheduling	0	0	104,281
Steam Trap	0	0	345,292
Variable Speed Drive	3,045,026	11	0
Water Heater	0	0	1,352
Window	9,940	0	14,790
Total Lifecycle	**113,926,269**	**872**	**4,285,173**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities, focused on these key topics for the Multifamily Programs:

- Customer satisfaction with components of the Multifamily Programs
- Barriers to participation and opportunities in other market segments, particularly with mixed-use and condominium properties
- Trade Ally engagement, satisfaction, and value propositions
- Opportunities to achieve deeper energy savings per building and unit through the Multifamily Direct Install Program
- Satisfaction with the data tracking processes and coordination between the Program Administrator and Program Implementer

The Evaluation Team also used these interviews and surveys to follow up on a couple of issues identified in the CY 2015 process evaluation recommendations:

- Improving Trade Ally satisfaction through increased direct contact and application support
- Incorporating new measures into the Multifamily Direct Install Program—such as common area heating and cooling tune-ups and advanced thermostats—to achieve deeper energy savings

Program Design, Delivery, and Goals

Focus on Energy began offering its Multifamily Programs in CY 2001, and continues to offer prescriptive and custom incentives through the Multifamily Energy Savings Program and direct installation of energy-saving products through the Multifamily Direct Install Program.

Multifamily Energy Savings Program Design

Through the Multifamily Energy Savings Program, Focus on Energy offers prescriptive rebates for eligible retrofit and new construction projects. Property owners may also take advantage of increased retrofit prescriptive incentives through the CALP, and for custom incentives available for performance-based projects.

The Program Implementer introduced CALP in CY 2013, through which participating property owners and managers provide a $250 co-pay and can receive the following common area lighting upgrades for fixtures that operate for 12 or more hours per day:

- CFL and LED fixtures
- Occupancy sensors
- Low ballast factor T8 ballasts and lamps

Only registered Trade Allies are eligible to promote CALP, and only specific Trade Allies (N=6) are authorized to deliver CALP.[75] These Trade Allies may receive CALP leads from the Multifamily Direct Install Program, or they may find participants through their own marketing efforts. CALP contributions to the Multifamily Energy Savings Program savings dropped considerably from CY 2015 to CY 2016 (from 12% of the Program lifecycle MMBtus in CY 2015 to 2% in CY 2016). Table 157 shows *ex ante* electric savings for CALP measures in CY 2016 and CY 2015.

[75] The list of authorized CALP Trade Allies is available on the Focus on Energy website: https://focusonenergy.com/sites/default/files/supporting_documents/CALP%20TAs%20-%2003.02.2016.xlsx

Table 157. CALP Lifecycle Electric Savings

CALP Measure	CY 2016 *Ex Ante* Gross Lifecycle kWh	CY 2015 *Ex Ante* Gross Lifecycle kWh
CFL fixtures	342,875	27,292,200
LED fixtures	2,264,729	4,376,159
LED exit signs	1,124,760	2,003,501
Linear fluorescent fixtures	1,628,610	4,266,276
Occupancy sensors	103,837	2,710,851
Total	**5,464,811**	**40,648,987**

During interviews, the Program Implementer reported success in engaging Trade Allies and customers in the CALP offering in CY 2016, but said that budget limitations have constrained overall CALP promotion, along with expansion of the Trade Ally network and the measures offered through CALP. For this reason, the Program Implementer did not expand the offers for heating and cooling measures, as the Evaluation Team had recommended in the CY 2015 evaluation report.

However, to maintain the Program foothold on market advancements, the Program Implementer reported researching the possibility of introducing T8 LED, linear retrofit LED kits, and screw-in or pin-based LED products in common areas as part of the CALP offerings. These new measures were not implemented in CY 2016 due to time and budget constraints, but Program staff included these measures in the CY 2017 CALP offerings. The Program Implementer also said they revised the CALP application in CY 2017, so that it mirrors the catalog format used for all Multifamily Energy Savings Program prescriptive offerings.

Customers who install custom measures are eligible for energy savings rewards for projects that do not qualify for prescriptive incentives. Focus on Energy provides custom incentives based on anticipated project energy savings performance. In CY 2016, it offered a tiered incentive structure for Multifamily Energy Savings Program custom measures (shown in Table 158), providing higher incentives for projects that achieved greater energy savings.

Table 158. CY 2016 Multifamily Energy Savings Program: Custom Measure Incentives

Custom Tier	Electric Incentive ($/kW)[1]	Electric Incentive ($/kWh)	Natural Gas Incentive ($/therm)
Tier 1: <20% savings over baseline	$100	$0.05	$0.80
Tier 2: ≥20% savings over baseline	$125	$0.07	$1.00

[1] The Evaluation Team determined peak kilowatts using the average reduction in kW load that occurred between 1:00 p.m. and 4:00 p.m. on weekdays during the months of June, July, and August 2016.

Multifamily Direct Install Program Design

The Program Administrator and Program Implementer designed the Multifamily Direct Install Program to achieve energy savings by installing free energy-efficient measures in multifamily building tenant units. Additionally, through the Multifamily Direct Install Program, Focus on Energy offers free LED exit

sign retrofits and vending miser installation for common areas. Table 159 lists the Multifamily Direct Install Program measures and installation requirements.

Table 159. Multifamily Direct Install Program Measures and Installation Requirements

Measure	Installation Requirement
Showerhead (1.5 gpm)	Replaces showerhead with flow rate ≥2.0 gpm
Handheld showerhead (1.5 gpm)	Replaces showerhead with flow rate ≥2.0 gpm
Kitchen faucet aerator (1.5 gpm)	Replaces faucet aerator with flow rate ≥2.0 gpm
Bathroom faucet aerator (1.0 gpm)	Replaces faucet aerator with flow rate ≥1.5 gpm
Pre-rinse sprayer (1.28 gpm)	Replaces sprayer with flow rate ≥2.0 gpm
CFL (specialty)	Replaces incandescent or halogen lamps
LED lamps	Replaces incandescent or halogen lamps
Domestic hot water pipe insulation	Up to nine feet of insulation for water heater piping located in tenant units and/or within common area(s) in unconditioned space
Water heater temperature setback	Existing temperature of 130°F to 150°F reduced to 120°F to 125°F
LED exit sign retrofit	Replaces incandescent lamp or CFLs in common area exit sign(s)
Vending misers	For vending machine(s) located in common areas

Program Management and Delivery Structure

The Program Implementer's program manager is supported by Energy Advisors, engineers, field technicians, and staff members who handle marketing, Trade Ally engagement, direct installation, and application processing.

Energy Advisors primarily conduct outreach marketing to Trade Allies, supporting both Trade Allies and customers in order to facilitate Multifamily Energy Savings Program participation. While Trade Allies drive the majority of energy efficiency projects in the Multifamily Energy Savings Program through outreach to customers, Multifamily Direct Install Program participant outreach is managed by Program Implementer staff. Energy Advisors recruit direct install participants, then schedule the installation and recommend any common area opportunities through the *Prescriptive and Custom Rewards Recommendation Checklist*. Program staff then encourage Multifamily Direct Install Program participants to pursue future opportunities, including CALP, by contacting a Trade Ally.

Program Changes

In early CY 2016, the Program Implementer decreased most of the Multifamily Energy Savings Program custom and prescriptive incentive levels, with the exception of those for Tier 1 kW and therms savings. According to the Program Administrator and Program Implementer, this change was necessary to address the increased savings and demand goals without an increased incentive budget, and to ensure that adequate funding would be available throughout the year.

The Program Implementer worked with other program stakeholders to align the custom incentive levels across the nonresidential portfolio. The Program Administrator said that, because custom incentives are

targeted to larger buildings and larger energy users, the custom incentive changes may not impact the Multifamily Energy Savings Program as much as other Focus on Energy programs.

In addition to the custom and prescriptive incentive reductions, the Multifamily Energy Savings Program prescriptive incentives underwent the following changes in CY 2016 (and as noted in Table 160):

- The Program Implementer increased the CALP co-pay from $179 to $250, and decreased the project cost maximum (i.e., the actual project value) from $2,500 to $2,000. Both the Program Implementer and Program Administrator said they made this change to maintain CALP funding throughout the end of the year.
- The Program Implementer added single package vertical units to the program offerings. The Program Administrator reported that this measure has good savings potential because many buildings use this technology for in-unit heating and cooling; however, because single package vertical units are typically replaced on failure, this measure will take time to build momentum. Single package vertical units accounted for less than 1% of the electric savings and 1% of demand reduction for the Program in CY 2016.
- The Program Implementer added pipe, wall, and attic insulation measures to the Program. The Program Implementer reported experiencing more activity from attic insulation than wall insulation, likely due to the greater level of difficulty in installing wall insulation compared to attic insulation. While pipe insulation accounted for less than 1% of the lifetime therms savings achieved in CY 2016, attic insulation accounted for 6% and wall insulation accounted for 4%. Attic insulation contributed less than 1% of the lifetime electric savings achieved in CY 2016.

Table 160. CY 2016 Changes to Multifamily Energy Savings Program Prescriptive Offerings

CY 2016 Program Element	CY 2015 Offering	CY 2016 Offering
CALP co-pay	$179	$250
CALP maximum project cost	Up to $2,500	Up to $2,000
Single package vertical units	n/a	$100/unit
Pipe insulation	n/a	$3-6/foot
Wall insulation	n/a	$0.40/square foot
Attic insulation	n/a	$0.10-0.25/square foot

Program Goals

The Multifamily Programs' overall objective is to encourage multifamily building owners, managers, and tenants to use more energy-efficient products. The Multifamily Programs' savings goals and results for CY 2016 are shown in Table 161.

Table 161. Multifamily Programs' CY 2016 Goals and Achievements

Performance Metric	CY 2016 Goal	CY 2016 Actual *Ex Ante*
Multifamily Energy Savings Program		
Lifecycle electric savings (kWh)	146,960,000	146,933,872
Lifecycle natural gas savings (therms)	6,084,000	6,084,568
Demand reduction (kW)	1,291	1,291
Multifamily Direct Install Program		
Lifecycle electric savings (kWh)	61,500,000	61,042,827
Lifecycle natural gas savings (therms)	1,549,000	1,549,341
Demand reduction (kW)	278	282
Participation (units)	5,000	6,487

The Multifamily Energy Savings Program and Multifamily Direct Install Program exceeded all CY 2016 *ex ante* goals except for electric savings, but fell short of all verified gross savings goals.

The Program Implementer attributed the success of the Multifamily Energy Savings Program in CY 2016 to strong Trade Ally awareness of the program and having a consistent incentive application process and paperwork across the nonresidential portfolio. The Program Implementer said the Multifamily Direct Install Program reached its savings and demand goals because of the substantial Program interest and activity throughout the year.

Savings achievement for the Multifamily Programs has increased over time, as shown in Table 162. In CY 2011 and CY 2012, savings from direct install measures contributed about half of the total electric savings achieved in the Multifamily Programs. Energy savings increased substantially beginning in CY 2013, and about 70% of the electric savings achieved from CY 2013 to CY 2016 are through the Multifamily Energy Savings Program and about 30% through the Multifamily Direct Install Program.

Table 162. Multifamily Programs Verified Net Savings Achievements

Performance Metric	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015	CY 2016
Lifecycle electric savings (kWh)	47,757,028	68,763,048	108,794,423	119,909,612	161,314,333	172,669,359
Lifecycle natural gas savings (therms)	2,986,113	5,881,859	6,614,761	7,086,378	6,089,151	5,744,709
Demand reduction (kW)	876	1,079	964	998	1,128	1,140

Source: CY 2011-CY 2015 Evaluation Reports. Available online: https://www.focusonenergy.com/about/evaluation-reports

The Program Implementer tracked KPIs in addition to energy and participation achievements to measure Program performance. To target rural communities, privately-owned buildings, and condominiums in CY 2016, the Program Administrator and Program Implementer set minimum achievement goals for the Multifamily Programs. Program staff also established a participant conversion baseline goal to encourage tracking and follow up with property managers and owners whose properties have undergone retrofits through either the Multifamily Direct Install Program or Multifamily Energy Savings Program, but not both.

Table 163 shows the KPIs and CY 2016 results as reported by the Program Implementer, and which the Evaluation Team verified through SPECTRUM where possible. The Program Implementer reached all but one of its KPI goals.

Table 163. Multifamily Programs' CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Multifamily Energy Savings Program			
Customer Satisfaction	Maintain or improve the CY 2015 overall satisfaction score of 8.7 (on a scale of 0 to 10)	Reached goal (9.4)	Evaluation Team's ongoing participant satisfaction survey
Building Ownership	25% of Multifamily Energy Savings Program participants have privately-owned buildings	Reached goal (45%)	Reported by Program Implementer
Participant Conversion	5% of participants' buildings previously participated in the Multifamily Direct Install Program (between CY 2011 and CY 2015)	Reached goal (20%)	Reported by Program Implementer
Rural Territory Reach	20% of buildings in communities with a population under 30,000	Reached goal (43%)	Reported by Program Implementer
Pre-Approval Processing Time	20 days from receipt of custom application to Program Implementer pre-approval	Reached goal (8 days)	SPECTRUM. Submit for Preapproval Date compared to Pre-Approved Date

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Processing Time	35 days from receipt of prescriptive application to providing customer incentive payment	Reached goal (30)	SPECTRUM. Application Received/Received Complete Date compared to Date of Status Change to Paid
Multifamily Direct Install Program			
Customer Satisfaction	Maintain or improve the CY 2015 product score of 7.9 and overall satisfaction score of 8.3 (on a scale of 0 to 10)	Reached goal (9.6)	Evaluation Team's ongoing participant satisfaction survey
Participant Type	30% of buildings as condominiums	Did not reach goal (5%)	Reported by Program Implementer
Participant Conversion	5% of participants' buildings having previously participated in the Multifamily Energy Savings Program (between CY 2011 and CY 2015)	Reached goal (11%)	Reported by Program Implementer

Data Management and Reporting

In CY 2016, the Program Implementer continued to manage data and generate reports through SPECTRUM. The Program Administrator and Program Implementer identified no significant changes to the tracking system or reporting features from CY 2015 to CY 2016.

Both the Program Administrator and the Program Implementer reported some challenges with tracking Multifamily Programs' opportunities through SPECTRUM, and indicated that the functionality could be improved. In CY 2015, the Program Implementer began to use a field collection tool to capture common area opportunities in addition to all measures implemented through the Multifamily Direct Install Program, but halted this data tracking effort in December 2015 upon discovering that the SPECTRUM database did not support the Program batch data uploads.

In CY 2016, the Program Implementer did not manage its leads and opportunities through SPECTRUM, or perform bulk uploads of the *Prescriptive and Custom Rewards Recommendation Checklist* staff created for prospective Multifamily Energy Savings Program participants. The Program Implementer and Program Administrator said they had not pursued these procedures in CY 2016 because SPECTRUM is primarily used to collect completed (not prospective) project information. The Program Administrator noted that while there are opportunities to improve staff efficiency if more programs had the ability to perform bulk uploads in SPECTRUM, they do not currently have the authority to make these process changes. Historically, bulk uploads have been limited to programs with very high participation, such as the Retailer Lighting and Appliance Program or Simple Energy Efficiency Program. The Program Administrator also said that while the *Prescriptive and Custom Rewards Recommendation Checklist*

could be attached to records like leads and opportunities, the attachments are not searchable, and it would be difficult to look at the attached files at an aggregate level, reducing usability.

Multifamily Energy Savings Program Data Management

The Program Implementer entered all information from the Multifamily Energy Savings Program project applications and invoices into SPECTRUM. These data included measures and quantities, incentive amounts, and customer information. The Program Administrator identified a need for improvement in targeting and tracking prospective and existing customers by building type, including mixed-use, condominiums, and privately owned and managed properties. The Program Administrator noted that many utilities do not have this information available for the Programs.

Multifamily Direct Install Program Data Management

The Program Implementer's Energy Advisors tracked Multifamily Direct Install Program measure installations in tenant units on a worksheet during the installation process, and required property managers and owners to sign off on the details in this worksheet. The Program Implementer then entered aggregate information by building into SPECTRUM. The Program Implementer began tracking condominium participation in CY 2016 to assess whether 30% of the Program activities are from condominiums. The Program Implementer reported that five percent of CY 2016 Multifamily Direct Install Program measure installations occurred in condominiums.

Marketing and Outreach

The Program Implementer's CY 2016 marketing plan highlighted tactics, campaigns, and objectives for both of the Multifamily Programs, with targeted outreach to customers and Trade Allies to increase their awareness and participation and to improve utility coordination. The CY 2016 marketing strategies included these tactics:

- Content for multifamily industry association newsletters, meetings, and tradeshows
- Direct outreach to customers with sell sheets and e-mail blasts
- Customized materials and sponsored events targeting condo associations
- Social media postings, including a direct install road trip that highlights installation crew visits around the state
- E-mail blasts, webinars, and sell sheets promoted directly to Trade Allies

The Program Administrator and Program Implementer reported that a large outreach barrier was identifying and targeting customers who have been previously underserved, specifically condo associations, mixed-used property owners, and small property management companies. The Program Administrator and Program Implementer said that most utility account information was not coded to identify multifamily properties very effectively, making targeted recruitment difficult. To address this barrier and help identify property information and conduct targeted outreach, the Program Implementer performed general internet searches and subscribed to CoStar, a real estate database and directory service.

Multifamily Energy Savings Program Marketing

Multifamily Energy Savings Program participation is primarily driven through Trade Ally promotion. The Program Implementer continued to deliver its Trade Ally outreach plan in CY 2016, in which it identified specific approaches and tactics to increase Trade Ally participation through outreach to manufacturers, distributors, industry associations, and Trade Allies. The Program Implementer also assigned an Energy Advisor to each registered Trade Ally.

The Program Implementer reported that Trade Allies have effectively marketed the Multifamily Energy Savings Program, particularly since Focus on Energy integrated the incentive application process across the nonresidential portfolio in CY 2015. The Program Implementer also reported tasking the Energy Advisors assigned to Northern Wisconsin with increasing CALP participation in that area by targeting electrical contractors. The Program Implementer said that, due to the rural landscape and limited opportunity, this area of the state has a smaller network of qualified contractors.

The Program Implementer looked for deeper savings from past participants directly and through new marketing materials. Energy Advisors contacted past customers to determine whether they had additional opportunities under the same management. The Program Implementer also launched a seasonal digital campaign for property managers and maintenance staff, e-mailing them an invitation to download a heating season guide, and providing maintenance recommendations for furnaces and boilers along with a maintenance calendar that included tips to use throughout the year. The Program Implementer reported getting 90 requests to download the maintenance calendar and 35 requests for the heating season guide as part of this campaign.

Multifamily Direct Install Program Marketing

The Program Implementer uses direct outreach as the primary tactic for promoting the Multifamily Direct Install Program and recruiting program participants. The Program Implementer supports outreach with sell sheets and web-based Program information. The Program Implementer planned to develop a direct install sample kit to help property managers and owners conceptualize the measures to be implemented, and to create a Direct Install Day handout for tenants that highlights the installation process. However, the Program Implementer reported that because of property managers and owners' continued interest in the Program throughout CY 2016, there was no need to spend Program budget on these marketing efforts.

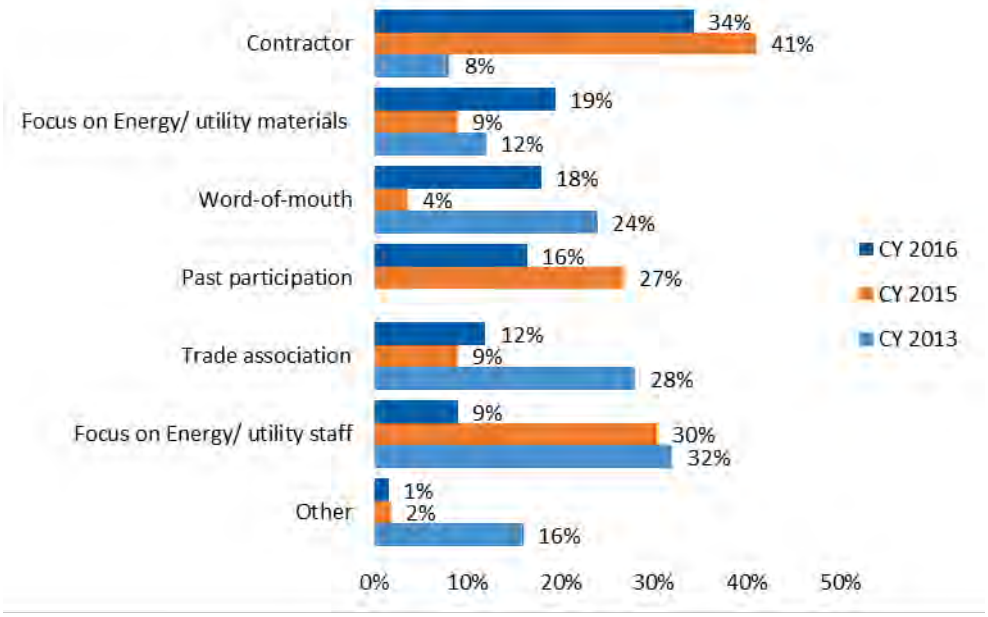
In CY 2016, the Program Implementer created a 30% condominium participation goal, where at least 1,500 of the 5,000 units served must be condo-owned properties. The Program Implementer said their staff worked with condo association staff to host events at the properties, and they developed a condo-specific poster and meeting invitation postcards to highlight direct install measures and gain buy-in from condo owners to proceed with scheduling an installation.

Building Owner and Manager Awareness

The Evaluation Team surveyed 70 multifamily building owners and managers who participated in the Multifamily Energy Savings Program in CY 2016. According to surveyed participants, they most often

learned about the Multifamily Energy Savings Program incentives through their contractor (34%), followed by Focus on Energy materials (19%). Word of mouth significantly increased from CY 2015 to CY 2016 (from 4% to 18%, respectively),[76] while Focus on Energy and utility staff mentions decreased significantly (from 30% in CY 2015 to 9% in CY 2016).[77] The Program Administrator said that decreased Program Implementer and utility staff mentions could be the result of increased Trade Ally marketing and customer direct mail and e-mail campaigns. Figure 87 shows the complete breakdown of responses from CY 2016, CY 2015, and CY 2013.

Figure 87. How Customers Learned of Multifamily Energy Savings Program Incentives



Source: CY 2016, CY 2015, and CY 2013 Multifamily Energy Savings Program Participant Survey Question C1: "How did your organization learn about the incentives available for this project?" Multiple responses allowed (CY 2016 n=67, CY 2015 n=56, CY 2013 n=25)

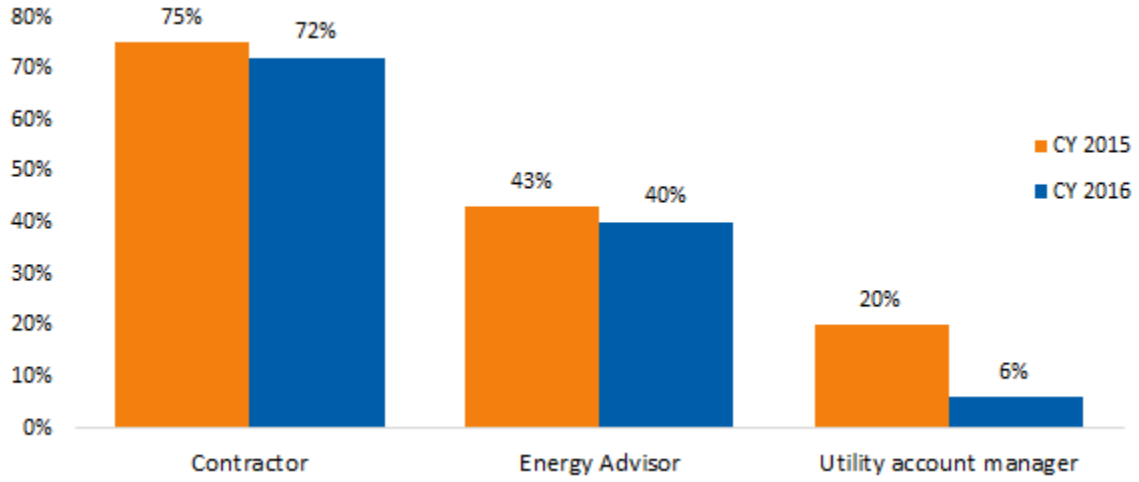
Property owners and managers also identified contractors as the most common source of Multifamily Energy Savings Program project initiation. Nearly three-fourths of respondents (72%) said contractors were involved in initiating their projects, followed by Energy Advisors (40%) and utility account managers (6%; with some respondents providing more than one answer, see Figure 88). The Program Implementer's KPIs in CY 2016 did not include a utility partnership for marketing efforts, as they had in

[76] $p < 0.01$ using a binomial t-test.

[77] $p < 0.01$ using a binomial t-test.

CY 2015,[78] and significantly fewer respondents cited utility account managers as a source for project initiation compared to CY 2015.[79]

Figure 88. Multifamily Energy Savings Program Project Initiation Source



Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question D1 and CY 2015 Multifamily Energy Savings Program Participant Survey Question D2: "I'm going to read you a short list. Please tell me who, if anyone, was involved in helping you initiate your energy efficiency project." (CY 2016 n=65-69; CY 2015 n=66-69)

Nearly half of the Multifamily Energy Savings Program participating property owners and managers (46%, n=70) said they also participated in the Multifamily Direct Install Program. Of those who had not participated, nearly half (45%) reported being unaware of the Multifamily Direct Install Program. Another 21% said they had not participated because of the difficulty in getting approval from the property owner, tenants, or condo owners. A higher proportion of condo property respondents (60%, n=10) said they had not participated because of the difficulty in obtaining approval from the tenant owners (compared to 4% of apartment building respondents, n=24). This difference is statistically significant.[80]

Building Owner and Manager Messaging Preferences

To assist the Program Administrator in enhancing Focus on Energy messaging, the Evaluation Team asked multifamily building manager and owner survey respondents to share insights on messaging that resonates with them. The Team asked building owners and managers for the first three words that come

[78] The Program Implementer's CY 2015 goal was to work with utilities to offer least five campaigns annually, and seven utilities assisted with promoting the Multifamily Programs in CY 2015.

[79] $p \leq 0.01$ using a binomial t-test.

[80] $p \leq 0.01$ using a binomial t-test.

to mind when they think about Focus on Energy. As shown in Figure 89, the most common words were "savings," "energy," and "rebates."

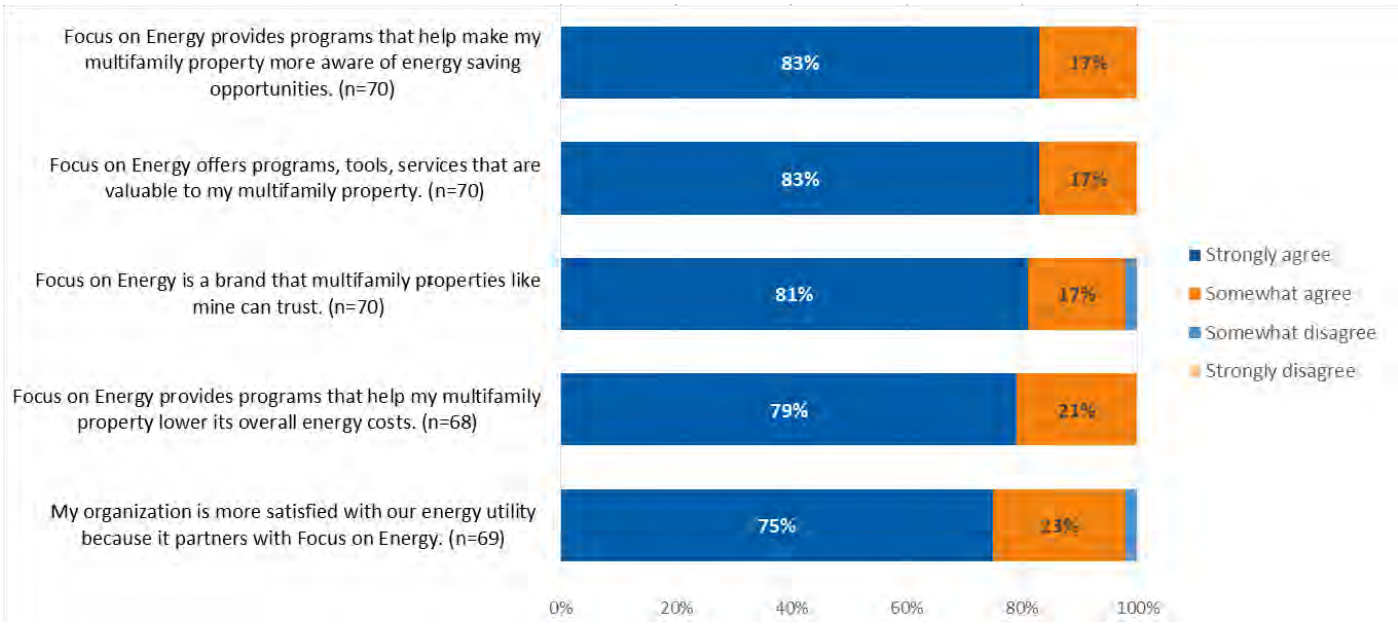
Figure 89. Respondent Word Association with "Focus on Energy"



Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question C5: "What are the first three words that come to mind when you hear 'Focus on Energy'?" (n=70)

To gauge Focus on Energy brand affinity, the Evaluation Team asked respondents to what extent they agreed with several marketing statements. The vast majority of respondents agreed with all of the statements, but the two messages that respondents agreed with most strongly were that Focus on Energy builds awareness of energy saving opportunities and offers valuable programs and services. Figure 90 shows a detailed breakdown of agreement with the five brand affinity statements.

Figure 90. Agreement with Focus on Energy Statements



Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question C6: "Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with these statements."

The Evaluation Team asked surveyed respondents to identify which of several statements (shown in Table 164) would make them most interested in learning more about Focus on Energy. Respondents gravitated toward cost-oriented statements; the statement that resonated most with property owners and managers, selected by 54% of respondents, was "reduce their energy costs and save money."

Table 164. Participant Reaction to Marketing Statements

Focus on Energy helps Wisconsin multifamily properties….	Top Statement by Percentage of Respondents
Reduce their energy costs and save money	54%
Lower their energy costs	34%
With solutions to use energy smarter and save money	10%
Grow by making smarter decisions about their energy use	1%

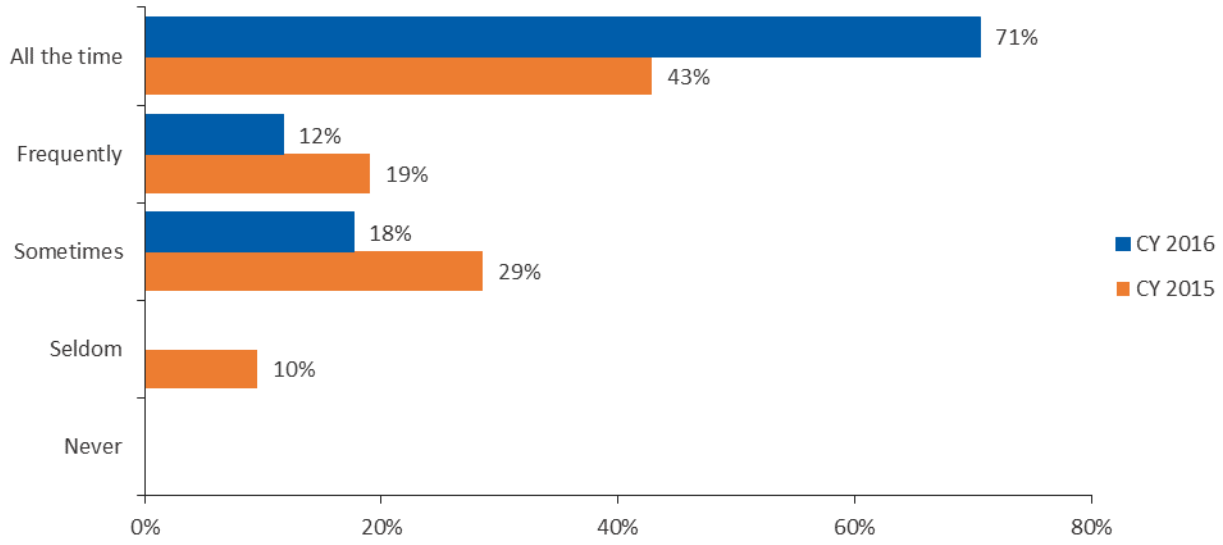
Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question C7: "Which of the following statements would make you most interested in learning more about Focus on Energy?" (n=70)

Trade Ally Engagement and Awareness

The Evaluation Team contacted 67 registered Multifamily Energy Savings Program Trade Allies and received a response from 17. Most of those who responded said they regularly promote Focus on Energy programs (i.e., "all the time," or "frequently"). As shown in Figure 91, 71% of CY 2016 respondents said they promote the Program "all the time," compared to 43% of 21 CY 2015 respondents (the sample size was too small to verify whether the difference was statistically significant). The three CY 2016 respondents who reported only "sometimes" promoting the Program identified excessive

paperwork, customer confusion, and issues with describing the Program effectively and confidently as their primary barriers to promotion.

Figure 91. Trade Ally Multifamily Energy Savings Program Promotion



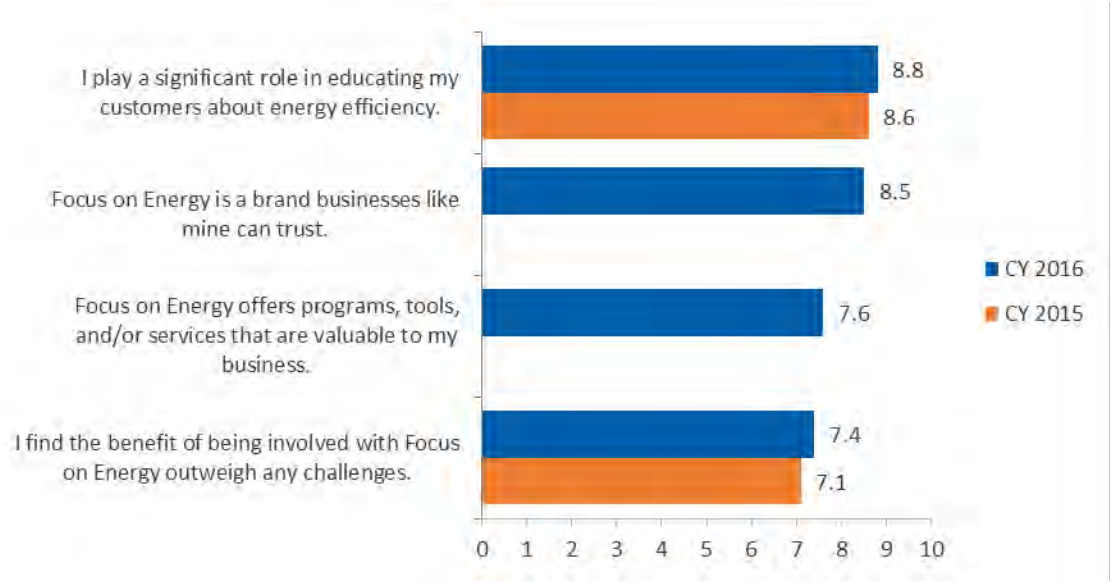
Source: CY 2016 Trade Ally Survey Question B3 and CY 2015 Trade Ally Survey Question F2: "How often do you promote Focus on Energy programs to customers?" (CY 2016 n=17, CY 2015 n=21)

Trade Allies reported limited awareness and effectiveness of the Multifamily Energy Savings Program's CALP. Ten of the 17 Trade Allies specialized in lighting, electrical or renovations, which are trades likely to deliver CALP. Three of the 10 Trade Ally respondents reported being authorized to offer CALP to their customers, and three of 10 respondents did not know if they were eligible to provide CALP offerings. The three respondents who said they can offer CALP said it is "somewhat effective" or "not too effective" at encouraging multifamily property owners and managers to upgrade their properties. One of these three respondents reported promoting the package to their customers "frequently," while the other two said they "sometimes" promote CALP, then cited customer confusion, too much paperwork, and disinterest in the equipment or products as reasons for not promoting CALP more often.

The Evaluation Team also asked Trade Allies how Focus on Energy could better support them in promoting the Program to property owners and managers of mixed-use buildings. Of three who had suggestions, two Trade Allies said Focus on Energy should "educate us" or that they "would need to know more about [how to address these customers] in order to promote it." The third Trade Ally said they would benefit from "more contact and conversations" with these prospective customers.

Trade Allies identified with statements regarding customer education and Focus on Energy brand trust. Figure 92 shows Trade Allies' level of agreement with several statements about Focus on Energy in CY 2016 and, where available, compares to CY 2015 mean scores. Average CY 2016 scores were consistent with CY 2015.

Figure 92. Trade Ally Mean Scores for Focus on Energy Statements



Source: CY 2016 Trade Ally Survey Question B6 and CY 2015 Trade Ally Survey Question F5: "On a 10-point scale where 0 means *strongly disagree* and 10 means *strongly agree*, please select your level of agreement with the following statements." (CY 2016 n=17, CY 2015 n=20)

Nearly half of the Trade Ally respondents (seven of 16) reported e-mail communication from the Program Implementer, and six of 16 respondents identified contact from their Energy Advisor, as the best source of relevant information about Focus on Energy. The remaining three respondents preferred to use the Focus on Energy website. When asked to rank information sources from most to least useful, Trade Allies rated Energy Advisor contact as the most useful, and meetings (i.e., Trade Ally forums and staff meetings) as the least useful means of staying informed about the Focus on Energy Programs. Table 165 shows Trade Allies' rankings of information sources.

Table 165. Trade Ally Ranking of Focus on Energy Information Sources

	1 - Most Useful	2	3	4	5 - Least Useful	Mean
Energy Advisor	50%	31%	13%	0%	6%	1.8
E-mails	44%	31%	6%	13%	6%	2.1
Website	6%	25%	56%	0%	13%	2.9
Trainings	0%	6%	13%	50%	31%	4.1
Meetings	0%	6%	13%	38%	44%	4.2

Source: CY 2016 Trade Ally Survey Question C3: "Now we would like to know how useful these information sources are in helping you stay up to date with Focus on Energy programs. Please rank the following communication options from most useful to least useful." (n=16)

Multifamily Programs' Customer Experience

To better understand awareness of and satisfaction with the Multifamily Programs, the Evaluation Team conducted three separate research efforts to speak with a sample of building owners and property managers about their experiences participating in the Multifamily Programs:

- Ongoing participant satisfaction survey, administered quarterly, in which the Team collected responses from 35 Multifamily Energy Savings Program and 16 Multifamily Direct Install Program participating property owners and managers.
- Multifamily Programs property owners and manager survey, which informs the impact evaluation and was used to gather in-depth feedback regarding participants' Program experience. The Evaluation Team surveyed 70 Multifamily Energy Savings Program participating property owners and managers (some of whom may have also participated in the Multifamily Direct Install Program).
- Partial participant interviews with 12 Multifamily Direct Install Program participating property owners and managers who have not moved forward with the opportunities recommended through the Multifamily Energy Savings Program as part of the direct installation process.

The Evaluation Team used these surveys and interviews to investigate marketing, Program components, customer decision making, satisfaction, and participation barriers.

Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2016, the Evaluation Team surveyed participating building owners and property managers to measure their satisfaction with various aspects of the Multifamily Programs. [81] Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.

As shown in Figure 93, average ratings for overall satisfaction in CY 2016 were 9.4 for Multifamily Energy Savings Program participants and 9.6 for Multifamily Direct Install Program participants. Ratings for both programs increased by a statistically significant degree from CY 2015, and both were statistically higher than the CY 2015 portfolio baseline[82] of 8.8.[83]

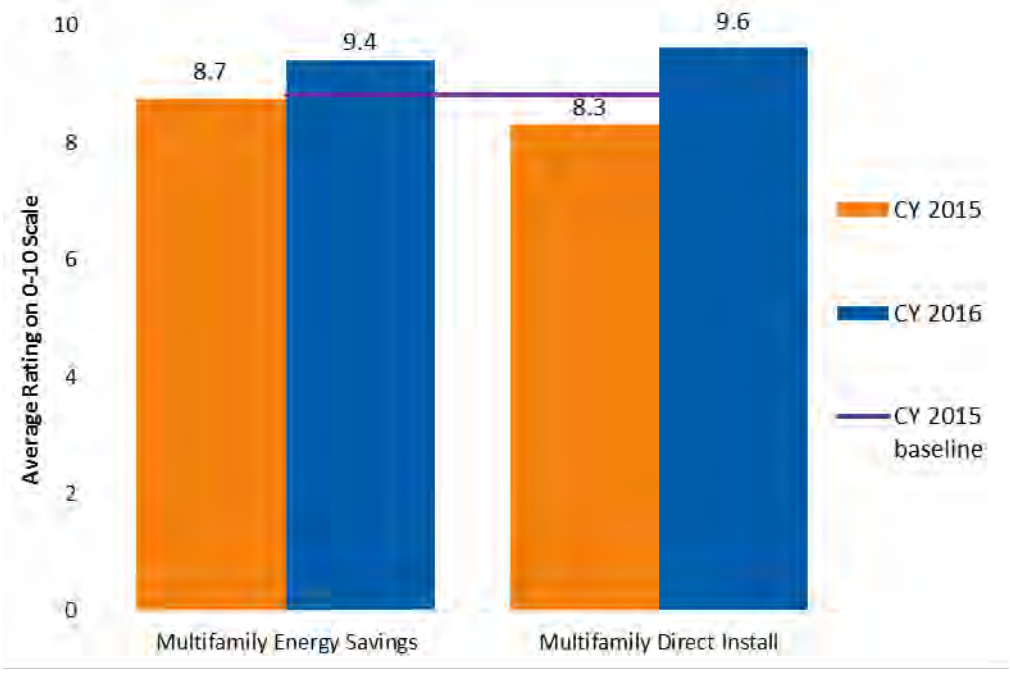
---

[81] The Evaluation Team found that some surveys did not include identifying information used to match survey responses to program participation dates. The Team used survey responses without participation dates in the year-end total but not the quarterly breakdown.

[82] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015-2018 quadrennium).

[83] $p < 0.05$ using binomial t-tests.

Figure 93. Overall Multifamily Programs Satisfaction

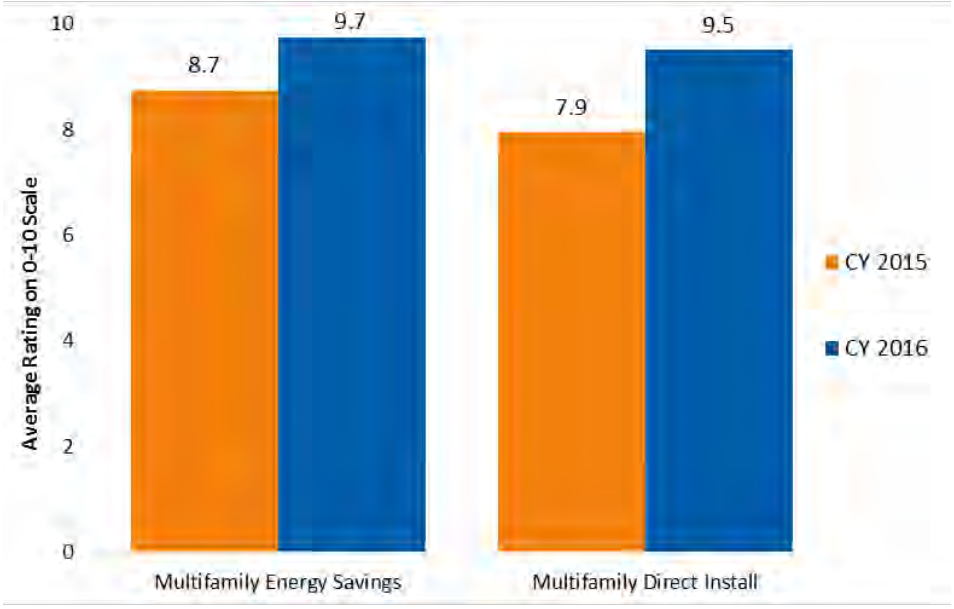


Source: Multifamily Energy Savings Program and Multifamily Direct Install Program Ongoing Participant Satisfaction Survey Question: "Overall, how satisfied are you with the Program?" (Multifamily Energy Savings Program CY 2015 n=87, CY 2016 n=35; Multifamily Direct Install Program CY 2015 n=22, CY 2016 n=16) The portfolio baseline (8.8) is indicated by a purple line.

As shown in Figure 94, CY 2016 Multifamily Energy Savings Program participants, on average, rated their satisfaction with the upgrades they received as 9.7, while Multifamily Direct Install Program participants' ratings averaged 9.5. Ratings for upgrades in both programs were significantly higher in CY 2016 than in CY 2015.[84]

[84] $p < 0.05$ using binomial t-tests.

Figure 94. Satisfaction with Multifamily Program Upgrades

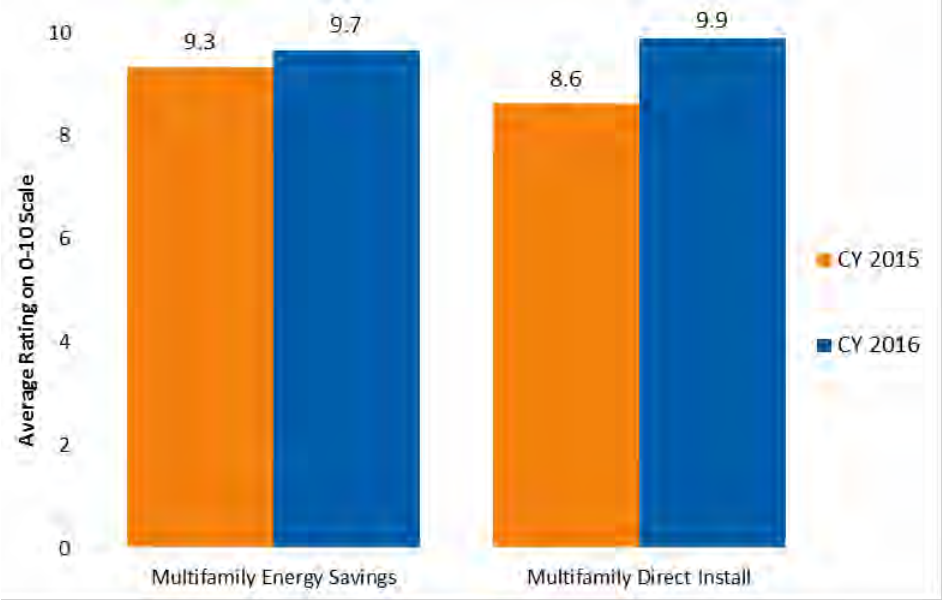


Source: Multifamily Energy Savings Program and Multifamily Direct Install Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient upgrades you received?" (Multifamily Energy Savings Program CY 2015 n=81, CY 2016 n=33; Multifamily Direct Install Program CY 2015 n=19, CY 2016 n=16)

Participants gave the Focus on Energy staff who assisted them high satisfaction ratings, averaging 9.7 among Multifamily Energy Savings Program participants and 9.9 among Multifamily Direct Install Program participants (Figure 95). Compared to CY 2015, the CY 2016 increase in staff ratings from Multifamily Direct Install Program participants was statistically significant, though the change in Multifamily Energy Savings Program participants' rating was not.[85]

[85] $p < 0.05$ using binomial t-test.

Figure 95. Multifamily Program Satisfaction with Focus on Energy Staff



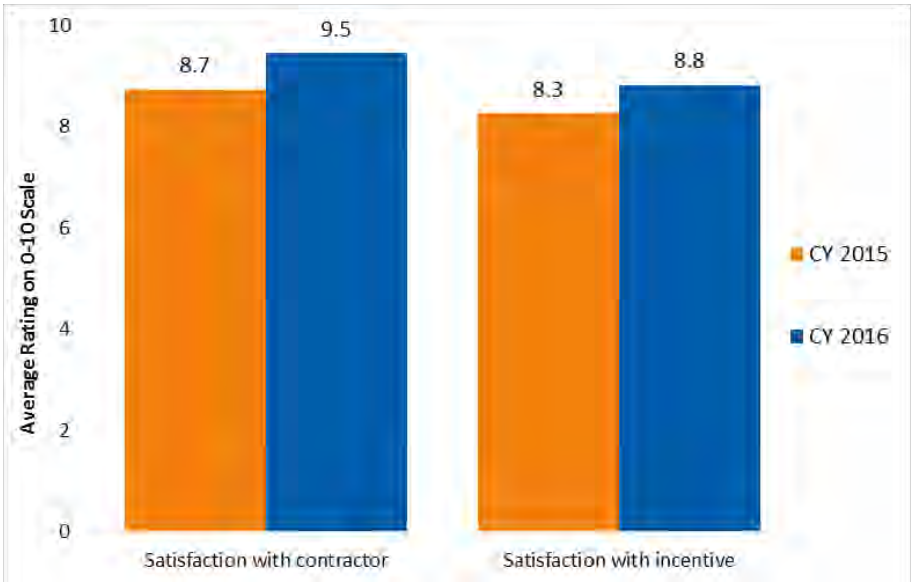
Source: Multifamily Energy Savings Program and Multifamily Direct Install Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the Focus on Energy staff who assisted you?" (Multifamily Energy Savings Program CY 2015 n=76, CY 2016 n=26; Multifamily Direct Install Program CY 2015 n=21, CY 2016 n=16)

The Evaluation Team asked Multifamily Energy Savings Program participants to rate their satisfaction with the contractor who performed services for them, and with the amount of incentive they received.[86] Figure 96 shows the average contractor satisfaction rating was 9.5, a statistically significant increase from CY 2015 participants' ratings.[87] Multifamily Energy Savings Program participants, on average, rated their satisfaction with the incentive amount as 8.8, which was not significantly different from CY 2015.

[86] The Evaluation Team did not ask Multifamily Direct Install Program participants these questions because they are not relevant to the Program design and delivery structure.

[87] $p < 0.10$ using binomial t-test.

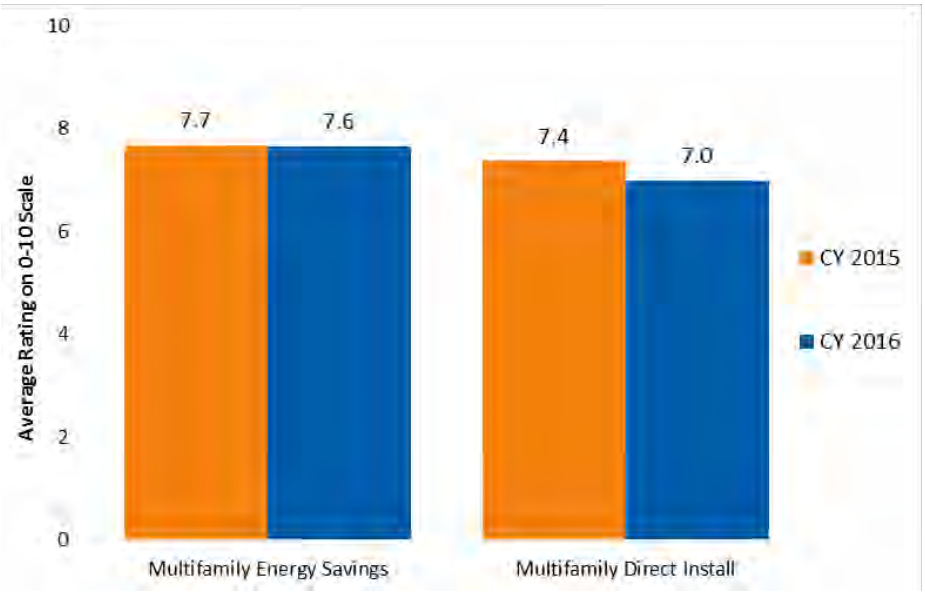
Figure 96. Multifamily Energy Savings Program Satisfaction with Contractor and Program Incentives



Source: Multifamily Energy Savings Program Ongoing Participant Satisfaction Survey Questions: "How satisfied are you with the contractor who provided the service?" (CY 2015 n=77, CY 2016 n=31) and "How satisfied are you with the amount of incentive you received?" (CY 2015 n=85, CY 2016 n=33)

Figure 97 shows the likelihood of respondents to initiate another energy efficiency project in the next 12 months. Multifamily Energy Savings Program participants, on average, rated the likelihood to implement another project at 7.6, while Multifamily Direct Install participants' ratings averaged 7.0. Neither of these ratings was significantly different from likelihood ratings provided by participants in CY 2015.

Figure 97. Likelihood of Initiating Energy Efficiency Improvement



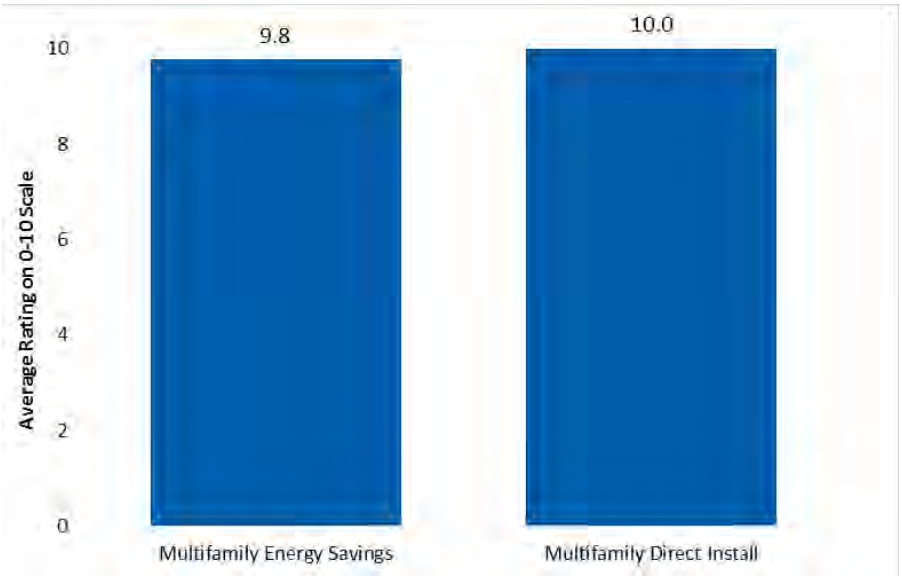
Source: Multifamily Energy Savings Program and Multifamily Direct Install Program Ongoing Participant Satisfaction Survey Question: "How likely are you to initiate another energy efficiency improvement in the next 12 months?" (Multifamily Energy Savings Program CY 2015 n=79, CY 2016 n=34; Multifamily Direct Install Program CY 2015 n=19, CY 2016 n=10)

For participants in the Multifamily Direct Install Program, the survey included a question about what projects they intend to accomplish in the next 12 months. All three respondents who mentioned specific measures indicated that they plan to upgrade exterior lighting to LEDs, while one also mentioned upgrading a boiler system.

Figure 98 shows that respondents' ratings for the likelihood they would recommend this Program to others was 9.8 among Multifamily Energy Savings Program participants and 10.0 among Multifamily Direct Install Program participants.[88] Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Multifamily Energy Savings Program NPS is +94, based on 94% of participants identifying as promoters and 0% identifying as detractors. The Multifamily Direct Install Program NPS is +100, based on 100% of participants identifying as promoters and 0% identifying as detractors.

[88] Customers who responded that they "already have" recommended the Program were counted in mean ratings as a rating of 10 (most likely).

Figure 98. CY 2016 Likelihood of Recommending the Program



Source: Multifamily Energy Savings Program and Multifamily Direct Install Program Ongoing Participant Satisfaction Survey Question: "How likely is it that you would recommend this program to others?" (Multifamily Energy Savings Program n=35, Multifamily Direct Install Program n=15)

The ongoing participant satisfaction surveys also included questions about whether respondents had any comments or suggestions for improving the Programs.

Of the 35 participants who responded to the Multifamily Energy Savings Program survey, 14 (40%) provided open-ended feedback. Of these comments, 10 were positive or complimentary (71%), and four were suggestions for improvement (29%). Most of the positive comments complimented the Program staff and Trade Allies or expressed a generally positive experience, though one participant also mentioned that they started noticing energy savings almost immediately upon installing their upgrades. The four suggestions for improvement included improving measures installed (some of this respondent's lighting burned out shortly after installation), expanding the Program scope to include rebates for more equipment, improving communications about the steps required for the rebate process, and improving contractor performance (installers had disconnected fire alarms and not reconnected them).

Of the 16 participants who responded to the Multifamily Direct Install Program survey, just one (or 6%) provided open-ended feedback, stating that they have not participated in the Multifamily Energy Savings Program because the approved lighting fixtures were too expensive, then suggested that the Program include less expensive fixtures. The survey included a question to ask if respondents had any specific comments or suggestions regarding the Focus on Energy staff who had assisted them: seven participants made comments, and all seven were complimentary of staff and did not include any suggestions for improvement.

Multifamily Direct Install Program respondents were also asked if they had concerns about any of the measures installed through the Program. Twelve of the 16 survey respondents did not have concerns,

though three mentioned concerns regarding lighting, two mentioned concerns with efficient aerators, and two had concerns about showerheads. When asked to elaborate on concerns about lighting, one participant said they noticed that several of the Program CFLs had burned out after a few months, and another participant was disappointed that the installer would not replace their currently installed CFLs with globe-style CFLs. Of the two respondents who made comments about the aerators, one reported that water flow was "louder and slower" with the new measures, while another said tenants had reported unspecified issues with the aerators (which their maintenance staff had been able to resolve as issues arose).

Multifamily Energy Savings Program Property Owner and Manager Survey

Through the Multifamily Energy Savings Program property owner and manager survey, these respondents shared their in-depth program participation experiences. Building owners and property managers answered questions about program awareness, decision making influences, participation barriers, and satisfaction with Program application components. Whenever possible, the Evaluation Team compared the CY 2016 participant survey results to the CY 2015 and CY 2013 participant survey results to document any changes or progress.

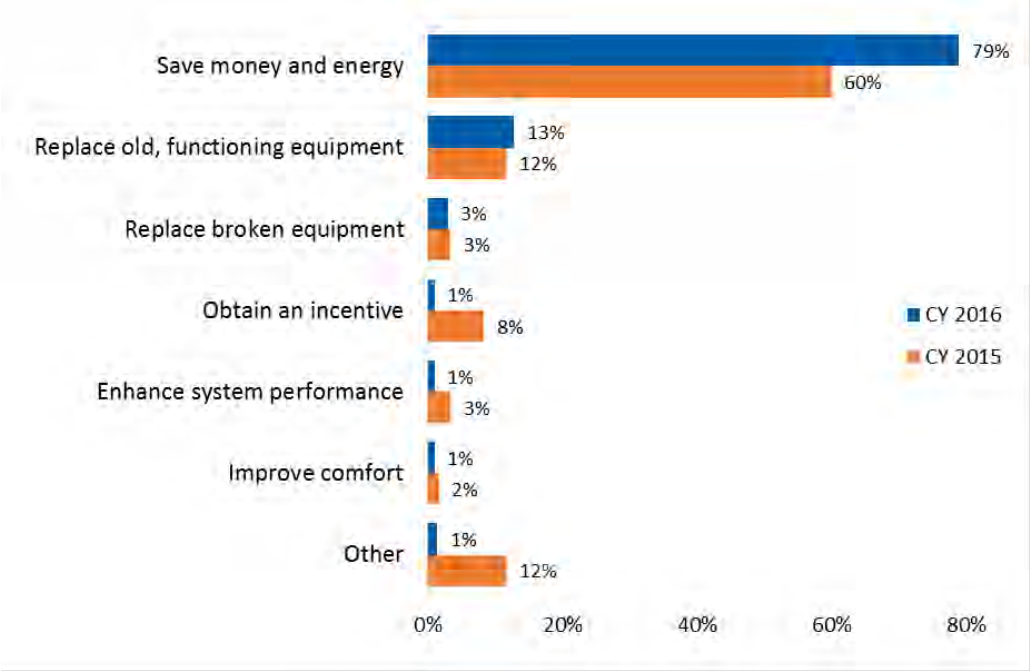
Multifamily Energy Savings Program Property Owner and Manager Decision Influences

The Evaluation Team asked property managers and owners to rate the importance of several factors—saving money, protecting the environment, and creating jobs—in making energy efficiency upgrades. The vast majority of respondents (86%) said saving money on utility bills is the most important factor when deciding to upgrade properties' energy efficiency, followed by protecting the environment (11%).

Property owners and managers shared their motivations to participate in the Multifamily Energy Savings Program. More than three-fourth of the respondents (79%) were most motivated to save money and energy, which was significantly higher compared to CY 2015 (60% of respondents).[89] Figure 99 shows the participants' motivations for participating.

[89] $p \leq 0.01$ using a binomial t-test.

Figure 99. Multifamily Energy Savings Program Participation Motivations

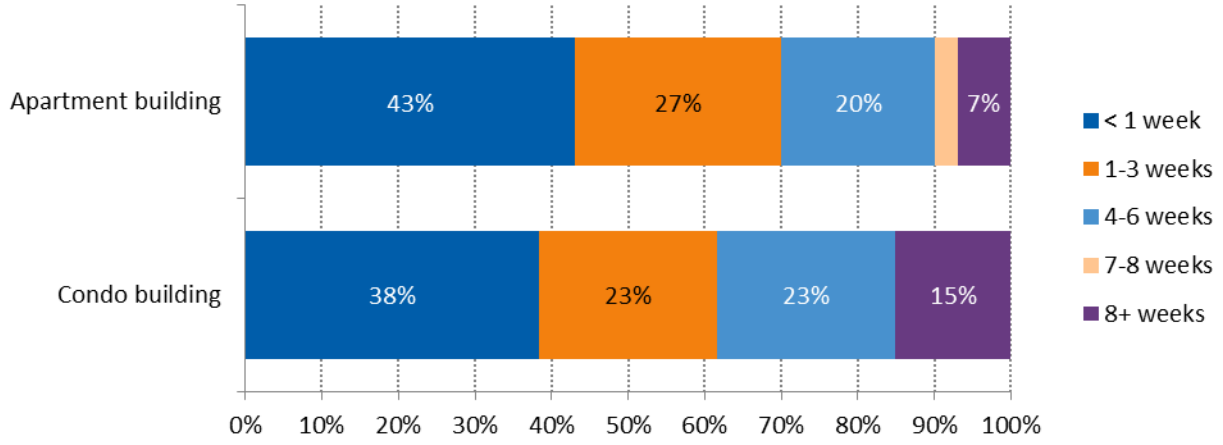


Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question D2 and CY 2015 Multifamily Energy Savings Program Participant Survey Question D3: "What factor was most important to your company's decision to make these upgrades energy efficient?" (CY 2016 n=70, CY 2015 n=60)

Most property owners and managers of apartment (residential, tenant occupied) buildings (60%, n=52) require approval to proceed with capital upgrades for their buildings, but over three-fourths of condominium (residential, owner occupied) building and mixed-use (residential and commercial, tenant occupied) building owners and managers (76%, n=17 and 77%, n=13, respectively) said they require approval for building upgrades. All condo building respondents who require approval noted that these approvals come from a board of directors.

Approval timelines for building upgrades are similar for apartment and condo building owners and managers. Figure 100 shows participants' building upgrade approval timelines by building type.

Figure 100. Multifamily Building Upgrade Approval Timelines by Building Type



Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question D5: "How long does it typically take to receive approval to move forward with an energy efficiency upgrade?"
(apartment building n=30, condo building n=13)

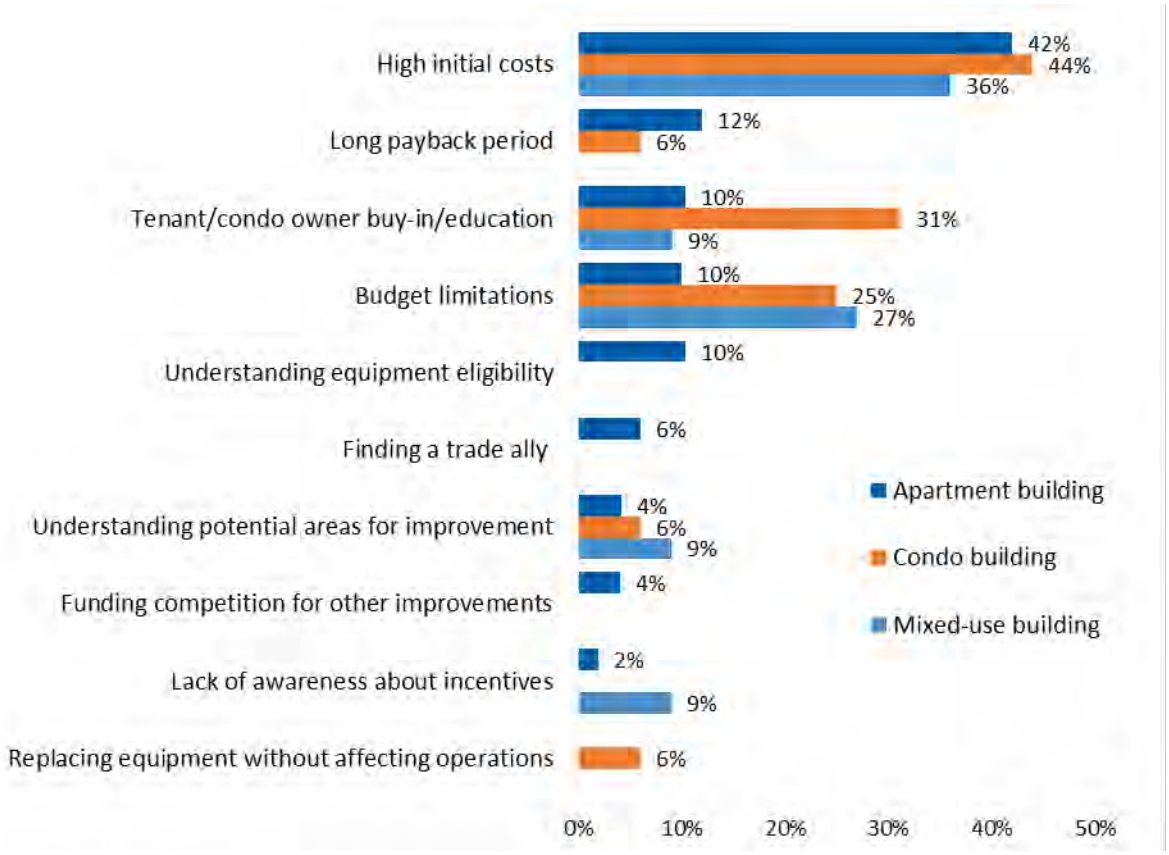
Property Owner and Manager Training

The Evaluation Team asked building owners and managers if they have attended a Focus on Energy-sponsored training in the past two years. While only five respondents said they had attended a training recently, four of the five said the training was *very important* in their decision to move forward with their energy-efficient upgrades.

Multifamily Energy Savings Program Property Owner and Manager Barriers to Participation

Surveyed Multifamily Energy Savings Program property owners and managers cited a variety of barriers to participating in the Program, and the frequency of these barriers varied by participating building type. Respondents most frequently reported high initial costs as the primary barrier, regardless of building type. The second most common barrier for respondents with participating apartment buildings was long payback periods, while condo building respondents cited condo owner buy-in to the project and mixed-use property respondents cited budget limitations (Figure 101).

Figure 101. Barriers to Implementing Multifamily Energy Savings Program Projects



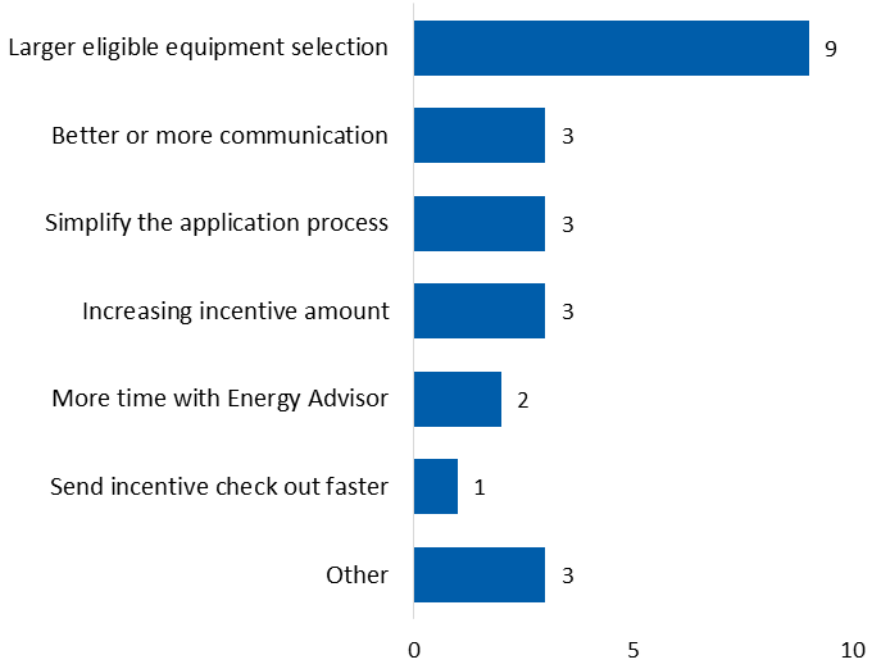
Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question E1: "What do you see as the biggest challenges to making energy-efficient improvements at your properties?" Multiple responses allowed (apartment building n=48, condo building n=16, mixed-use building n=11)

The Evaluation Team asked respondents what could be done to help them overcome the challenges to making energy-efficient improvements at their properties. Forty-eight percent (n=63) suggested higher incentives, 35% said to provide the incentives up front (instant or point-of-sale rebates), and 29% cited the need for improved information about the Program.

Multifamily Energy Savings Program Improvement Recommendations

Of the 70 participants who responded to the Multifamily Energy Savings Program survey, 18 (26%) provided open-ended feedback, which the Evaluation Team coded into a total of 24 mentions. The most common suggestions for Program improvement involved increasing the selection of eligible equipment (nine of 18 respondents), improving communication (three of 18 respondents), simplifying the application process (three of 18 respondents), and increasing the incentive amount (three of 18 respondents). Comments about increasing Program offerings were entirely focused on lighting, and respondents most frequently mentioned exterior lighting. Figure 102 shows participants' suggestions for improvement.

Figure 102. Multifamily Energy Savings Program Improvement Suggestions



Source: CY 2016 Multifamily Energy Savings Program Participant Survey Question J6: "Is there anything that Focus on Energy could have done to improve your overall experience with the Multifamily Energy Savings Program?" Multiple responses allowed (n=18)

Partial Participant Interviews

The Evaluation Team conducted in-depth interviews with 12 Multifamily Direct Install Program property managers and owners who received direct installation services through the Program in CY 2015 but have not retrofitted these properties through the Multifamily Energy Savings Program. Respondents had between one and 25 unique site addresses that participated in the Multifamily Direct Install Program in CY 2015. These partial participant respondents represent the following ownership models or building characteristics:

- Condominium associations (two respondents)
- Mixed-use properties (two respondents)
- Standard residential apartment buildings without commercial leased space (eight respondents)
  - Two of the eight respondents' properties are funded and managed through a housing authority

The Team determined whether respondents received a *Prescriptive and Custom Rewards Recommendation Checklist* to pursue future opportunities through the Multifamily Energy Savings Program, and whether Program staff followed up with participants regarding these additional opportunities. Half of the participants interviewed (six of 12) had participated in the Multifamily Direct Install Program in the first half of CY 2015, and half had participated in the second half of CY 2015.

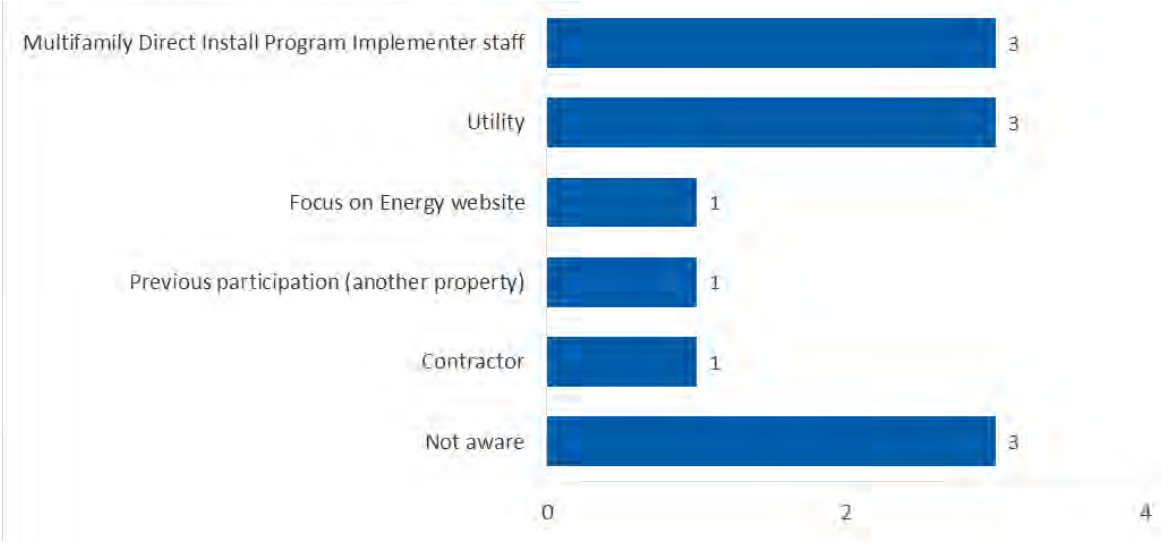
Therefore, respondents had at least eight months to act on the energy-saving opportunities recommended by Program staff during the Multifamily Direct Install Program process.

Partial Participant Awareness and Engagement

The Evaluation Team asked partial participant respondents about their awareness of the Multifamily Energy Savings Program and whether their Multifamily Direct Install Program Implementer staff—the Energy Advisors or field technicians—had recommended additional energy efficiency opportunities in the properties' common areas through the Multifamily Energy Savings Program.

Three-fourths of respondents (nine of 12) said they were aware that incentives are available beyond the Multifamily Direct Install Program. Figure 103 shows partial participant respondents' awareness source.

Figure 103. Source of Multifamily Energy Savings Program Incentives Awareness



Source: CY 2016 Multifamily Program Partial Participant Interview Question B1.a: "How had you heard about these incentives?" (n=12)

When asked whether their Multifamily Direct Install Program Implementer staff assessed the common areas for energy-saving opportunities, 75% (nine of 12) confirmed that Program staff had performed this task. All respondents who reported that a walk-through occurred said the Energy Advisor or field technician reviewed the interior and/or exterior lighting opportunities, and over half of the respondents (five of nine) said they looked for heating, cooling, and/or water heating opportunities in the buildings. One respondent, who reported that Program staff did not perform an assessment, noted that the lack of assessment was because the building maintenance staff did not have time to accommodate this process, but the property manager said they would have provided Program staff with keys to access the building and mechanical equipment.

The Evaluation Team asked all partial participant respondents if they had received a *Prescriptive and Custom Rewards Recommendation Checklist.* One-third of respondents (four of 12) recalled the Multifamily Direct Install Program Implementer staff providing a recommendations checklist. Half of

these respondents (two of four) received a hard copy of the recommendations checklist on the day the direct installation services occurred, and the remaining two received the checklist via e-mail shortly after the visit. One of the two condo association property respondents reported receiving a checklist. Similarly, one of the two respondents with mixed-use space properties said they received a checklist, but noted that the checklist did not address the leased commercial space.

The Evaluation Team asked respondents if they received information regarding CALP as part of their recommendations checklist. Three of four respondents said their recommendations included information about CALP: all three received a qualified contractor list and assistance with navigating the CALP offer. The one respondent who had not received CALP information reported having received this information for another property, but said that the property the Evaluation Team was surveying them about lacked opportunities to pursue CALP.

All four partial participant respondents who received a checklist found the recommendations to be useful. One respondent said the checklist provided the owner with "suggestions you may not normally think of." Another respondent noted that the report was useful because it was "nice to see the incentives and savings available" for potential property upgrades.

Partial Participant Program Follow-Up

The Evaluation Team asked partial participant respondents whether the Multifamily Programs' staff contacted them about their properties' additional opportunities to save energy. One-third of respondents (four of 12) reported having phone and/or e-mail communications with Program staff following the direct installation services. Three of these four respondents also recalled receiving the *Prescriptive and Custom Rewards Recommendation Checklist*. All four respondents said they were satisfied with the communications from Program staff, and two of these four respondents also noted that Program staff consistently respond to their inquiries "within 24 hours."

Most partial participant respondents (nine of 12) reported that they would contact Focus on Energy if they had questions about moving forward with energy-saving upgrades at the property, with four of the nine identifying specific Multifamily Programs staff members. One respondent said she would contact her vendor with questions, and two were not sure who to contact for future questions about upgrading their property.

Partial Participant Barriers to Participation

As shown in Table 166, respondents reported several reasons for not moving forward with any energy efficiency projects since participating in the Multifamily Direct Install Program. One-quarter of respondents (three of 12) reported that, barring any equipment failures, there were no sufficient opportunities available, either due to the buildings' size (i.e., "[there are only] two bulbs in the common area") or because the building equipment was fairly new. Another one-quarter of respondents (three of 12) said that any additional upgrades provided a poor return on investment. One of these respondents said they assess equipment payback but "always replace with energy-efficient product [upon failure]." Another of these respondents noted that they had replaced the water heaters before becoming aware

of a dual boiler and water heating system, and this had reduced their motivation to move forward with a boiler replacement.

Half of partial participant respondents (six of 12) mentioned the remaining three barriers. Two respondents, who could not recall receiving a recommendations checklist, said Program staff did not provide enough information or guidance to move forward with future upgrades, with one suggesting that this may be "a result of Focus staff turnover." Two respondents identified their own changes in management or ownership as the reason they had not proceeded with additional opportunities. The last barrier, mentioned by both housing authority-managed respondents, is that funding is a primary barrier. One respondent said, "being a nonprofit… we try to get to each [upgrade] as we can fund it."

Table 166. Barriers to Moving Forward with Additional Upgrades

Barriers	Responses
No Multifamily Energy Savings Program-eligible opportunities currently available within building	3
Poor return on investment	3
Need more information or guidance from program staff	2
Property management or ownership changes	2
Funding limitations	2

Source: CY 2016 Multifamily Program Partial Participant Interview. Question C1: "What are the reasons your organization has not acted on the recommendations that program staff made, or any other energy efficiency project at the property?" (n=12)

Partial Participant Property Owner and Manager Decision Making

The Evaluation Team explored whether differences in ownership and leasing models affects how property managers and owners make building upgrade decisions. The Team asked respondents to share their decision-making process.

The two condo association respondents said building upgrade decision making is fairly standardized, starting with a recommendation from a condo owner, maintenance staff, or board staff member to assess building needs, followed by a request for proposals and vendor selection. Building upgrades that exceed the operating budget (respondents' reported annual operating budgets for maintenance of $3,000 and $4,000) require board of directors' approval, and upgrades exceeding $10,000 require condo owners' approval. The project budget is allocated to a future year if funds are not presently available.

The two respondents with mixed-use properties reported that while they have had commercial leases where the building owner is responsible for all building upgrades, the current commercial tenants are responsible for the upgrades within their own leased space. Six respondents with standard residential apartment buildings reported that building upgrade decisions are made by the property manager and/or property owner, with maintenance staff bringing forth issues and suggestions.

Housing authorities managed two additional standard residential apartment respondents, where, similar to condo associations, they require board approval on projects exceeding their operating budgets (reported to be $1,000 and $10,000).

Partial Participant Suggestions for Improvement

The Evaluation Team asked partial participant respondents what Focus on Energy and Program stakeholders could do to help their organizations proceed with making additional building upgrades. Respondents who had no opportunities felt they had everything under control and said they know how to reach the Program staff should they need assistance. Respondents who have remaining energy efficiency opportunities primarily suggested that the Multifamily Energy Savings Program staff provide detailed recommendations and increase Program support after completing the direct installation services:

- "Provide very specific action items, including recommendations [checklist for things] like occupancy sensors."
- "Provide the recommendations [checklist] for common areas."
- "Be available when we're ready to move forward."
- "Help me select lighting that's eligible. I received a giant list of model numbers, but we don't have technical expertise."
- "[Provide] better outreach and marketing through apartment association newsletter and meetings."

Multifamily Energy Savings Program Trade Ally Experience

Through the online Trade Ally survey, the Evaluation Team assessed Trade Ally experiences with the Multifamily Energy Savings Program and the impact on their businesses.

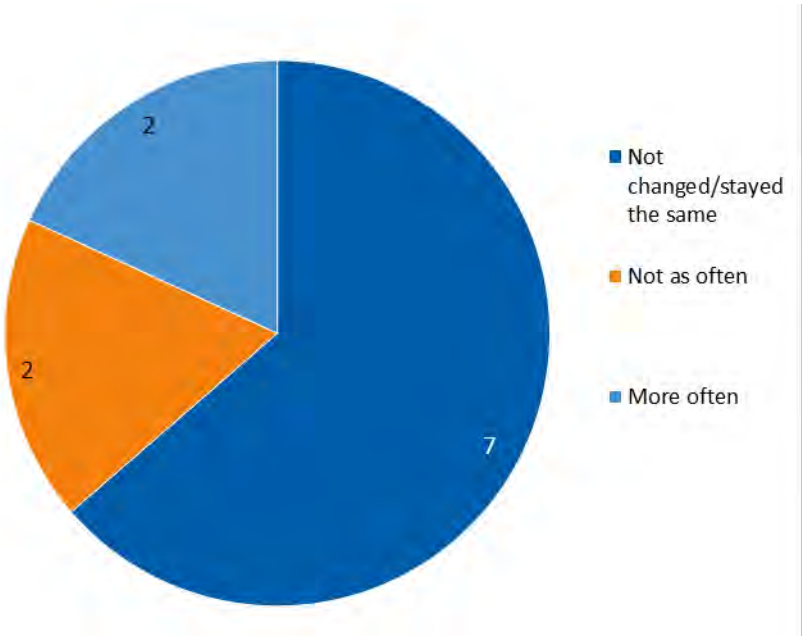
Multifamily Energy Savings Program Economic Impacts

On average, Multifamily Energy Savings Program Trade Allies (n=16) reported that 43% of their customers received a Focus on Energy incentive during CY 2016, which was similar to CY 2015 responses (41%, n=19). Seven of 14 CY 2016 respondents reported that their sales volume increased since participating, while seven reported no impact and two did not know. Five Trade Allies reported being able to expand business activities as a result of their participation; this included hiring more staff, adding product or equipment offerings, or expanding their service locations.

The Program Implementer reported that the prescriptive and custom incentive reductions have impacted Trade Ally engagement with and willingness to participate in the Program. To determine the impact of the CY 2016 incentive reductions on Trade Allies' business, the Evaluation Team asked Trade Ally respondents about their perception of incentive levels inside and outside of Wisconsin. Most Trade Allies (11 of 17) were aware that Focus on Energy reduced incentives across all of their nonresidential programs. Of those who were aware of incentive level changes, most reported that the change had no major impact on their ability to sell projects: Seven of 11 respondents said the reductions have not

changed how often they promote nonresidential Programs, but two respondents said they promote the Programs less often. Two said they promote the Programs more often, likely due to circumstances outside of Focus on Energy incentive levels (Figure 104).

Figure 104. Incentive Reduction Impact on Trade Allies' Program Promotion



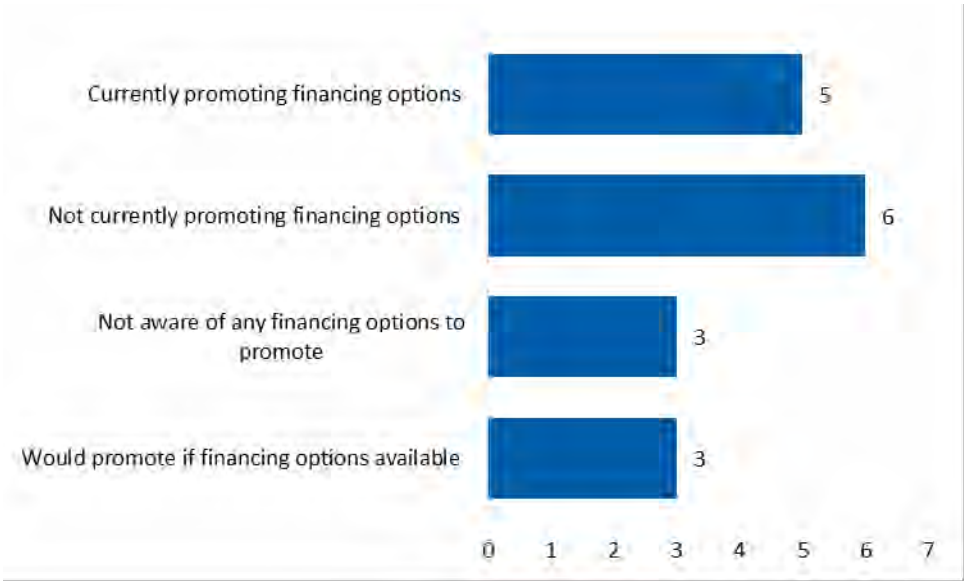
Source: CY 2016 Trade Ally Survey Question H2: "How has the incentive reduction affected how often you promote Focus on Energy programs? Would you say you promote the programs…" (n=11)

Over one-third of Trade Ally respondents (seven of 17) work outside of Wisconsin. Only two of the seven respondents who provide services in other states said they do so because programs in other states offer higher financial incentives.

Multifamily Energy Savings Program Financing

The Evaluation Team asked if Trade Allies promote financing or loan options to their customers. Figure 105 shows the number of respondents promoting some type of financing or loan option. Most respondents (12 of 17) did not promote financing, often because they were not aware of any viable financing options or there were no options available. The five Trade Allies who currently promote financing said they had access to financing through lending institutions or partnerships with equipment manufacturers.

Figure 105.Trade Ally Promotion of Project Financing



Source: CY 2016 Trade Ally Survey Question H6: "When presenting energy efficiency equipment options to your customers, do you promote any type of financing or loan program options?" (n=17)

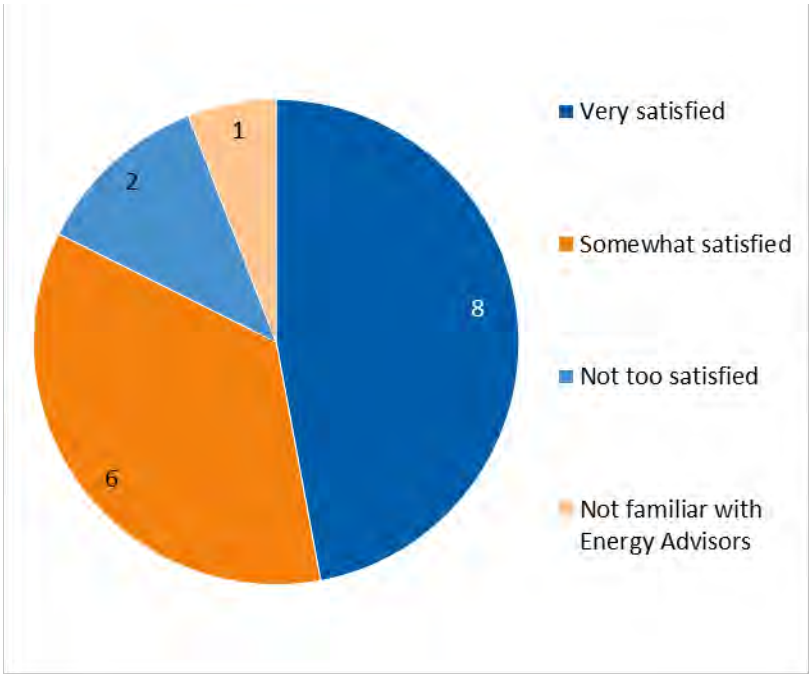
Multifamily Energy Savings Program Trade Ally Training

Only three of the 17 responding Trade Allies said they had received training on sales and lighting technologies. These three Trade Allies said the training was useful, with a mean rating of 7.0 on a 10-point scale where 10 indicates being *extremely useful*. Two of the three Trade Allies said the training was an important aspect of their decision to promote the Program. To improve the trainings, one respondent suggested providing follow-up information or contact after the training.

Energy Advisor Support

Trade Allies reported high levels of satisfaction regarding the support they received from Energy Advisors. Shown in Figure 106, eight of 17 Trade Allies were *very satisfied* with the support they received from their Energy Advisor, and another six of 17 were *somewhat satisfied*.

Figure 106. Trade Ally Satisfaction with Energy Advisor Support



Source: CY 2016 Trade Ally Survey Question F2: "How satisfied are you with the Program support you receive from the Focus on Energy Program Energy Advisors?" (n=11)

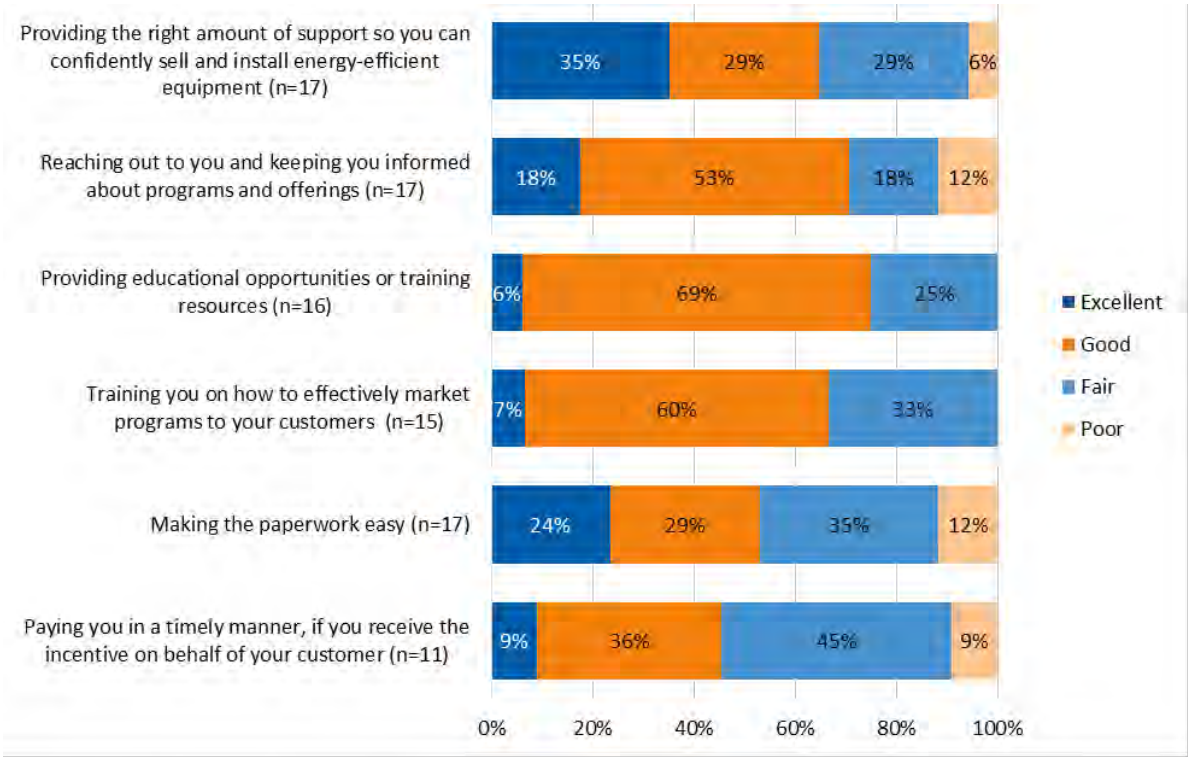
Multifamily Energy Savings Program Trade Ally Satisfaction

Trade Allies rated Focus on Energy's performance on several factors, as shown in Figure 107. More than half of the surveyed respondents reported Focus on Energy's performance as *excellent* or *good* in all categories other than paying in a timely manner.

Additionally, the Evaluation Team asked Trade Allies to rate their satisfaction with Focus on Energy overall. On a 10-point scale where 0 means *not all satisfied* and 10 means *extremely satisfied*, Multifamily Energy Savings Program Trade Allies' mean satisfaction score was 7.5, which is consistent with the average score of 6.8 from CY 2015 Multifamily Programs' Trade Allies and the average satisfaction score of 7.8 among CY 2016 Trade Allies across all nonresidential programs.

Eight Trade Allies provided feedback on how Focus on Energy can increase their satisfaction. Three respondents said they would like a wider range of measures to be eligible for incentives. Two indicated they would like to have increased support from Energy Advisors. The remaining three respondents had unique recommendations: one would like larger steam trap incentives, one requested timely Program interaction, and one would like to be included in Focus on Energy's Chain Stores and Franchises Program activities.

Figure 107. Performance Ratings



Source: CY 2016 Trade Ally Survey Question F1: "How is Focus on Energy doing when it comes to the following?"

Participant Demographics

According to Multifamily Energy Savings Program participant survey respondents, 74% of the participating buildings are standard apartment buildings (n=70), while 24% are condo-owned and 1% is some combination of both leased and owned space. Respondents reported that 19% of participating buildings include commercial leased space within the building (i.e., mixed-use buildings).

Most property owner and manager participant survey respondents (65%, n=70) own or manage more than one multifamily building, and these respondents each own or manage an average of 21 multifamily properties in Wisconsin. Respondents reported (on average) that one-third of all of their buildings are condominiums, and 14% include commercial leased space.

The Evaluation Team asked Multifamily Energy Savings Program property manager and owner participants about electric and natural gas bill payment responsibility within the buildings' residential units. The majority of respondents (87%) said the tenant is responsible for paying the electric bill; however, most property managers and owners (63%) reported that the building owner or manager is responsible for the natural gas bill. In total, 53% of respondents said the property manager or owner is

responsible for a portion of the energy bills, which is statistically higher[90] than the national average (23% of households) for multifamily properties with five or more units as reported by the Energy Information Administration (EIA).[91] Comparisons to the national average as reported by EIA are found in Table 167.

Table 167. Comparison of Bill Payment Responsibility

Bill Responsibility	Multifamily Energy Savings Program Participant Survey Respondents (n=58)	EIA Residential Energy Consumption Survey Respondents (n=12,083)	Midwest EIA Residential Energy Consumption Survey Respondents[1]
Building owner pays	14%	15%	10%
Tenant pays	33%	58%	66%
Some combination of both	53%	23%	16%
Other method	n/a	4%	7%

[1] Midwest EIA survey data is a subset of the U.S. EIA survey data and includes all property types (single-family, duplex, etc.)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 168 lists the CY 2015 and CY 2016 incentive costs for the Multifamily Energy Savings Program.

Table 168. Multifamily Energy Savings Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$1,265,281	$1,925,153

The Evaluation Team found the CY 2016 Multifamily Energy Savings Program was cost-effective (2.57). Table 169 lists the evaluated costs and benefits.

[90] $p < 0.01$ using a binomial t-test.

[91] Energy Information Administration. *2009 Residential Energy Consumption Survey, Tables HC9.2 and HC9.9.* Final release May 6, 2013. Available online: https://www.eia.gov/consumption/residential/data/2009/#house

Table 169. Multifamily Energy Savings Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$329,869	$305,431
Delivery Costs	$752,249	$696,518
Incremental Measure Costs	$3,400,605	$5,231,112
Total Non-Incentive Costs	**$4,482,724**	**$6,233,060**
Benefits		
Electric Benefits	$6,769,894	$7,388,053
Gas Benefits	$3,087,346	$3,942,209
Emissions Benefits	$1,647,883	$1,841,351
Total TRC Benefits	**$11,505,123**	**$13,171,613**
Net TRC Benefits	**$7,022,399**	**$6,938,553**
TRC B/C Ratio	**2.57**	**2.11**

Table 170 lists the CY 2015 and CY 2016 incentive costs for the Multifamily Direct Install Program.

Table 170. Multifamily Direct Install Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$286,026	$405,581

The Evaluation Team found the CY 2016 Multifamily Direct Install Program was cost-effective (3.81). Table 171 lists the evaluated costs and benefits.

Table 171. Multifamily Direct Install Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$251,800	$221,822
Delivery Costs	$574,217	$505,852
Incremental Measure Costs	$542,024	$365,091
Total Non-Incentive Costs	**$1,368,042**	**$1,092,764**
Benefits		
Electric Benefits	$3,368,800	$1,931,482
Gas Benefits	$1,049,055	$804,243
Emissions Benefits	$793,084	$506,075
Total TRC Benefits	**$5,210,938**	**$3,241,800**
Net TRC Benefits	**$3,842,896**	**$2,149,035**
TRC B/C Ratio	**3.81**	**2.97**

Table 172 lists the CY 2015 and CY 2016 incentive costs for the combined Multifamily Programs.

Table 172. Multifamily Programs Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$1,551,307	$2,330,734

The Evaluation Team found the CY 2016 Program was cost-effective (2.86). Table 173 lists the evaluated costs and benefits.

Table 173. Multifamily Programs Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$581,670	$527,252
Delivery Costs	$1,326,466	$1,202,370
Incremental Measure Costs	$3,942,630	$5,596,203
Total Non-Incentive Costs	**$5,850,766**	**$7,325,824**
Benefits		
Electric Benefits	$10,138,693	$9,319,535
Gas Benefits	$4,136,401	$4,746,452
Emissions Benefits	$2,440,967	$2,347,426
Total TRC Benefits	**$16,716,061**	**$16,413,413**
Net TRC Benefits	**$10,865,295**	**$9,087,589**
TRC B/C Ratio	**2.86**	**2.24**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Multifamily Programs.

Outcome 1. The Programs successfully met goals to cross-promote and convert participants from one Multifamily Program to another. However, better tracking methods may be necessary to maintain connections with properties that have savings opportunities that could, in time, result in energy-efficient building upgrades.

Program staff established conversion goals in CY 2016 to encourage increased savings within each participating business. Both Multifamily Programs reached their target, but staff were challenged by limited tracking capabilities, which may have created a barrier to effectively performing and tracking outreach to businesses with project potential. Program Implementer staff did not document opportunities through SPECTRUM. Most partial participants who received direct installation services but did not install equipment through the Multifamily Energy Savings Program said they had not obtained or could not recall obtaining a *Prescriptive and Custom Rewards Recommendation Checklist* from their Energy Advisor or field technician. Those businesses with remaining energy efficiency opportunities

primarily suggested that the Program provide them with detailed recommendations and increased Program support after they complete the direct installation services.

Recommendation 1: Consider using SPECTRUM's capacity to upload leads and opportunities, and record dates and notes regarding checklist delivery and other key outreach activities. The Program Implementer should track customer management at all stages of a potential project through SPECTRUM. Leads and opportunities should be tracked without concern for customers' long decision-making periods. The Multifamily Energy Savings Program staff could also establish outreach goals to follow-up with customers, determining the outreach frequencies based on project likelihood and timelines. Tracking these activities in SPECTRUM would help ensure accountability across nonresidential programs and regardless of contract or staff turnover.

Outcome 2. While many multifamily property owners have participated in both the Multifamily Direct Install Program and the Multifamily Energy Savings Program, the Programs may benefit from a consistent approach to creating continued awareness and following up with past participants.

Half of Multifamily Energy Savings Program participant respondents confirmed previous participation in the Multifamily Direct Install Program, which suggests that the direct install services contribute to generating property manager and owner interest in additional savings and incentive opportunities through the Multifamily Energy Savings Program.

However, of those Multifamily Energy Savings Program participants who had not previously participated in the Multifamily Direct Install Program, half (45%, n=33) said they were not aware of these direct install services. While most Multifamily Direct Install Program participants said Program staff walked through the building to identify lighting and HVAC opportunities, only one-third of partial participants (four of 12) recalled receiving a recommendations checklist.

Recommendation 2: Consider implementing strategies to increase awareness of Multifamily Programs' and long-term engagement among previous participants. While the Program Implementer and Program Administrator set participant conversion goals from the Multifamily Direct Install Program to Multifamily Energy Savings Program and vice versa, Program staff could consider implementing specific marketing and outreach activities to encourage participant conversion, such as scheduled e-mails following Program participation and having periodic follow-up phone calls to determine opportunities available within the participating property or other properties the participant owns or manages.

Consider establishing standardized methods for ensuring that all Multifamily Direct Install Program participants receive a *Prescriptive and Custom Rewards Recommendation Checklist*, even in instances where limited or no opportunities remain. This approach provides customers with clear next steps for energy-savings potential on their building upgrades. Consider engaging utility staff in this activity by asking participants if the Program Implementer could share the checklist with a utility representative. Program and/or utility staff should reference the checklist recommendations when following up on participant opportunities. Consider recording any follow up to these long-term opportunities in a database, and only tracking projects with documented follow-up activity against the conversion goals.

Outcome 3. Property managers of condominiums experience slightly longer approval timelines and identified condo owner education as a barrier to moving projects forward.

Because condo associations are managed by a board of directors, and individual condo owners have input into the capital upgrades to their building, Multifamily Programs' staff need tools and more time to support the decision-making process within this hard-to-reach market. Three-fourths of condominium building managers (76%, n=17) said they require approval for energy-efficient building upgrades, compared to 60% of apartment building owners and property managers. One-third of condo building managers also cited condo owner buy-in or education as a barrier to energy-efficient building upgrades, compared to 10% of apartment building property managers and owners. Program staff have created marketing materials and condo building participation goals to approach this market in alternative ways, but Program staff may need to commit more time to educating prospective participants and Trade Allies to reach this market.

Recommendation 3: Because Energy Advisors are spending more time to capture condo owner buy-in, they will need to develop long-term relationships with condo boards and property managers to ensure they provide effective service to condo-owned buildings. Consider developing outreach and energy-savings goals for each Energy Advisor to target this market segment (to supplement the Program's overarching KPI), and creating tools for Program staff to effectively engage condo associations and their property managers and owners, such as case studies that showcase typical condo building opportunities. Consider developing talking points that resonate with each type of decision maker—condo owners, boards of directors, property managers, and maintenance staff—and creating presentations that are customized to building opportunities. The Program staff could expand the Programs' reach by training Trade Allies or engaging utility staff in tailoring their approach to condo building opportunities.

Outcome 4. Measures which were not supported by current approved workpapers drove the deviation of evaluated savings from expected (*ex ante*) values.

The Wisconsin TRM is made up of workpapers which have been reviewed and accepted by stakeholders. There are also a number of accepted workpapers which are not included in the TRM but are still used to support SPECTRUM savings values. Finally, a number of measures in SPECTRUM are not supported by the current TRM or current accepted workpapers, but rather are based on old, outdated workpapers or other substandard documentation. These active measures with insufficient documentation are a major source of deviation from expected savings values, since the Evaluation Team must rely upon other algorithms, input parameters, and sources.

Recommendation 4. Increase the measure management process rigor to mitigate the effects of old or insufficient documentation on current program savings. Consider employing sunset dates on all measures to restrict how long a measure savings value can persist in the SPECTRUM database. Consider, also, creating an "opt-in" process where only those measures with current, approved methodology are listed for use in the current program year database.

Nonresidential Segment Programs

Agriculture, Schools, and Government Program

Focus on Energy launched the Agriculture, Schools, and Government Program in CY 2015 to address the specialized needs of these target markets. Through the Program, Focus on Energy offers prescriptive and custom incentives to customers with average peak monthly demand under 1,000 kW.

The following customer groups are eligible for the Program:

- **Agricultural producers** (such as producers of grain, livestock, milk, poultry, fruits, vegetables, bees and honey, fish, and/or shellfish, as well as greenhouses, grain elevators, and feed mills)
- **Educational entities** (such as K-12 schools, two-year University of Wisconsin colleges, and private four-year colleges)
- **Government entities** (such as counties, cities, towns, villages, tribes, and state and federal agencies)
- **Municipal wastewater treatment facilities**

Prior to CY 2015, Focus on Energy served these targeted customer groups through the Business Incentive Program. Currently, these customers can obtain all of Focus on Energy's commercial incentives through the Agriculture, Schools, and Government Program, with some entities also able to obtain specialized incentives (agricultural producers, educational entities, and public buildings). The Program Administrator is CB&I and the Program Implementer is CESA 10.

The Program did not achieve its CY 2016 goals for energy savings or demand reduction. However, this achievement excludes any potential carryover savings[92], which based upon details obtained from the Program Administrator, helped the Program Implementer to achieve its overall contractual goals. The 2016 evaluated savings (not including the previous year's surplus) came in below these targets. The Program achieved high realization rates (93% to 102%, across various parameters), and the Evaluation Team found the majority of sampled program measures to be aligned between claimed and evaluated savings values.

Table 174 lists the actual Program spending, savings, participation, and cost-effectiveness.

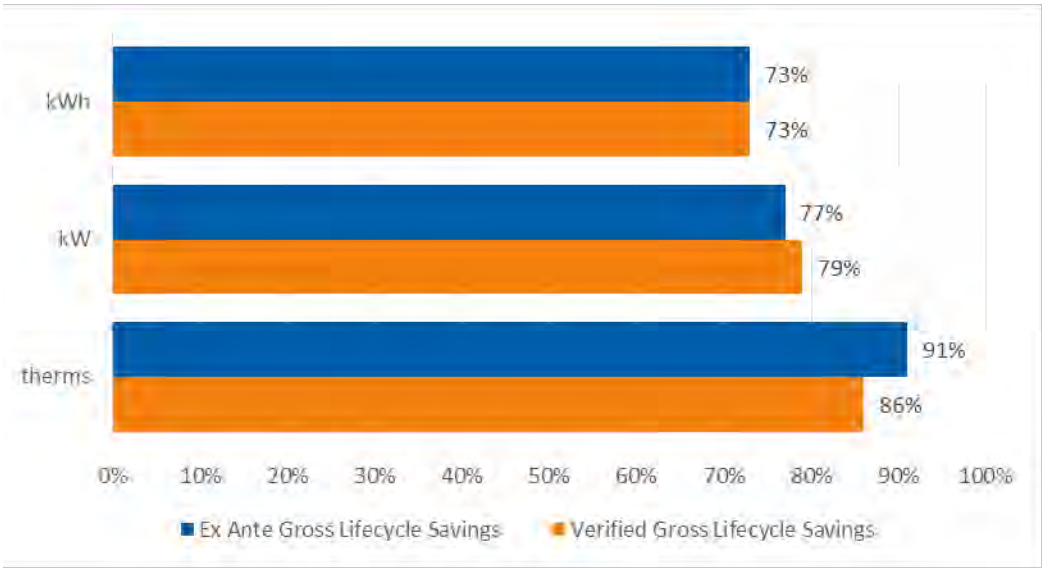
[92] This evaluation assesses verified and net level energy savings for projects completed in CY 2016 only. Based on feedback from the Program Administrator, Program Implementer contracts track *ex ante* program level goals, and savings above the previous year's goal ("carryover" savings) can be applied towards subsequent years' achievement.

Table 174. Agriculture, Schools, and Government Program Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$6,381,950	$5,656,868
Participation	Number of Participants	1,172	1,003
Verified Gross Lifecycle Savings	kWh	968,975,311	868,239,709
	kW	9,431	7,983
	therms	51,899,853	74,802,106
Verified Gross Lifecycle Realization Rate	MMBtu	97%	105%
Annual Net-to-Gross Ratio	MMBtu	65%	88%
Net Annual Savings	kWh per year	43,941,765	56,589,391
	kW	6,130	7,025
	therms per year	2,882,971	8,052,023
Cost-Effectiveness	Total Resource Cost Benefit/Cost Ratio	2.47	3.45

Figure 108 shows the percentage of gross lifecycle savings goals achieved by the Agriculture, Schools, and Government Program in CY 2016. The Program did not achieve CY 2016 goals, although contractual energy savings implementation targets were met per the Program Administrator when carryover savings were applied.

Figure 108. Agriculture, Schools, and Government Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Agriculture, Schools, and Government Program in CY 2016. The Team designed an EM&V approach to integrate multiple perspectives in assessing Program performance. Table 175 lists the specific data collection activities and sample sizes used in the evaluations.

Table 175. Agriculture, Schools, and Government Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Stakeholder Interviews	2
Tracking Database Review	Census
Marketing Review	n/a
Participant Surveys	142
Ongoing Participant Satisfaction Surveys[1]	473
Participating Trade Ally Surveys	18
Engineering Desk Review	42
Verification Site Visits	10

[1] The Program Implementer used data collected during ongoing customer satisfaction surveys to assess performance and help meet contractual obligations related to satisfaction key performance indicators.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator (CB&I) and the Program Implementer (CESA 10) in July 2016 to learn about the current state of the Agriculture, Schools, and Government Program and to assess Program objectives, Program performance, and implementation challenges and solutions. During the interviews, the Team covered these topics:

- Program goals and achievements
- Program delivery changes
- Marketing and outreach strategies and effectiveness
- Barriers to participation
- Data tracking
- Trade Ally management

Tracking Database Review

The Evaluation Team reviewed the accuracy and use of the SPECTRUM database for the Agriculture, Schools, and Government Program in the following ways:

- Reviewing total measure quantities reported by the Program Administrator and comparing with totals reported in SPECTRUM
- Reassigning savings from a number of database adjustment measures to the corresponding program measures
- Checking for complete and consistent application of data fields (measure names, first-year savings, EULs, etc.)

Marketing Review

The Evaluation Team reviewed the Agriculture, Schools, and Government Program marketing strategy and supporting marketing collateral to assess how effectively it targeted agricultural, schools, and government customers (with a specific focus on the agricultural-specific materials). The Evaluation Team used CY 2015 accomplishments as a baseline for the review and for recommending improvements to the Program marketing strategy. The marketing review research approach is outlined in Table 176.

Table 176. Marketing Review Research Approach

Research Subtask	Research Objective	Materials Reviewed
Program Document/ Strategy Assessment	Gauge the marketing strategies for the Program and changes from CY 2015	• CY 2016 and CY 2015 Marketing Plans • CY 2015 Operations Manual • CY 2016 and CY 2015 Summaries of Services • CY 2016 marketing campaign activities • CY 2016 Coordination and Leveraging Plan
Program Implementer Interview	Identify the reasons behind Program changes and determine CY 2016 performance	• One-on-one interview with the Program Implementer
Marketing Materials Review	Assess how well marketing materials support the strategy and connect with the intended recipients	• CY 2016 agricultural mailers • CY 2016 incentives infographic • CY 2016 catalogue guide • CY 2015 applications and catalogues • CY 2015 creatives • CY 2015 survey invitations • CY 2015 Trade Ally materials (Dairy Tune-Up, Power Connect chat sessions, Program overview, Lighting Catalogue, HVAC Catalogue)

Participant Surveys

The Evaluation Team contacted a random sample of 673 customers who participated in the Agriculture, Schools, and Government Program in CY 2016 to assess their experiences with the Program and to gather data to inform NTG calculations. Of the 142 customers surveyed (total response rate of 21%), 72 were in the agricultural sector and 70 were in the schools and government sector. At the time of the survey, the population of unique participants in the Program (as determined by unique phone numbers)

was 930. Based on this population size, the number of completed surveys achieved 90% confidence at ±10% precision at the Program level.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the 2015-2018 quadrennial. The goal of these surveys is to provide a quick and easy feedback opportunity to recent Program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow up to interested participants.

The Program Administrator deploys online surveys through SPECTRUM to all CY 2016 participants with an e-mail address within two weeks of completing participation in the Program. The Evaluation Team gathers online survey results via SPECTRUM, and sends, receives, and scans mail survey responses, combining them with the online results for quarterly and annual reporting. In CY 2016, 473 Agriculture, Schools and Government Program participants responded to the customer satisfaction survey.

Participating Trade Ally Surveys

The Evaluation Team conducted an online survey of participating Trade Allies, after sourcing the population frame from SPECTRUM and including all registered Trade Allies who completed projects through the Agriculture, Schools, and Government Program in CY 2016. Due to overlap between the nonresidential Focus on Energy programs, some Trade Allies worked on projects across multiple programs. To avoid response confusion, the Evaluation Team structured the first half of the online survey to ask general questions pertaining to Focus on Energy, and the second half of the survey to ask questions specific to the Agriculture, Schools, and Government Program. There were 266 registered Agriculture, Schools, and Government Program Trade Allies, from whom the Evaluation Team emailed a sample of 124 and received 18 responses, for a response rate of 15%.

Engineering Desk Review

The Evaluation Team reviewed all available project documentation in SPECTRUM for a sample of 42 Program measures. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Evaluation Team leveraged the applicable TRMs (dated October 2015 and February 2016) and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue). For prescriptive measures in Wisconsin, the Focus on Energy TRM and associated workpapers were the primary sources used by the Evaluation Team to determine methodology and data in nearly all cases. For hybrid and custom measures, the Evaluation Team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation. The evaluation sample for these reviews is selected using a weighted, random stratified sampling approach known as PPS (Probability Proportional to Size, here lifecycle total energy savings).

Verification Site Visits

The Evaluation Team conducted ten verification site visits for the CY 2016 Agriculture, Schools, and Government Program. Site visits involved verifying the type and quantity of equipment installed, determining how the installed equipment is controlled, and documenting the operating hours of the installed equipment.

The Team verified savings calculation input parameters based on operational and occupancy schedules, claimed and observed set-points, and any other relevant details identified prior to or upon arrival at the site.

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Program:

- Tracking database review
- In-Service rate determination
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data to determine reported installations, then applied the results from participant surveys (n=142), engineering desk reviews (n=33), and verification site visits (n=9) to calculate verified gross savings.

The Evaluation Team identified several types of measures where savings calculations did not align with the October 2015 or February 2016 TRM, or current approved workpapers. The Team identified a number of prescriptive boiler measures (MMID #3276) which were not supported by a current approved workpaper or the TRM. The Team calculated verified savings from these measures using the TRM methodology from a similar measure (MMID #3277) and project-specific inputs (boiler efficiency, etc.), and consequently these measures varied in measure-specific realization rate from 80% to 109%. The Team also made sizable adjustments to two hybrid measures (MMIID #2853 and #3384) based on observed operating parameters (outside air percentage, supply fan horsepower, etc.), which again were unsupported by current workpapers or TRMs.

For all sampled steam trap measures (3269, 3270, and 3272), the verified savings for CY 2016 were higher than the savings to be applied in 2017 per a new TRM update. A measure that matched actual savings achievement was unavailable to this Program. The Strategic Evaluation Plan provides some guidance as to how to deal with this type of circumstance, noting that findings related to prescriptive measures with deemed savings will generally be applied on a prospective basis. Therefore, to stay consistent with the plan and the precedent from previous evaluations, the Team did not make any adjustments to the deemed values and used the ex ante SPECTRUM deemed savings values to calculate the final verified savings.

Site visits generally confirmed that program measures were installed and operating as planned. Any observed deviations were minor and captured in the program-level realization rates.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2016, the Evaluation Team conducted participant surveys to verify the installed measures and estimate ISRs at the program level.

The Evaluation Team applied a combined, weighted ISR of 100.0% from these surveys to all engineering desk reviews without a completed site visit. The Evaluation Team applied a site-specific ISR to all measures where verification site visits were performed.

CY 2016 Verified Gross Savings Results

Table 177 lists the annual and lifecycle realization rates for the CY 2016 Program. Overall, the Program achieved a first-year evaluated realization rate of 94%, weighted by total (MMBtu) energy savings.[93] Realization rates are generally the same for a given demand or energy savings type unless they are influenced by the ISR. The totals presented in this report represent a weighted average realization rate for the entire Program. The Program Implementer includes the category of Bonus measures in the tracking database for accounting purposes (specifically to capture funds paid out to various participants and Trade Allies); no demand reduction or energy savings are associated with these measures, and they are omitted from the following tables.

Table 177. CY 2016 Agriculture, Schools, and Government Program
Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
99%	102%	93%	94%	100%	102%	95%	96%

Table 178 lists the *ex ante* and verified annual gross savings for the Program for CY 2016.

Table 178. CY 2016 Agriculture, Schools, and Government Program
Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	1,076,494	127	0	1,061,761	129	0
Air Sealing	31,015	0	48,987	30,591	0	45,518
Boiler	137,970	0	1,100,728	136,082	0	1,022,788
Chiller	2,491,538	651	0	2,457,439	662	0
Clothes Washer	0	0	448	0	0	416

[93] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Compressor	344,769	62	0	340,050	63	0
Controls	11,741,360	1,149	521,786	11,580,666	1,169	484,840
Delamping	1,443,617	294	0	1,423,859	299	0
Dishwasher, Commercial	225,434	1	4,617	222,348	1	4,290
Door	0	0	800	0	0	743
Dryer	27,724	2	64,495	27,345	2	59,928
Economizer	20,604	0	0	20,322	0	0
Energy Recovery	331,056	220	120,230	326,525	224	111,717
Fan	1,361,439	327	1,424	1,342,806	333	1,323
Fluorescent, Compact (CFL)	17,098	5	0	16,864	5	0
Fluorescent, Linear	3,486,839	643	0	3,439,118	654	0
Fryer	0	0	1,584	0	0	1,472
Furnace	33,539	0	14,615	33,080	0	13,580
Grain Dryer	38,199	0	31,281	37,676	0	29,066
Greenhouse	0	0	25,430	0	0	23,629
Heat Exchanger	1,318,348	0	0	1,300,305	0	0
High Intensity Discharge (HID)	45,839	0	0	45,212	0	0
Hot Holding Cabinet	40,474	7	0	39,920	8	0
Infrared Heater	0	0	9,950	0	0	9,245
Insulation	78,658	7	77,930	77,581	7	72,412
Light Emitting Diode (LED)	26,111,118	3,454	0	25,753,758	3,514	0
Livestock Waterer	806,360	0	0	795,324	0	0
Motor	106,873	13	0	105,410	13	0
Other	3,380,209	472	541,574	3,333,947	480	503,227
Oven	100,991	23	4,166	99,609	23	3,871
Pre-Rinse Sprayer	71	0	52	70	0	48
Refrigerator / Freezer - Commercial	63,254	7	0	62,388	7	0
Rooftop Unit / Split System A/C	239,380	340	19,991	236,104	346	18,575
Scheduling	77,240	13	2,268	76,183	14	2,107
Steam Trap	0	0	2,136,392	0	0	1,985,120
Steamer	40,121	8	4,168	39,572	8	3,873
Tune-up / Repair / Commissioning	59,734	0	0	58,916	0	0
Unit Heater	0	0	26,279	0	0	24,419
Variable Speed Drive	12,885,092	1,415	0	12,708,745	1,439	0
Water Heater	314,352	24	6,476	310,050	25	6,017
Window	0	0	7,654	0	0	7,112
Pump	63,964	6	0	63,089	6	0

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Total Annual	**68,540,772**	**9,269**	**4,773,326**	**67,602,715**	**9,431**	**4,435,341**

Table 179 lists the *ex ante* and verified gross lifecycle savings by measure type for the Program in CY 2016.

Table 179. CY 2016 Agriculture, Schools, and Government Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Aeration	16,147,410	127	0	16,180,345	129	0
Air Sealing	620,300	0	979,740	621,565	0	930,784
Boiler	2,759,400	0	22,014,537	2,765,028	0	20,914,517
Chiller	49,830,740	651	0	49,932,376	662	0
Clothes Washer	0	0	6,720	0	0	6,384
Compressor	5,171,533	62	0	5,182,081	63	0
Controls	126,050,767	1,149	7,423,678	126,307,863	1,169	7,052,732
Delamping	14,436,170	294	0	14,465,614	299	0
Dishwasher, Commercial	2,254,337	1	46,170	2,258,935	1	43,863
Door	0	0	16,000	0	0	15,201
Dryer	415,872	2	967,429	416,720	2	919,089
Economizer	206,040	0	0	206,460	0	0
Energy Recovery	4,965,841	220	1,803,990	4,975,969	224	1,713,848
Fan	20,110,787	327	21,360	20,151,805	333	20,293
Fluorescent, Compact (CFL)	77,832	5	0	77,991	5	0
Fluorescent, Linear	49,954,170	643	0	50,056,057	654	0
Fryer	0	0	19,008	0	0	18,058
Furnace	603,566	0	263,004	604,797	0	249,862
Grain Dryer	572,985	0	469,215	574,154	0	445,769
Greenhouse	0	0	203,381	0	0	193,218
Heat Exchanger	19,775,220	0	0	19,815,554	0	0
High Intensity Discharge (HID)	673,798	0	0	675,172	0	0
Hot Holding Cabinet	485,688	7	0	486,679	8	0
Infrared Heater	0	0	149,250	0	0	141,792
Insulation	1,966,450	7	1,837,659	1,970,461	7	1,745,835
Light Emitting Diode (LED)	405,780,560	3,454	0	406,608,198	3,514	0
Livestock Waterer	8,063,600	0	0	8,080,047	0	0
Motor	1,709,968	13	0	1,713,456	13	0
Other	27,939,947	472	4,633,584	27,996,934	480	4,402,054
Oven	1,211,866	23	49,993	1,214,338	23	47,495
Pre-Rinse Sprayer	355	0	260	356	0	247

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Refrigerator / Freezer - Commercial	759,048	7	0	760,596	7	0
Rooftop Unit / Split System A/C	3,362,180	340	228,595	3,369,038	346	217,173
Scheduling	866,410	13	24,000	868,177	14	22,801
Steam Trap	0	0	12,818,380	0	0	12,177,873
Steamer	441,331	8	45,848	442,231	8	43,557
Tune-up / Repair / Commissioning	597,339	0	0	598,557	0	0
Unit Heater	0	0	394,192	0	0	374,495
Variable Speed Drive	193,516,162	1,415	0	193,910,861	1,439	0
Water Heater	4,715,861	24	60,504	4,725,480	25	57,481
Window	0	0	153,080	0	0	145,431
Pump	959,460	6	0	961,417	6	0
Total Lifecycle	**967,002,993**	**9,269**	**54,629,578**	**968,975,311**	**9,431**	**51,899,853**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Agriculture, Schools, and Government Program, and calculated a NTG percentage of 65% for CY 2016.

Freeridership

The Evaluation Team used the self-report survey method to determine the Program freeridership level for CY 2016. The Team estimated an average self-reported freeridership of 36%, weighted by evaluated savings, for the CY 2016 Program.

In CY 2016, the two respondents with the greatest savings accounted for 39% of the total analysis sample gross savings, and both are estimated as 50% freeriders. These two respondents account for 19% of the overall 36% weighted freeridership estimate, and are the main driver of the higher freeridership estimate observed in CY 2016 compared to CY 2015. The three CY 2015 respondents with the greatest savings accounted for 77% of the total analysis sample gross savings, and all three were estimated as 0% freeriders. These three respondents were the main driver of the low freeridership estimate of 12% observed in CY 2015. Table 180 lists the CY 2015 and CY 2016 self-reported freeridership estimates, weighted by participant gross evaluated energy savings.

Table 180. CY 2015 and CY 2016 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	77	12%
CY 2016	142	36%

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Agriculture, Schools, and Government Program and who rated their Program participation as *very important* in their decision. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table 181.

Table 181. CY 2016 Agriculture, Schools, and Government Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	60	424.67
Building Fans	21	685.40

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, rounded to the nearest whole percentage, for the Agriculture, Schools, and Government Program respondents (Table 182).

Table 182. CY 2016 Agriculture, Schools, and Government Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	1,110.07
Program Savings	187,497.72
Spillover Estimate	**1%**

CY 2016 Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG estimate of 65% for the Program. Table 183 shows total net-of-freeridership savings, participant spillover savings, and total net savings in MMBtu, as well as the overall Program NTG.[94]

Table 183. CY 2016 Agriculture, Schools, and Government Program Annual Net Savings and NTG

Net-of-Freeridership Savings (MMBtu)	Participant Spillover Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
431,484	6,742	674,195	438,226	65%

Table 184 shows the annual net demand and energy impacts (kWh, kW, and therms) by measure category for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 184. CY 2016 Agriculture, Schools, and Government Program Annual Net Savings

Measure	Annual Net Savings		
	kWh	kW	therms
Aeration	690,145	84	0
Air Sealing	19,884	0	29,587
Boiler	88,453	0	664,812
Chiller	1,597,335	430	0
Clothes Washer	0	0	271
Compressor	221,033	41	0
Controls	7,527,433	760	315,146
Delamping	925,509	194	0
Dishwasher, Commercial	144,526	0	2,789
Door	0	0	483
Dryer	17,774	1	38,953
Economizer	13,209	0	0
Energy Recovery	212,241	146	72,616
Fan	872,824	216	860
Fluorescent, Compact (CFL)	10,962	3	0
Fluorescent, Linear	2,235,427	425	0
Fryer	0	0	957
Furnace	21,502	0	8,827
Grain Dryer	24,490	0	18,893
Greenhouse	0	0	15,359

[94] Although nonparticipant spillover was measured through Trade Ally interviews in CY 2016, these savings will be reviewed by the EWG and a determination of if and how these savings should be applied will occur at the end of the CY 2015–CY 2018 quadrennial, consistent with broader sampling practices design to draw full-quad conclusions.

Measure	Annual Net Savings		
	kWh	kW	therms
Heat Exchanger	845,198	0	0
High Intensity Discharge (HID)	29,388	0	0
Hot Holding Cabinet	25,948	5	0
Infrared Heater	0	0	6,010
Insulation	50,428	5	47,068
Light Emitting Diode (LED)	16,739,943	2,284	0
Livestock Waterer	516,961	0	0
Motor	68,517	8	0
Other	2,167,065	312	327,097
Oven	64,746	15	2,516
Pre-Rinse Sprayer	46	0	31
Refrigerator / Freezer - Commercial	40,552	5	0
Rooftop Unit / Split System A/C	153,467	225	12,074
Scheduling	49,519	9	1,370
Steam Trap	0	0	1,290,328
Steamer	25,722	5	2,517
Tune-up / Repair / Commissioning	38,296	0	0
Unit Heater	0	0	15,872
Variable Speed Drive	8,260,684	936	0
Water Heater	201,532	16	3,911
Window	0	0	4,623
Pump	41,008	4	0
Total Annual	**43,941,765**	**6,130**	**2,882,971**

Table 185 lists the lifecycle net demand and energy impacts (kWh, kW, and therms) by measure category for the Program.

Table 185. CY 2016 Agriculture, Schools, and Government Program Lifecycle Net Savings

Measure	Lifecycle Net Savings		
	kWh	kW	therms
Aeration	10,517,224	84	0
Air Sealing	404,017	0	605,010
Boiler	1,797,268	0	13,594,436
Chiller	32,456,044	430	0
Clothes Washer	0	0	4,150
Compressor	3,368,353	41	0
Controls	82,100,111	760	4,584,276
Delamping	9,402,649	194	0
Dishwasher, Commercial	1,468,308	0	28,511
Door	0	0	9,880

Measure	Lifecycle Net Savings		
	kWh	kW	therms
Dryer	270,868	1	597,408
Economizer	134,199	0	0
Energy Recovery	3,234,380	146	1,114,001
Fan	13,098,673	216	13,190
Fluorescent, Compact (CFL)	50,694	3	0
Fluorescent, Linear	32,536,437	425	0
Fryer	0	0	11,738
Furnace	393,118	0	162,411
Grain Dryer	373,200	0	289,750
Greenhouse	0	0	125,592
Heat Exchanger	12,880,110	0	0
High Intensity Discharge (HID)	438,862	0	0
Hot Holding Cabinet	316,341	5	0
Infrared Heater	0	0	92,165
Insulation	1,280,800	5	1,134,793
Light Emitting Diode (LED)	264,295,329	2,284	0
Livestock Waterer	5,252,030	0	0
Motor	1,113,746	8	0
Other	18,198,007	312	2,861,335
Oven	789,320	15	30,872
Pre-Rinse Sprayer	231	0	161
Refrigerator / Freezer - Commercial	494,388	5	0
Rooftop Unit / Split System A/C	2,189,874	225	141,162
Scheduling	564,315	9	14,821
Steam Trap	0	0	7,915,617
Steamer	287,450	5	28,312
Tune-up / Repair / Commissioning	389,062	0	0
Unit Heater	0	0	243,422
Variable Speed Drive	126,042,060	936	0
Water Heater	3,071,562	16	37,362
Window	0	0	94,530
Pump	624,921	4	0
Total Lifecycle	**629,833,952**	**6,130**	**33,734,905**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities. The Team focused the process evaluation on these key topics for the Agriculture, Schools, and Government Program:

- Customer satisfaction with Program components
- Tailored outreach targeting agricultural customers
- Efforts to streamline the paperwork and incentive process; specifically, the ease of use for agricultural customers
- Program tracking processes and coordination among the Program Administrator, Program Implementer (including Energy Advisors), and utility partners

Program Design, Delivery, and Goals

Focus on Energy centered the Program on direct and personal communication between dedicated Energy Advisors (employees of the Program Implementer) and the customers. Program delivery is focused on the customers rather than the Trade Allies, and each Energy Advisor is assigned to a territory that locates them within 100 miles of their customers. This ensures that customers have access to a Focus on Energy representative who is local and familiar with their specific needs. Customers may be assigned to other Energy Advisors depending on the type of project, the customer's level of participation, the Energy Advisors' experience in a specific industry and past project experience, or based on the customer-Energy Advisor relationship. Although the Program is delivered by Energy Advisors, projects can start via a utility contact, an Energy Advisor, a Trade Ally, or direct customer contact.

Program Management and Delivery Structure

CESA 10 has implemented the Program since it was launched in CY 2015, responsible for conducting customer outreach, providing Energy Advisors, training Trade Allies, and ensuring that applications are submitted with complete and correct information.

The process of applying for and receiving incentives is designed to be customer-driven: Energy Advisors help customers start a project, then each customer contacts a Trade Ally. For custom projects, the Energy Advisor frequently completes the custom application with the customer using project information, then the Trade Ally provides the savings and incentive calculations to the Energy Advisor. Next, the Energy Advisor submits the project workbook to a Customer Service Team Member (ITM) of the Program Implementer staff, who enters the project data into SPECTRUM. The ITM uses a checklist to ensure that the application is complete and accurate before sending the document to the Technical Review Team. If the application is missing data or has errors, the ITM will attempt to get the information from previous customer records in SPECTRUM. If customer records do not have the details, the ITM makes a log of the error and sends the application back to the customer or Trade Ally, depending on who filled it out.

Program Changes

Focus on Energy changed the marketing plan in CY 2016 to focus more on Trade Ally engagement compared to the CY 2015 plan.

Additionally, Focus on Energy released a midyear CY 2016 adjustment to the incentive structure of the Agriculture, Schools, and Government Program by offering a bonus to wastewater customers (started in May 2016 for custom projects and in July 2016 for prescriptive projects). Focus on Energy aimed this bonus at increasing the number of projects in the pipeline because wastewater projects have long design processes. Wastewater customers with projects preapproved by December 2016 were eligible for a 20% prescriptive bonus incentive or a 10% custom bonus incentive.

Program Goals

The overall objective of the Program is to encourage agricultural, educational, and institutional customers to use more energy-efficient products. The savings goals for CY 2016 included:

- Energy savings: 1,332,943,608 kWh
- Demand reduction: 12,000 kW
- Natural gas savings: 60,186,316 therms

In CY 2016, the Program did not achieve any of its savings goals, although contractual energy savings implementation targets were met per the Program Administrator when carryover savings were applied. The Program delivered 91% and 86% of its natural gas energy goals, 77% and 79% of its demand reduction goals, and 73% and 78% of its electric energy goals, *ex ante* and verified respectively.

In addition to the energy and demand goals, the Program Administrator and Program Implementer track several KPIs, shown in Table 186. The Program met or exceeded five of its eight CY 2016 KPIs. The number of agricultural customers increased by 18% from CY 2015 (n=566) to CY 2016 (n=669). The Program Implementer said the Program exceeded this goal due to better Trade Ally alignment and a streamlined catalog, which led to a simplified application process (this is discussed more in the *Program Management and Delivery Structure* section).

Table 186. Agriculture, Schools, and Government Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Customer Participation	Increase agricultural sector customer participation by 10% in CY 2016	Reached goal (agricultural sector participation increased by 18% in CY 2016)	Confirmed by final CY 2016 SPECTRUM data
Data Management and Quality Control	1% or less application error rate	Fell short of goal (1.28% error rate)	Reported by Program Administrator
	Train 30 Trade Allies every six months	Reached goal (Program Implementer reached out to 149 Trade Allies for training in CY 2016)	Reported by Program Administrator
Customer Leads and Opportunities	Enter at least five opportunities into SPECTRUM each month	Reached goal (average of five opportunities added into SPECTRUM each month)	Confirmed by final CY 2016 SPECTRUM data
	Average five new agricultural sector leads or opportunities per quarter	Fell short of goal (average of 3.5 new agricultural sector leads or opportunities per quarter)	Confirmed by final CY 2016 SPECTRUM data
Leverage Emerging Technology Program	Adopt four emerging technologies from the Clean Tech Partners Program in four years	Two technologies added: • Swimming pool sensor in CY 2015 • Control systems and spring-loaded garage door hinges in CY 2015	Confirmed by final CY 2016 SPECTRUM data
School Additions	Add eight participating school buildings in Delivering Energy Efficiency Together (DEET)	Reached goal (14 participating school buildings)	Confirmed by final CY 2016 SPECTRUM data
Satisfaction	Meet or exceed CY 2015 customer satisfaction metrics: • Overall: 8.9 • Program upgrades: 9.2 • Focus on Energy staff: 9.1 • Program contractors: 8.8 • Program incentives: 8.5 • Likelihood of initiating another project: 8.5	Goal met for four of six categories: • Overall: 9.1 • Program upgrades: 9.2 • Focus on Energy staff: 9.3 • Program contractors: 9.0 • Program incentives: 8.3 • Likelihood of initiating another project: 8.2	Confirmed by Ongoing Customer Satisfaction Surveys

Data Management and Reporting

The primary data management tool used for the Program is SPECTRUM. The Evaluation Team recommended during the CY 2015 evaluation that the Program Implementer add internal error tracking to SPECTRUM. Although this did not happen, after receiving feedback from Energy Advisors that they

spent a significant amount of their time fixing application errors, the Program Administrator created a CY 2016 internal goal to decrease errors in applications and data entry.

The internal QC checks consist of the Program Administrator visually checking a percentage of applications submitted through SPECTRUM for errors, and emailing the Program Implementer a summary of the type and location of the error. The Evaluation Team reviewed a log of these emails and found that common errors were in transcription, missing information, and typos. In order to reach the aggressive 1% goal, the Program Implementer began to conduct their own QC applications reviews before sending them to the Program Administrator. The Program Implementer said that the 1% goal for accuracy was not realistic considering the resources required to QC every application, and expressed concern that the QC process slowed the timeline for incentives reaching customers and could lead to decreased satisfaction. Although the Program Implementer said that the goal was very aggressive, the Program Administrator reported that application errors decreased from 5% in CY 2015 to 1.28% in CY 2016.

Marketing and Outreach

Customers find out about the Program through the Energy Advisors, Trade Allies, or utility representatives. The Program Implementer attends trade shows and contacts previous customers once a year to inform them about new Program offerings. Energy Advisors use their existing relationships with customers to inform them of Program offerings, and the Trade Allies conduct their own marketing.

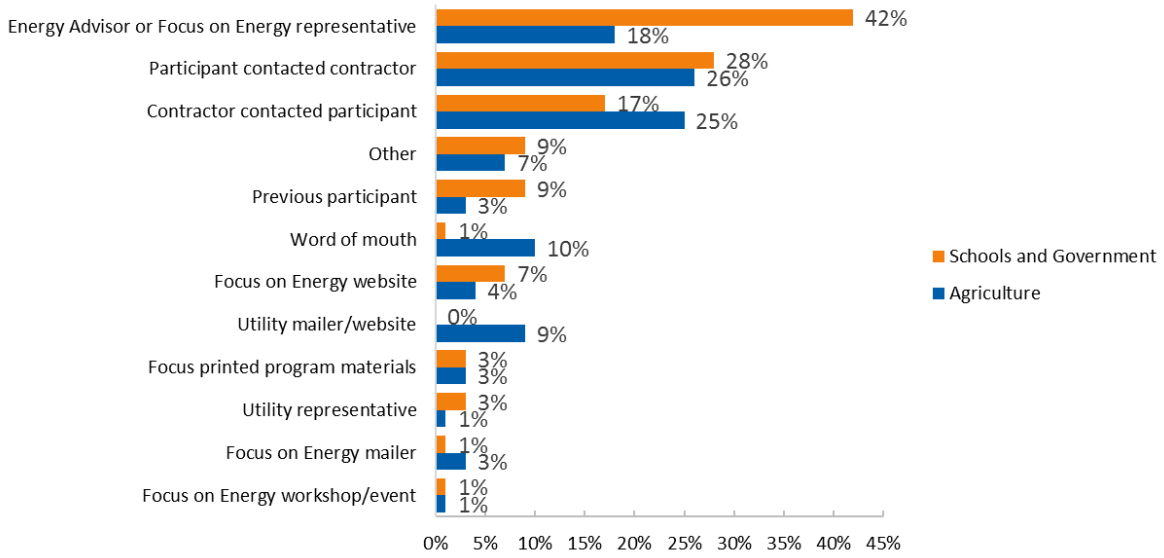
Schools and government participants learned about the available incentives most frequently from an Energy Advisor or other Focus on Energy representative (42%), while statistically fewer agricultural customers (18%) learned of the incentives from these sources (see Figure 109).[95] Agricultural participants learned about the available incentives most frequently by either contacting their contractor (26%) or by having their contractor contact them (25%). Agricultural participants were also significantly more likely than schools and government participants to hear about the Program through word of mouth (10% compared to 1%).[96] Compared to CY 2015, schools and government customers were statistically less likely to learn about incentives because of previous participation (30% in CY 2015 and 9% in CY 2016).[97]

[95] This difference is statistically significant ($p < 0.01$ using a binomial t-test).

[96] This difference is statistically significant ($p < 0.01$ using a binomial t-test).

[97] This difference is statistically significant ($p < 0.01$ using a binomial t-test).

Figure 109. How Participant Learned About Focus on Energy Incentives

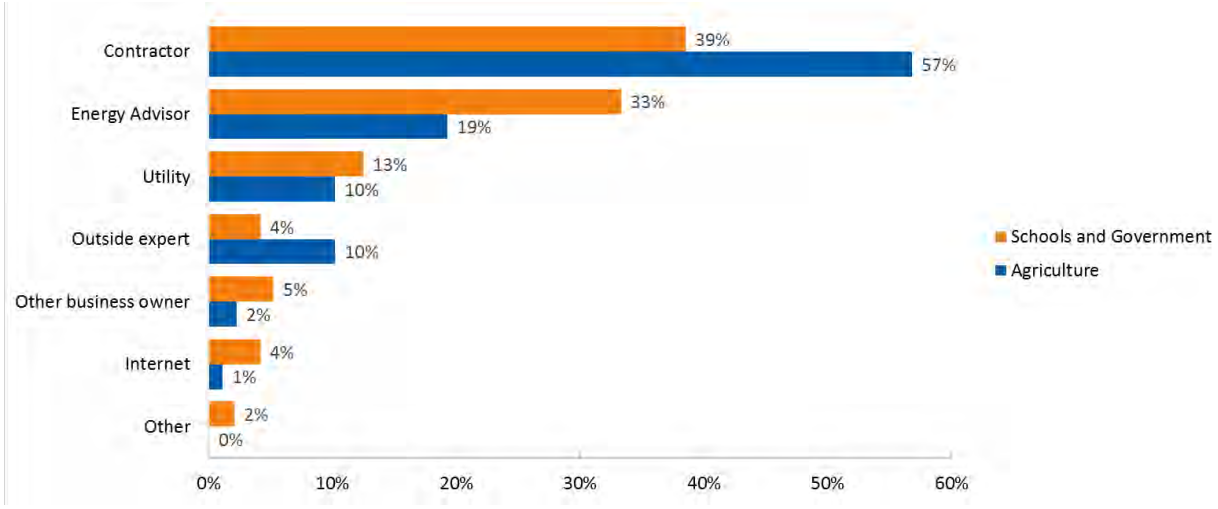


Source: CY 2016 Participant Survey Question A5. "How did your organization learn about the Focus on Energy incentives available for this project?" Multiple responses allowed (n=137)

The Evaluation Team asked participants what sources of information they trusted to give them Program information. The most common trusted source of information overall was a contractor (47%; shown by segment in Figure 110), but this varied by sector. Schools and government participants rated contractors and Energy Advisors as relatively equally trusted sources of information (at 39% and 33%, respectively), while agricultural participants were statistically more likely to rate their contractor as a trusted source of Program information (at 57%).[98] Thirteen respondents said they rely on other experts, with six citing an electrician, three citing an engineer, and two citing a professional organization, and two citing others.

[98] This difference is statistically significant ($p < 0.01$ using a binomial t-test).

Figure 110. Trusted Sources of Information



Source: CY 2016 Participant Survey Question D4. "Who do you seek out as a trusted source of information regarding energy-efficiency upgrades for your organization?" Multiple responses allowed (n=138)

In CY 2016, Focus on Energy centered the Program on advertising to customers in the agricultural sector, with agricultural radio advertisements and mailers explaining incentives available to agricultural customers. The Evaluation Team found that most of the agricultural respondents (73%, n=67) had received the agricultural mailer. Agricultural customers also noted their preferred mode of communication from Focus on Energy as mailings (62%, n=72), followed by email (29%).

Marketing Review

The Evaluation Team conducted an in-depth marketing review to assess the comprehensiveness and effectiveness of the Program marketing strategy and supporting materials. Specifically, the Team focused on how effectively CY 2016 marketing materials targeted agricultural customers. As noted above, one of the Program KPIs was to increase agricultural participation by 10% in CY 2016.

Marketing Strategy

The CY 2015 Agriculture, Schools, and Government Program marketing plan had five key objectives:

- Meet all energy savings goals
- Increase customer satisfaction
- Increase awareness of Focus on Energy program offerings
- Increase promotion of Focus on Energy program offerings by utility, Trade Ally, and industry partners
- Build affinity for Focus on Energy program offerings

In CY 2015, the Program outreach efforts were spread relatively evenly across multiple areas, such as direct contact, Energy Advisors, Trade Allies, and events.

The CY 2016 outreach plan for agricultural customers was focused more heavily (but not exclusively) on the network of Trade Allies, bolstered through attendance at farm technology days and the utility farm show. For the schools and government sector, Focus on Energy partnered with the Wisconsin Association of School Board Officials (WASBO) to increase attendance at events and make direct connections with eligible customers. The Program Implementer said that the enhanced focus on Trade Allies and the WASBO partnership lends greater credibility to the Program and allows a larger network of professionals to advocate for the Program.

Marketing Materials

The Evaluation Team assessed the suite of Program marketing materials, focusing primarily on agriculture-specific materials. The Team analyzed materials against our comprehensive list of the top 10 best practice elements[99] of effective and successful marketing materials (shown in Table 187). The best practices have been curated from marketing evaluations across a wide variety of industries, creating an unbiased standard for best practice marketing.

Table 187. Top 10 Best Practice Elements for Marketing Materials

Element	Description
Consistent messaging and look and feel	Repetition in messaging and consistency in appearance help to reinforce brand awareness and make it easier for viewers to understand and remember key program information
Identifiable target audience	Target audiences are more motivated and engaged if the messaging, content, and delivery are clearly aimed at a program's unique target audience, address key barriers, or leverage distinct motivators
Clear and comprehensive program details and benefits	Successful communications materials convey benefits in simple terms and explain the value proposition, leading to a higher likelihood of understanding and participation in the program
Direct call to action	A customer will be more likely to follow through with a desired action if the desired action is clearly stated
Appropriate messaging and creative given context	Creative layout, design, and messaging should match the marketing and media channel in which it will be placed
Complementary creative imagery and messaging	An effective and impactful creative platform seamlessly and strategically blends key messaging with imagery and layout to ensure that all components work together to encourage the desired outcome
Visual appeal	Visually appealing materials leave a positive impression

[99] The Evaluation Team compiled this list of best practice elements from its experience evaluating hundreds of approaches to customer engagement and promotion of energy-efficiency programs nationwide.

Element	Description
Easy steps to participate	Effective marketing and communications materials outline a clear and simple path for consumers to follow in order to participate in a program
Memorable and recognizable message	A memorable and recognizable message increases the likelihood of a customer recalling that message which, in turn, increases their likelihood of participation
QA/QC	Materials that have errors detract from the credibility of the organization

The Program Administrator provided the Evaluation Team with 45 distinct marketing materials from CY 2015 and CY 2016, ranging from flyers and mailers to radio and digital ads. The materials cover a broad Program range and a mix of target audiences (general, agricultural, schools and government, and wastewater). The Evaluation Team grouped these 45 materials into seven clusters, listed in Table 188.

Table 188. Marketing Clusters and Associated Materials

Cluster	Materials
Program Overview Documents	Catalogue Guide (1-pager); Summary of Services and Incentives for the Agriculture, Schools, and Government Program; Summary of Services and Incentives for Agriculture
Flyers	Cut Energy Costs for your School, Government, or Farm Facility; Cut Energy Costs in Your School; New Program, Higher Incentives; Reward Schools for Energy Saving Behaviors (DEET Fact Sheet); Farm Tune-Up; Include Focus on Energy in This Year's Summer Project; Prescriptive vs. Custom Incentives
Mailers	Trade Ally Co-Branding Opportunity; Agricultural Mailer
Emails	Summer Planning; WASBO Spring Conference; Trade Allies; Power Connect Chat Session reminders and survey
Press Releases	Focus on Energy New Program, Higher Incentives; Focus on Energy's New Agriculture, Schools, and Government Program Gains Momentum
Radio Ads	Agricultural-specific radio ads (four total) on February 19, 2015 and April 11, 2015
Digital Ads	School-focused small ads; Focus on Energy side banner ads; Focus on Energy small icons; agricultural-focused larger ads; CY 2015 Bonus Incentive Program

Program Overview Documents

The Program overview documents have a very clear message intended to give the viewer (participant or Trade Ally) a sense of all that is available through the Program, including the types of upgrades covered, available incentives, and how to apply. The Catalogue Guide shows this visually, with the cover photo of each specific guide next to a list of the types of upgrades and incentives available. Additionally, contact information is present in three separate places on the one-pager, ensuring to catch the viewer's attention with a call to action. However, Program benefits in the Catalogue Guide are not as clear as they could be, as it simply lists the incentive catalogues but makes no mention of energy efficiency resulting in utility bill savings and incentive payments.

Figure 111. Summary of Services Document



The Summary of Services document, shown in Figure 111, has a very strong first two pages with a clear call to action, a four-step application process on the first page, and incentive details on the second page. The branding on both pages of this document matches very well to the overall Program, with the use of the same color palette, strong imagery, and the strategic use of circles. (Focus on Energy uses text and images within circles on most marketing materials.)

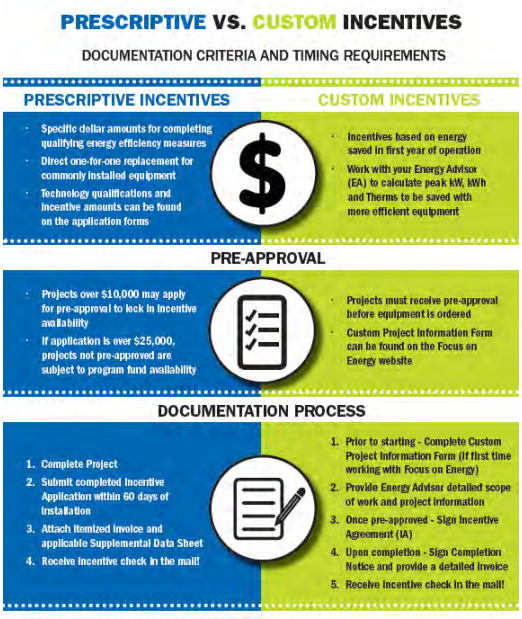
Using consistent imagery such as circles within circles helps the viewer feel comfortable that they are in the right place when looking for information.

Although the Summary of Services document provides a lot of detail on the incentives offered, the design of pages 3 through 12 could be improved. The current format has no clear organizational structure within each incentive grouping, making it tough for the viewer to find the incentive most applicable to them.

Flyers

The flyers the Evaluation Team reviewed are one- to two-page documents that are intended to concisely spread Program awareness to both customers and Trade Allies. The message that saving energy equates to saving money comes through clearly in the title of the documents for schools and government customers—for example, "Cut Energy Costs for your School Facility," "Reward Schools for Energy Saving Behaviors." However, the message of the agricultural flyer does not specifically call out energy savings or incentives, with a title of "It's Tune-Up Time for your Farm Facility." For all these documents, the target audience is immediately identifiable because of the large image of a government building, school with students, or a farm.

Figure 112. Prescriptive Versus Custom Incentives Infographic



Visually, these flyers generally excel at branding, with good use of images in circles and of the Focus on Energy logo, prominently shown in the lower right-hand corner of each flyer. As shown in Figure 112, the best visual design among the flyers is the "Prescriptive vs. Custom Incentives" infographic, which uses icons and color bars to delineate different sections and descriptors of the incentive types. The information is also presented in a

simplified manner, which is consistent with Focus on Energy's CY 2016 goal of streamlining application processes in the Agriculture, Schools, and Government Program (as stated in the CY 2016 Marketing Plan and by the Program Implementer during the interview).

One of the biggest areas of improvement for the flyers is to provide clear and easy next steps. Only one of the flyers, "Cut Energy Costs for your School, Government, or Farm Facility," provides the viewer with clear next steps on how to apply, while the rest of the flyers describe the incentives available or simply state that incentives are available.

The call to action is somewhat prevalent in these documents. For example, the first line of the "New Program, Higher Incentives" document asks "Looking for ways to improve the bottom line for your government facility?" but this could be made clearer and given a more prominent position.

Mailers

The Evaluation Team reviewed two mailers, one targeted to customers and one targeted to Trade Allies: these were some of the strongest marketing materials assessed. Each mailer has four sides when open, with good creative and branding elements such as easily readable call-outs of savings and relevant images spaced throughout. While there is a good amount of information present, it is not overwhelming and uses different stylistic elements like boxes and bullet points to convey key items.

Figure 113. Trade Ally Co-Branded Mailer



The wording and images on the front clearly indicate the target audience, and this audience is targeted throughout the entire document. In the mailer for agricultural customers, Focus on Energy did a great job of tailoring the messaging and creative to the target audience by keeping it simple and to the point.

For example, as shown in Figure 113, the front page of the mailer has a large farm image with a statistic that $1M was paid out to agricultural customers in CY 2015. When unfolded, one side of the full mailer explains why the customer should care about these upgrades and how they can contact Focus on Energy, and the other side shows specific examples of projects completed in different types of farms with the savings and incentive amounts, along with the business reply mail to contact an Energy Advisor for more information.

The "Trade Ally Co-Branding Opportunity" mailer also has many positive features, specifically the backside of the front page, where the requirements for co-branding are clearly laid out. Additionally, there are boxes throughout the mailer detailing who is eligible for the co-branding opportunities and

how to apply. The best feature of the mailer is a map with the name and contact information of each Energy Advisor, so that prospective Trade Allies can easily reach their point of contact. The biggest opportunity area for this marketing material is the explanation of benefits. In its current form, there is no information about why prospective Trade Allies should care about co-branding or what return they could get.

Emails

The emails the Evaluation Team reviewed fall into two distinct groups: those focused on the Power Connect Chat Sessions targeted to customers,[100] shown in Figure 114, and those focused on facility upgrades for both customers and Trade Allies. All emails have a large header with the title and a relevant image, consistent with other marketing materials provided. The relevant image and title help to easily identify the target audience and to grab the viewer's attention upon opening the email. The messages present in the body of the email are succinct, helping to ensure that everything stays above the fold (i.e., on one screen) when viewed on a computer. However, these emails are missing the key branding element of images within circles that exist in most of the other marketing materials.

The two groups of emails diverge in the Program details and call to action/ next steps. The Power Connect Chat Session emails do a good job of showing the benefits of attending a session, with a bulleted list of benefits in the center of the email, followed by dates and times with instructions on how to attend, giving the emails a clear call to action and next step. However, the facility upgrade emails do not state why the viewer should conduct Program upgrades. Additionally, the call to action and next step is not clear, with a small line at the bottom of these emails asking the viewer to call their Energy Advisor.

Figure 114. Power Connect Chat Session Email



Press Releases

The Evaluation Team reviewed two press releases from the initial Program launch in CY 2015, one specifically for the media, and one from the Farmnews section of the Wisconsin Public Service Corporation website,[101] shown in Figure 115. Since there are no creative elements in press releases, the

[100] Power Connect Chat Sessions are quarterly call-in chat series features program updates, product eligibility, incentive requirements, case studies, maintenance tips, and expert advice from Energy Advisors.

[101] See press release here: www.wisconsinpublicservice.com/business/farmnews3.aspx?NewsID=1647

text must convey the Focus on Energy messages and look and feel. These press releases have an easily identifiable target audience, with the language in both being aimed at the specific group. This messaging is consistent with other Program materials, with the benefits clearly stated and specific programs listed in the Farmnews press release. However, these press releases could be improved: both have underwhelming next steps and an unmemorable take-away message, leaving the viewer unsure about what to do now that they are aware of the Program.

Figure 115. Press Release



Farmnews

nergy FOR TODAY'S E

Focus On Energy: New Program, Higher Incentives
(Farmnews - March 2015)

New in 2015, Focus on Energy is offering a program dedicated to agriculture, schools, and government (AgSG) customers. The AgSG program offers both custom and prescriptive incentives for energy efficiency projects. These incentives are available for upgrading existing equipment or implementing energy efficiency projects. Current equipment incentive opportunities for agriculture facilities are: lighting, irrigation systems, grain dryers, dairy refrigeration tune-ups, and dairy and livestock equipment upgrades.

focus on energy
Partnering with Wisconsin utilities

Throughout 2015, there will be bonuses awarded to all approved applications. Prescriptive applications can expect to receive a 10% bonus and custom projects can expect to receive the following energy savings bonuses: $125/peak kW, $0.06/kWh — a 50% bonus, and $0.80/Therm — a 100% bonus. Bonuses are added automatically with no extra paperwork required.

Energy Advisors are available throughout the state to better assist you in completing projects. To find your local Energy Advisor, visit focusonenergy.com/agsgea and select Find your Energy Advisor. You can also call an AgSG representative toll-free at 888-947-7828 who will connect you to your local Energy Advisor.

Anyone interested in learning more about the Agriculture program should listen in to an Agriculture Power Connect Chat Session. These call-in sessions are held quarterly at 9 a.m. on the following dates: March 19, June 25, September 24 and December 3. It's easy to join the conversation, just call 855-947-8255 at 9 a.m. and enter the passcode: 9276715#, then listen and ask questions!

This spring we will be launching our Dairy Refrigeration Tune-Up Campaign! Start saving energy and money by improving the energy efficiency of your refrigeration equipment. Focus on Energy offers incentives 50% of service cost, and up to a maximum of $150 per site address.

Be sure to stop by the Focus on Energy booth at the WPS Farm Show, booth A3503. Energy Advisors will be on hand to discuss opportunities and answer questions!

To view all of the Focus on Energy offering details, visit focusonenergy.com, or call 888-947-7828 to speak directly to an AgSG representative.

Radio Ads

Without the aid of visual elements, the four radio ads about the Program that ran in February and April 2015 did a good job of conveying the intended messages to customers. From beginning to end, these radio ads are clearly intended for Wisconsin farmers. The animal noises, farm-focused jokes, and talk about specific upgrades all help to ensure that farmers get the message. Given that the ads are only 30 seconds long, the messaging is successfully direct.

These radio ads help to increase awareness of the Program and encourage the listener to seek more information, either at the Wisconsin Public Service Farm Show (for the February ad) or the website (for the April ad). These are some of the better marketing materials reviewed, even without the aid of visual elements.

Figure 116. Radio Ad

Focus on Energy
Branding-Business
30s
Mid-West Family Broadcasting
04/11/2015
LD

(SFX Animal noises fades in)
(Upbeat Music fades in)

Female Voice 1	Are you looking to upgrade your farm equipment?
Female Voice 2	Focus on Energy provides cashback incentives for installing energy efficient equipment.
Female Voice 1	By installing energy efficient equipment, you could add thousands of dollars in profits to your bottom line year after year.
Female Voice 2	Expert Energy Advisors are available throughout the state to help guide you through potential energy saving projects.
Female Voice 1	And extra bonuses are available with no extra paperwork required! To learn how Focus on Energy can help improve your bottom line, visit us at focus on energy dot com.
Female Voice 2	Focus on Energy, Saving Energy & Money for Wisconsin Farms.

(SFX Animal noises fades out)
(Upbeat Music fades out)

Digital Ads

The Evaluation Team reviewed a set of digital ads of varying sizes and target customer groups. Visually, these ads do a good job of catching the viewer's attention. Images take up the bulk of the ads and are relevant to the target audience. A good example is the side banner ads, which have a large headline at the top to draw the target audience's attention, and a big image that ties to this target audience (see Figure 117).

Figure 117. Digital Ad



Some of the digital ads clearly outline the Program benefits (like the bonus incentives ad), while others do not outline the benefit at all. These ads also fall short of defining a call to action or next steps, being focused primarily on awareness and leaving viewers wondering what to do next. Additionally, some of the ads do not have the same look and feel as the rest of the Program materials, opening the possibility for confusion if viewed out of context.

Customer Messaging Preferences

To assist the Program Administrator in enhancing Focus on Energy messaging, the Evaluation Team asked all participants what three words came to mind when they heard Focus on Energy. Figure 118 shows that the most common words cited were savings, energy, and rebates.

Figure 118. Word Cloud

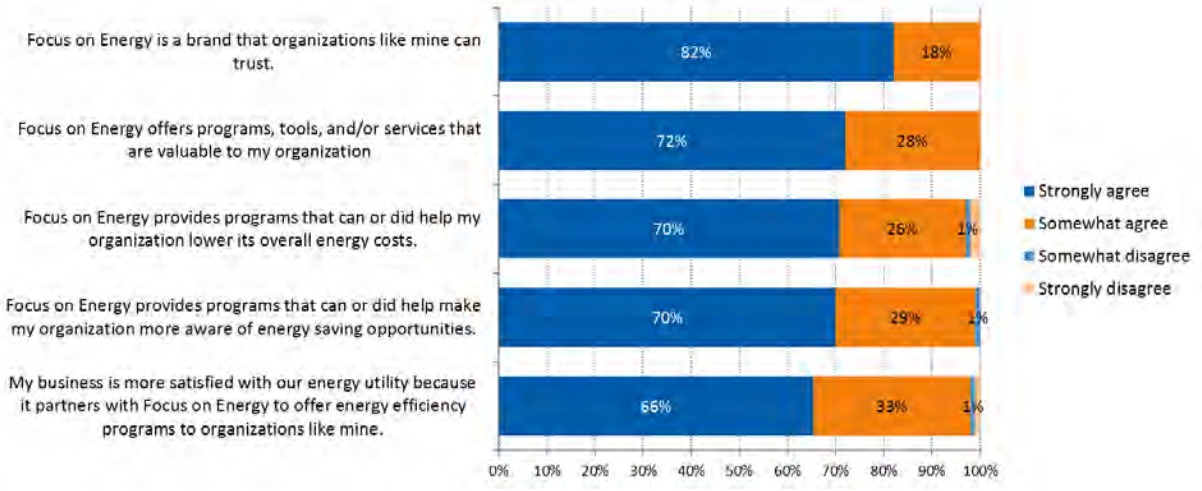


Source: CY 2016 Participant Survey Question B1. "What are the first three words that come to mind when you hear 'Focus on Energy'?" (n=142)

To explore participant satisfaction with Focus on Energy, the Evaluation Team asked participants to rate their agreement with a series of statements about the brand (Figure 119). Most respondents strongly agreed with all the statements. The statement with the highest percentage (82%) of *strongly agree* is "Focus on Energy is a brand that organizations like mine can trust." Schools and government participants were statistically more likely to *strongly agree* with each statement than agricultural participants, except that "Focus on Energy provides programs that can or did help make my organization more aware of energy savings opportunities," which was not rated differently between the two sectors.[102]

[102] This difference is statistically significant ($p < 0.05$ using a binomial t-test).

Figure 119. Agreement with Focus on Energy Claims



Source: CY 2016 Participant Survey Question B2. "Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with these statements." (n=140-141)

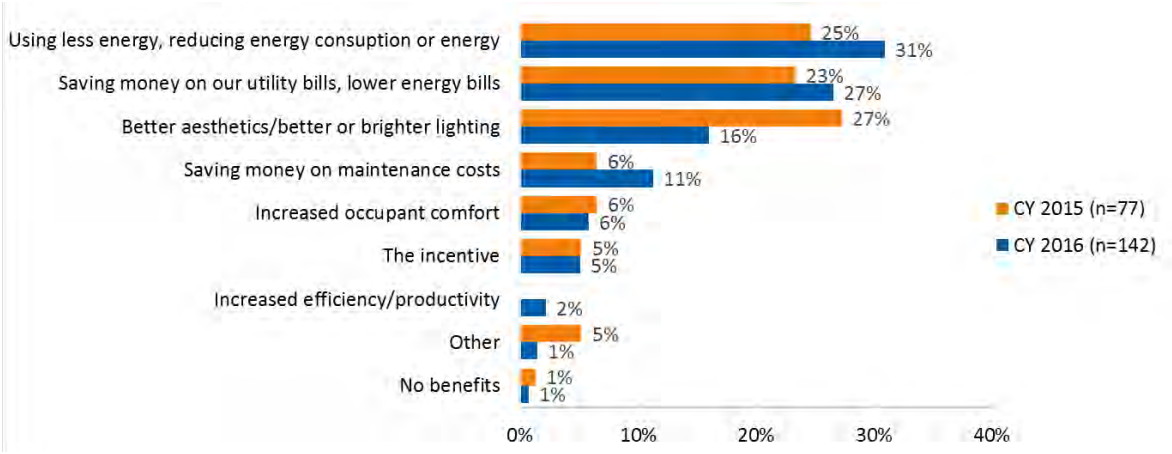
Customer Experience

Through surveys, participants most frequently said that the benefits of Program participation included using less energy (31%), saving money on energy bills (27%), and better aesthetics (e.g., brighter facilities, 16%; Figure 120). Six percent of respondents said that the upgrades they receive increase occupant comfort, which could mean a warmer or brighter building, or could indicate non-energy benefits: for example, one survey participant said they bought LED light fixtures to create a more welcome environment for special needs students, providing "comfort to kids with autism" and a dairy farmer said "cows are happier, meaning they make better milk and are healthier."

A statistically smaller proportion of CY 2016 respondents (16%) said that better aesthetics or brighter lighting is a Program benefit compared to CY 2015 respondents (27%).[103] Schools and government participants and agricultural customers reported similar benefits.

[103] This difference is statistically significant ($p < 0.05$ using a binomial t-test).

Figure 120. Perceived Benefits of Participation



Source: CY 2016 Participant Survey Question D1. "What would you say are the main benefits your organization has experienced as a result of the energy-efficiency upgrades we've discussed?" Multiple responses allowed (n=142)

Project Initiation and Application Process

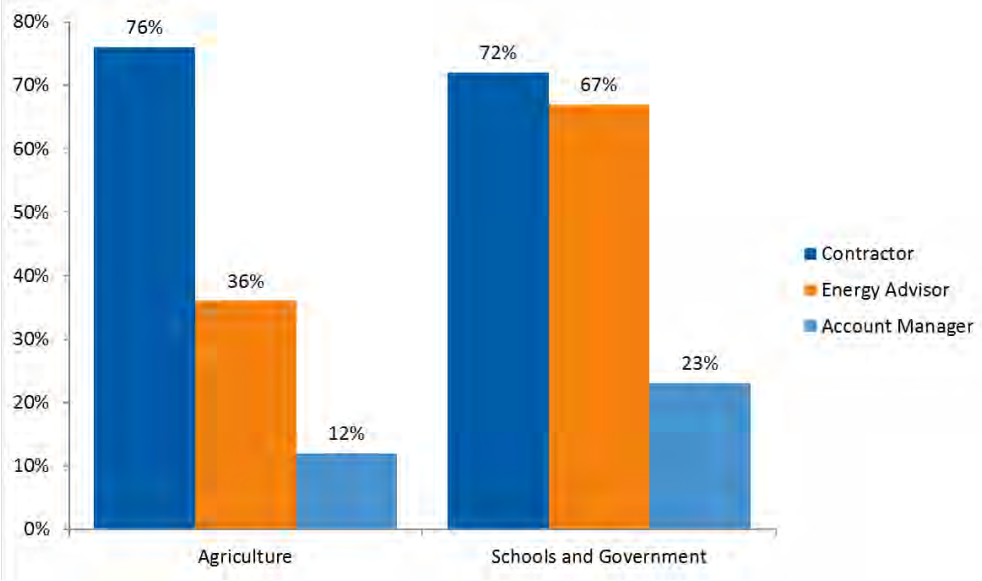
Projects in the Agriculture, Schools, and Government Program can be initiated by a Trade Ally, contractor, Energy Advisor, and/or utility account manager. The Evaluation Team asked a series of project initiation and application questions to understand how customers experienced the project initiation process. Most of the respondents in both sectors reported that their contractor was involved in initiating the project. Nearly one-third (30%, n=69) of schools and government participants and 22% of agricultural participants (n=72) said they had both a contractor and an Energy Advisor initiate their project. None of the respondents had only their utility account manager initiate the project. Ten percent of agricultural respondents and 14% of schools and government respondents said that all three stakeholders helped them initiate their projects.

Overall, respondents were statistically more likely to use an Energy Advisor in CY 2016 than in CY 2015 (at 51% overall compared to 25%, respectively).[104] Schools and government participants were statistically more likely than agricultural participants to involve an Energy Advisor in project initiation (67% compared to 36%, respectively; Figure 121).[105]

[104] This difference is statistically significant ($p < 0.05$ using a binomial t-test).

[105] This difference is statistically significant ($p < 0.01$ using a binomial t-test).

Figure 121. Program Stakeholders Involved in Initiating the Project



Source: CY 2016 Participant Survey Question A4. "Please tell me who, if anyone, was involved in helping you initiate your energy efficiency project." Multiple responses allowed (n=141)

Compared to CY 2015, there was no significant change in CY 2016 regarding who fills out the incentive application, and the sectors were also very similar in who filled out the applications.

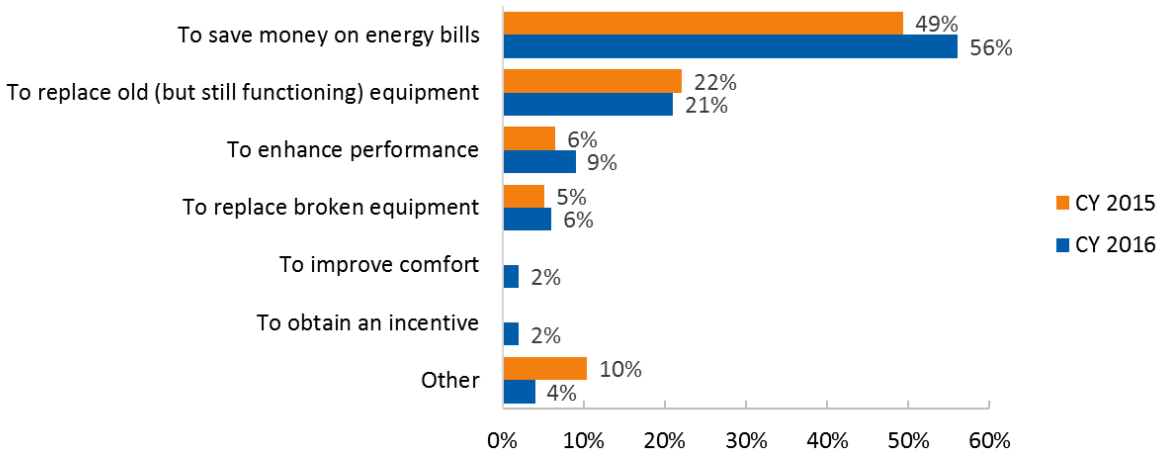
In CY 2015, the Evaluation Team interviewed Energy Advisors about their Program experience. Energy Advisors reported that customers found the incentive applications difficult to complete. In CY 2015, 23% of respondents (both sectors) found the application paperwork to be *somewhat challenging* (20%) or *very challenging* (3%). However, in CY 2016, nearly all customers who filled out their own applications (90%; n=60) rated the application paperwork as either *very easy* or *easy*. There was a statistically significant decrease in CY 2016 in respondents who reported that filling out the application was *somewhat challenging* (to 10%, from 20% in CY 2015).[106] This indicates that the efforts to streamline and simplify the Program application process were effective.

Decision Making

The Evaluation Team asked participants what factors influenced their decision to participate in the Program. The majority (56%; Figure 122) said they participated to save money on their energy bills, followed by 21% who participated to upgrade old equipment that was still functioning. There were no significant differences between sectors or from CY 2015 or CY 2016.

[106] This difference between years is statistically significant ($p < 0.05$ using a binomial t-test).

Figure 122. Influences on Decision Making



Source: CY 2016 Participant Survey Question C1. "What factor was most important to your organization's decision to make the energy-efficient upgrades for which you received an incentive?" (n=140)

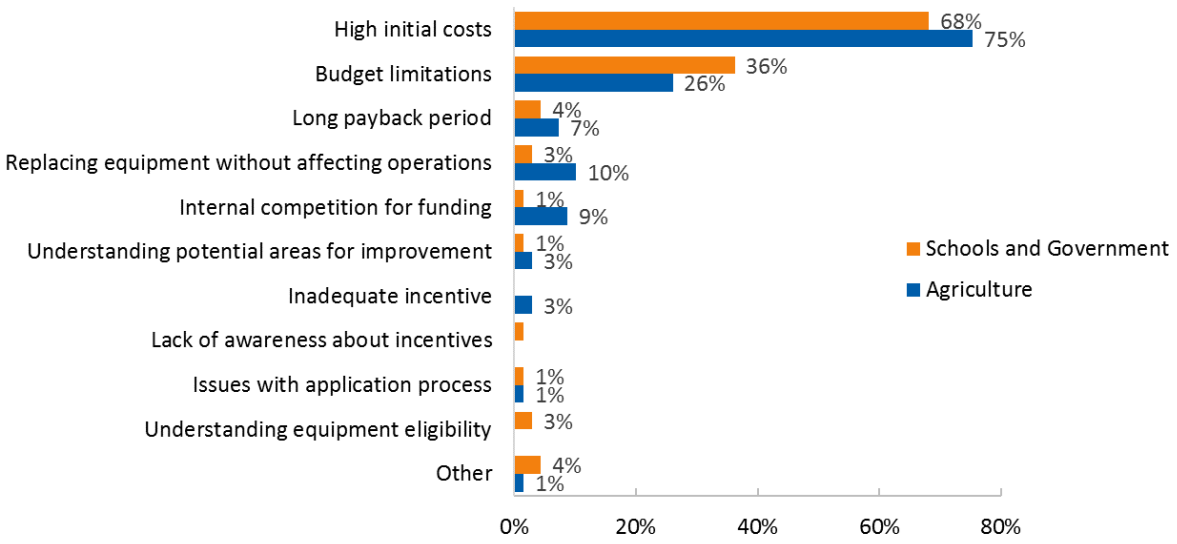
Barriers to Participation

To improve the Program approachability and identify actions the Program Administrator can take to make participation easier, the Evaluation Team asked participants about challenges they experienced when deciding to participate in the Program (Figure 123). Almost three quarters of respondents across both sectors said a challenge is the high initial cost of upgrading equipment (72%). Overall, 31% said that they did not have the budget to make energy-efficiency upgrades, with schools and government participants being statistically more likely than agricultural participants to cite budget limitations as the biggest challenge (36% compared to 26%, respectively).[107] Agricultural participants were significantly more likely than schools and government participants to say that internal competition for funding and making upgrades without disrupting operations were among the biggest challenges to participation.[108]

[107] This difference is statistically significant ($p < 0.05$ using a binomial t-test).

[108] This difference is statistically significant ($p < 0.01$ using a binomial t-test).

Figure 123. Biggest Challenges to Participation



Source: CY 2016 Participant Survey Question D2. "What do so see as the biggest challenges to making energy-efficient improvements inside your organization?" Multiple responses allowed (n=138)

After identifying the challenges faced by participants to making energy-efficient upgrades, the Evaluation Team asked what Focus on Energy could do to help participants overcome those challenges. Most respondents suggested higher incentives (65%, n=121) or providing upfront rewards or instant discounts from their contractors (40%).

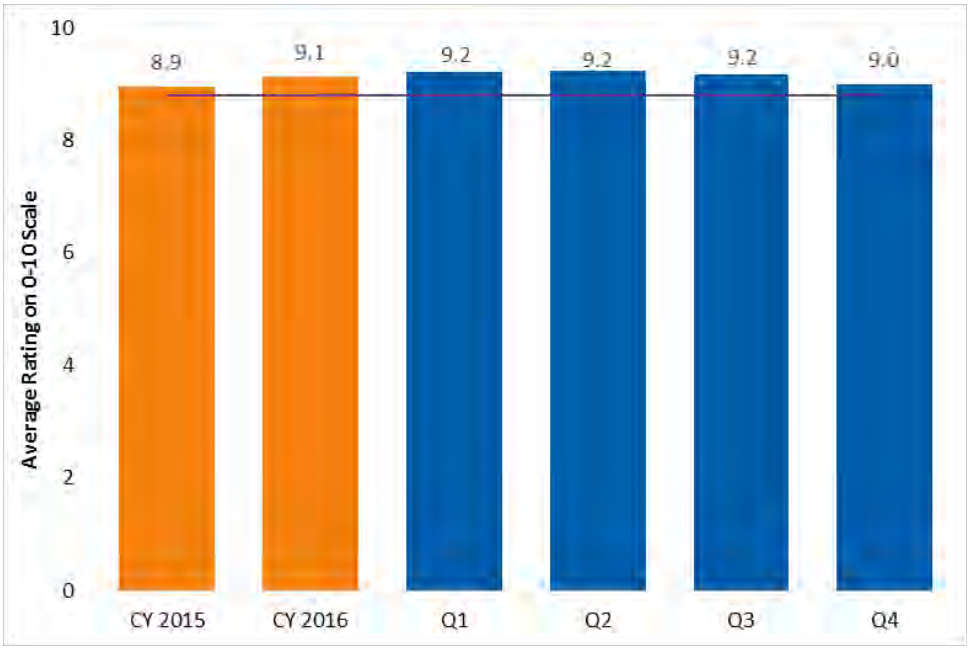
Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2016, the Program Administrator and Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Program.[109] Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 the lowest.

[109] The Evaluation Team found that some surveys did not include identifying information that would allow it to match survey responses to Program participation dates. The Team included survey responses without participation dates in the year-end total but not in the quarterly breakdown.

As shown in Figure 124, the average overall Program satisfaction rating among CY 2016 participants was 9.1, which was statistically higher than both the portfolio baseline[110] (8.8) and the average Program rating for CY 2015 (8.9).[111] The Program's satisfaction rating was statistically higher than the baseline for the first three quarters of CY 2016, then in Q4 it was consistent with the baseline (indicated by the purple line).[112]

Figure 124. CY 2016 Overall Program Satisfaction



Source: Agriculture, Schools, and Government Program Ongoing Participant Satisfaction Survey Question: "Overall, how satisfied are you with the program?" (CY 2015 n=323, CY 2016 n=471, Q1 n=102, Q2 n=90, Q3 n=72, Q4 n=178). The portfolio baseline (8.8) is indicated by a purple line.

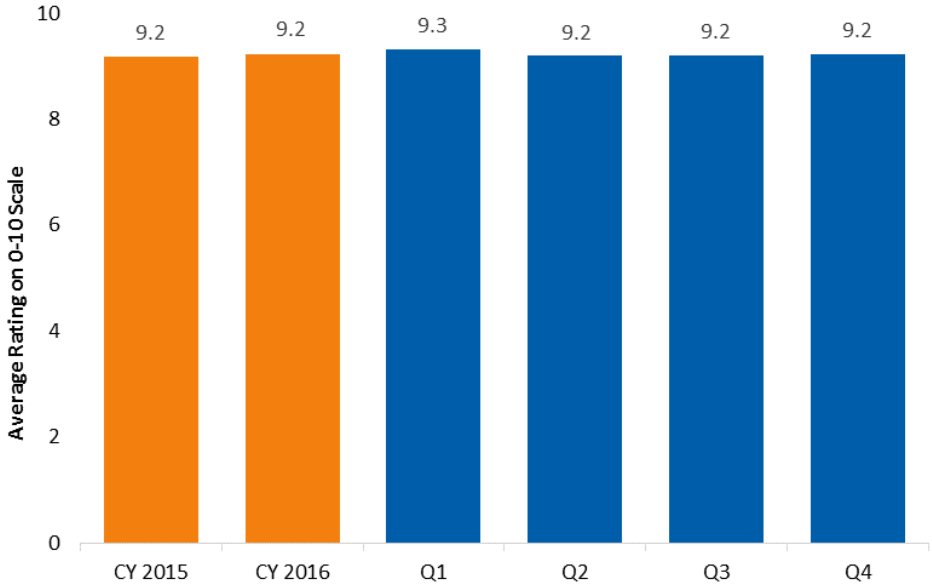
As shown in Figure 125, on average, respondents rated their satisfaction with the upgrades they received through the Program as a 9.2: this is the same as the average rating in CY 2015. The average rating was very stable throughout CY 2016, with no significant differences between quarters or years.

[110] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015-2018 quadrennium).

[111] CY 2016 was above the baseline at $p < 0.05$, and was higher than CY 2015 at $p < 0.10$, using binomial t-tests.

[112] $p < 0.05$ using binomial t-tests.

Figure 125. CY 2016 Satisfaction with Program Upgrades

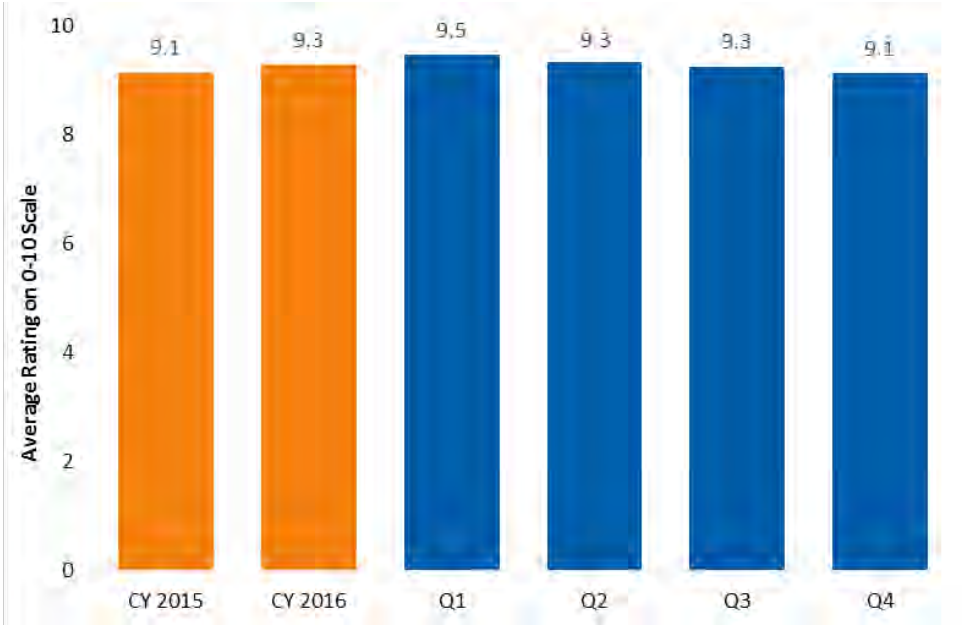


Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient upgrades you received?" (CY 2015 n=302, CY 2016 n=447, Q1 n=98, Q2 n=86, Q3 n=69, Q4 n=169)

Participants gave the Focus on Energy staff who assisted them an average satisfaction rating of 9.3 for CY 2016 (Figure 126). This increase from the average rating of 9.1 in CY 2015 was not statistically significant, though average ratings during Q1 (9.5) were significantly higher than the previous year.[113]

[113] $p < 0.10$ using binomial t-test.

Figure 126. CY 2016 Satisfaction with Focus on Energy Staff

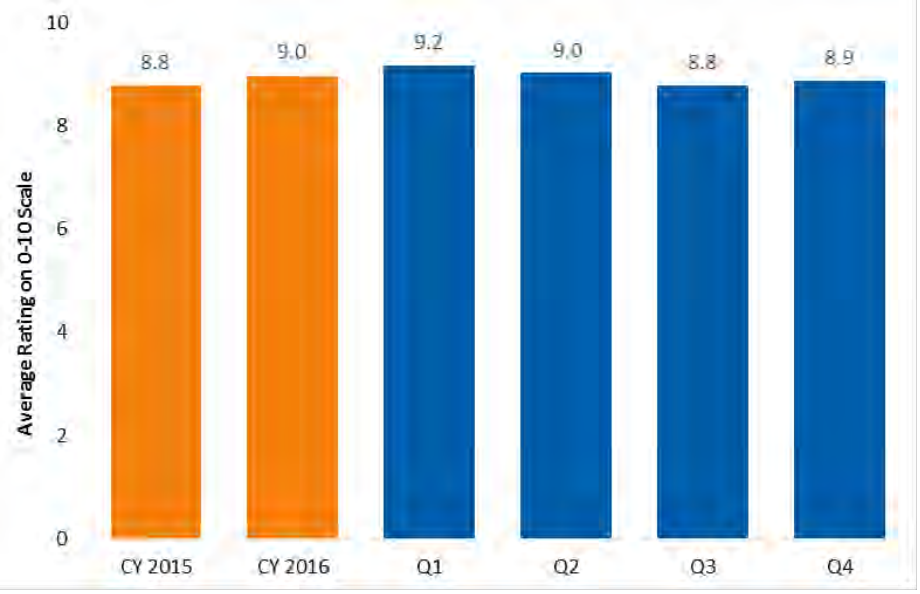


Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the Focus on Energy staff who assisted you?" (CY 2015 n=296, CY 2016 n=380, Q1 n=77, Q2 n=73, Q3 n=56, Q4 n=148)

Respondents gave an average rating of 9.0 for their satisfaction with the contractor who provided services for them (Figure 127). Although the increase from the average CY 2015 rating (8.8) was not statistically significant, during Q1 the average rating was significantly above CY 2015.[114]

[114] $p < 0.05$ using binomial t-test.

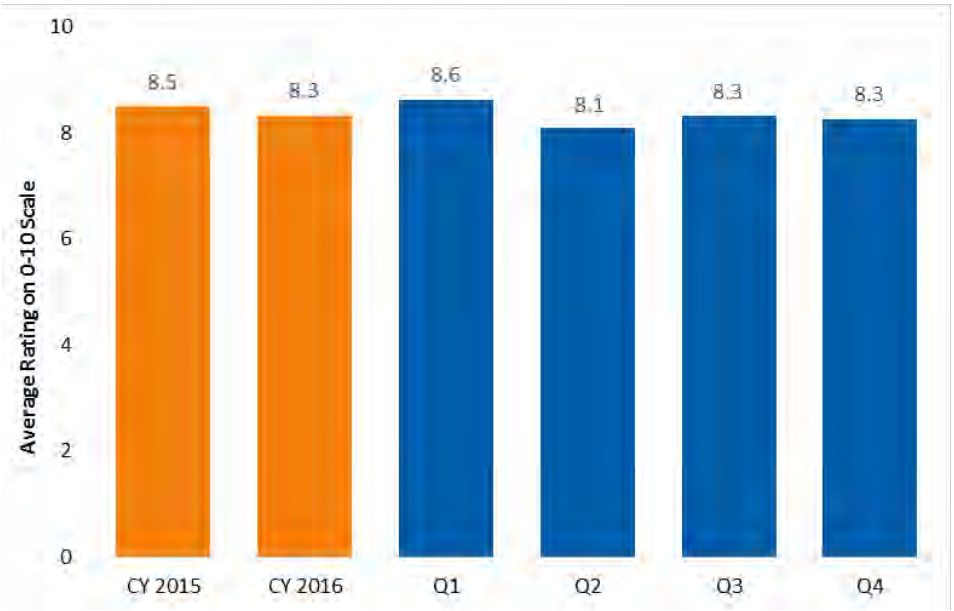
Figure 127. CY 2016 Satisfaction with Program Contractors



Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the contractor who provided the service?" (CY 2015 n=293, CY 2016 n=421, Q1 n=92, Q2 n=85, Q3 n=64, Q4 n=157)

Respondents gave an average rating of 8.3 for their satisfaction with the incentive they received (Figure 128). Though lower than the average rating of 8.5 in CY 2015, there were no statistically significant differences between quarters or years.

Figure 128. CY 2016 Satisfaction with Program Incentives

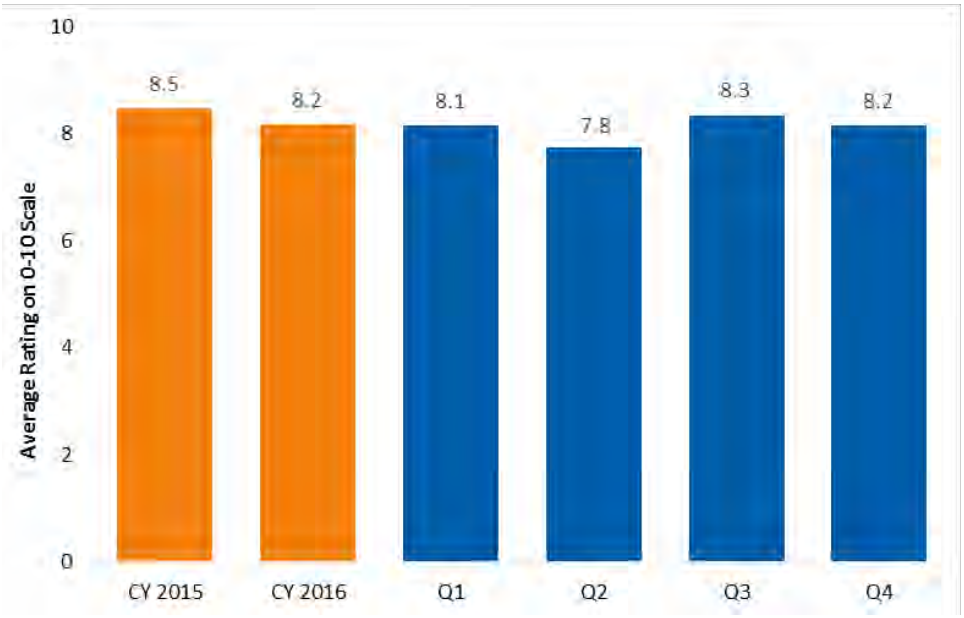


Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the amount of incentive you received?" (CY 2015 n=322, CY 2016 n=464, Q1 n=99, Q2 n=89, Q3 n=72, Q4 n=175)

As shown in Figure 129, respondents gave an average rating of 8.2 for the likelihood that they will initiate another energy-efficiency project in the next 12 months. These ratings were lower than in CY 2015 to a statistically significant degree, in particular during Q2.[115]

[115] CY 2016 was lower than CY 2015 at $p < 0.10$, and Q1 was lower than CY 2015 at $p < 0.05$, using binomial t-tests.

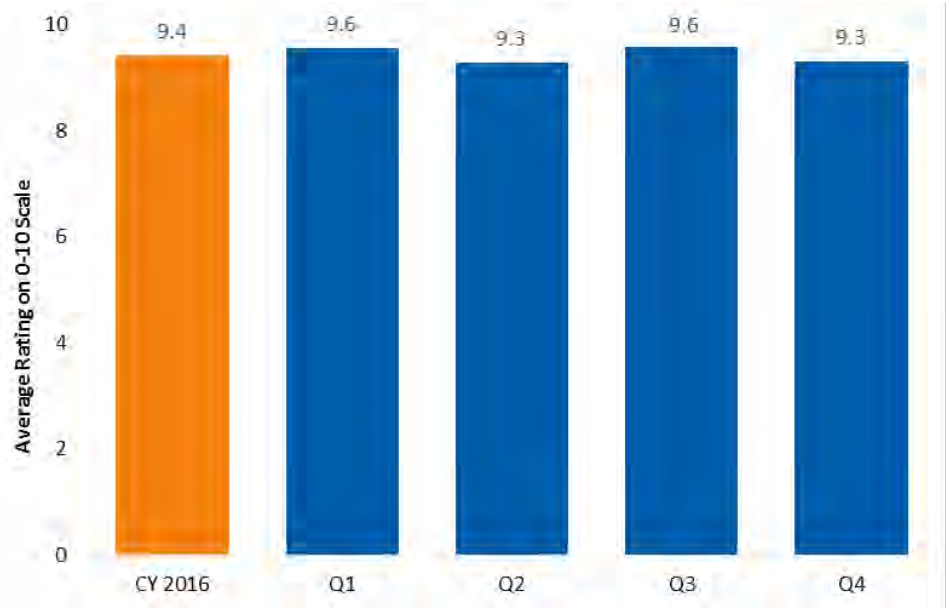
Figure 129. CY 2016 Likelihood of Initiating Energy-Efficiency Improvement



Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "How likely are you to initiate another energy-efficiency improvement in the next 12 months?" (CY 2015 n=286, CY 2016 n=430, Q1 n=87, Q2 n=84, Q3 n=66, Q4 n=164)

Figure 130Figure 41 shows that respondents' rating for likelihood they would recommend this Program to others was 9.4. Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and the percentage of detractors (respondents giving a rating of 0 to 6). The Agriculture, Schools and Government Program NPS is +81, based on 85% of participants identifying as promoters and 4% identifying as detractors.

Figure 130. CY 2016 Likelihood of Recommending the Program

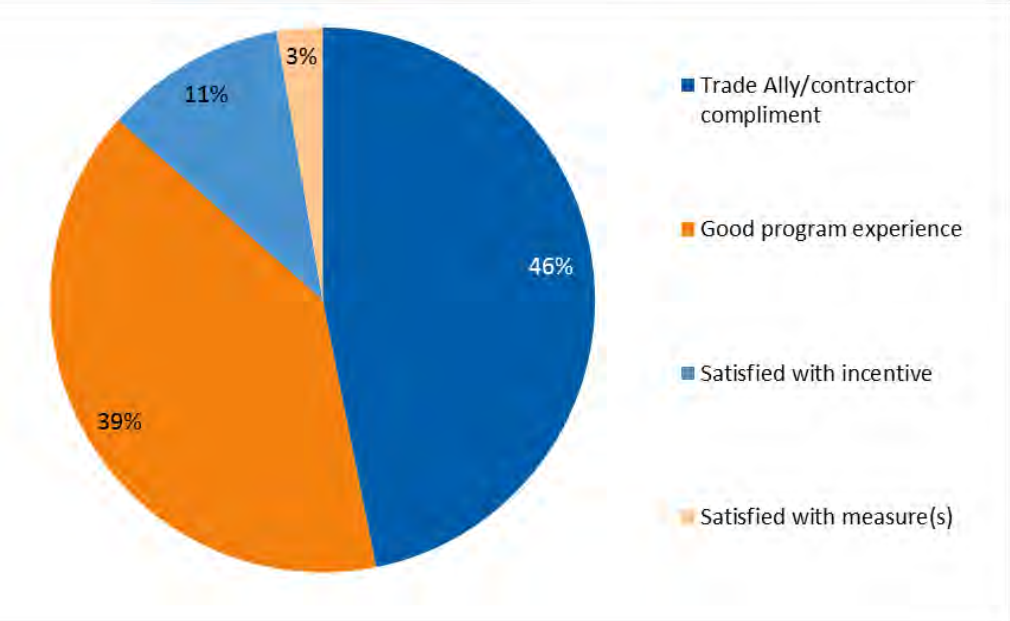


Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey
Question: "How likely is it that you would recommend this program to others?" (CY 2016 n=459, Q1 n=95, Q2 n=87, Q3 n=71, Q4 n=177)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 473 participants who responded to the survey, 135 (29%) provided open-ended feedback, which the Evaluation Team coded into a total of 156 mentions. Of these mentions, 113 were positive or complimentary comments (72%), and 43 were suggestions for improvement (28%). This represents an increase in positive comments from 59% in CY 2015.

Respondents' positive comments are shown in Figure 131. Nearly half of the 113 comments were complimentary of the Program staff and contractors (46%), and more than one-third (39%) reflect sentiments of a positive experience. These were also the two most common types of positive comments in CY 2015, mentioned at nearly identical rates.

Figure 131. CY 2016 Positive Comments About the Program

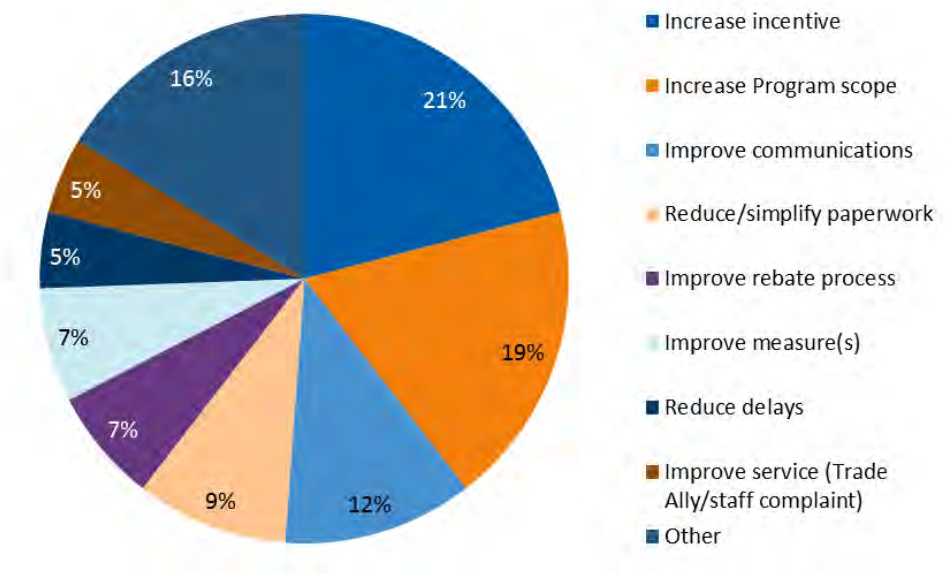


Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total positive mentions: CY 2016 n=113)

Respondents' suggestions for improvement are shown in Figure 132. The most common suggestions regard increasing incentives (21%) and expanding the Program scope (19%). The increase in the rate of suggestions about incentive levels corresponds to a statistically insignificant drop in satisfaction ratings with the incentive level in CY 2016.

Specific suggestions about scope referred to overly stringent qualifications about which model types were included for certain equipment (notably different types of LEDs), having inefficient equipment that do not have a program replacement model, and adding efficient equipment fueled by liquefied petroleum gas. In CY 2015, the top suggestions were improving communications (23%) and simplifying paperwork (20%), which were mentioned less frequently in CY 2016 (at 12% and 9%, respectively).

Figure 132. CY 2016 Suggestions for Improving the Program



Source: Agriculture, Schools and Government Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions: CY 2016 n=43)

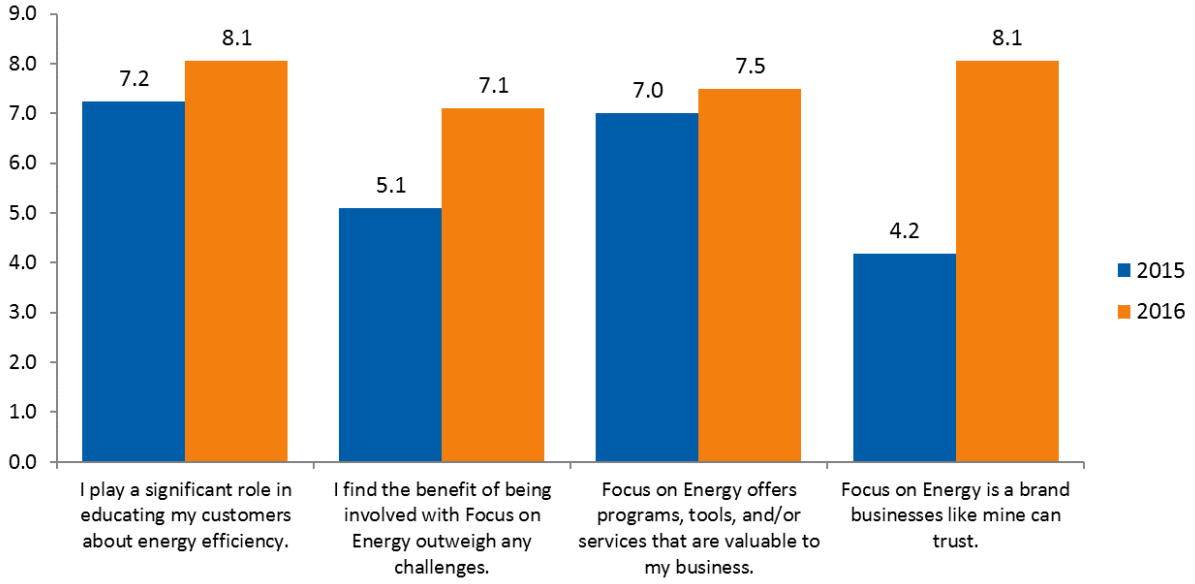
Trade Ally Experience

The Evaluation Team surveyed 18 registered Trade Allies who participated in the Agriculture, Schools, and Government Program. These Trade Allies provided information on their marketing decisions, their engagement with the Program, their satisfaction, and their experience with the incentive applications.

In terms of overall satisfaction, the Trade Allies gave an average rating of 7.6 on a scale from 0 to 10, where 0 is *not at all satisfied* and a 10 is *extremely satisfied*.

The Evaluation Team also asked the Trade Allies to rate their agreement with phrases about Focus on Energy and their relationship with their customers on a scale from 0 to 10, where 0 is *strongly disagree* and 10 is *strongly agree.* Overall, the Trade Allies had high levels of agreement with these phrases (see Figure 133).

Figure 133. Trade Ally Agreement with Phrases About Focus on Energy

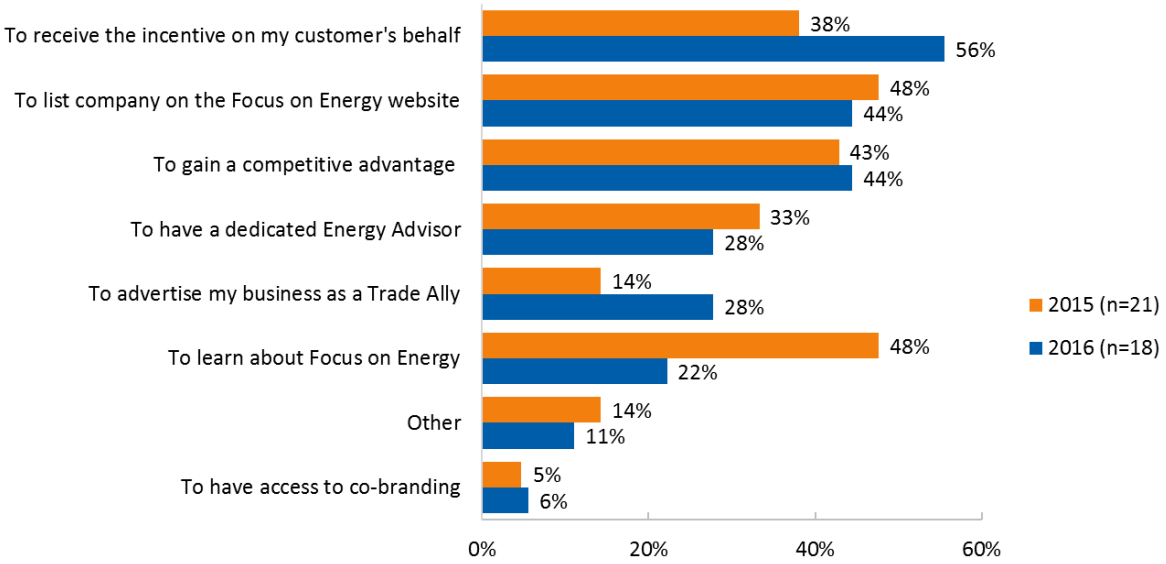


Source: CY 2016 Trade Ally Survey Question B6. "On a 10-point scale, where 0 means *strongly disagree* and 10 means *strongly agree*, please select your level of agreement with the following statements." (n=18)

Although the Program Implementer reached out to 149 Trade Allies in CY 2016, only three of the 18 survey respondents attended a training. One rated the training they attended as a 0 out of 10 on its usefulness, and the other two gave ratings of 7 and 8. The respondent who gave the 0 out of 10 said that the trainings are "never very educational as they always say to 'contact your Energy Advisor'."

The Evaluation Team asked Trade Allies why they participated in the Program. The most common response was that they wanted to receive an incentive on their customer's behalf (10 of 18; see Figure 134). Other common responses were to gain a competitive advantage (eight of 18) or to get their company listed on the Focus on Energy website (eight of 18). Only one Trade Ally chose to participate to access the co-branding.

Figure 134. Reasons Trade Ally Chose to Participate

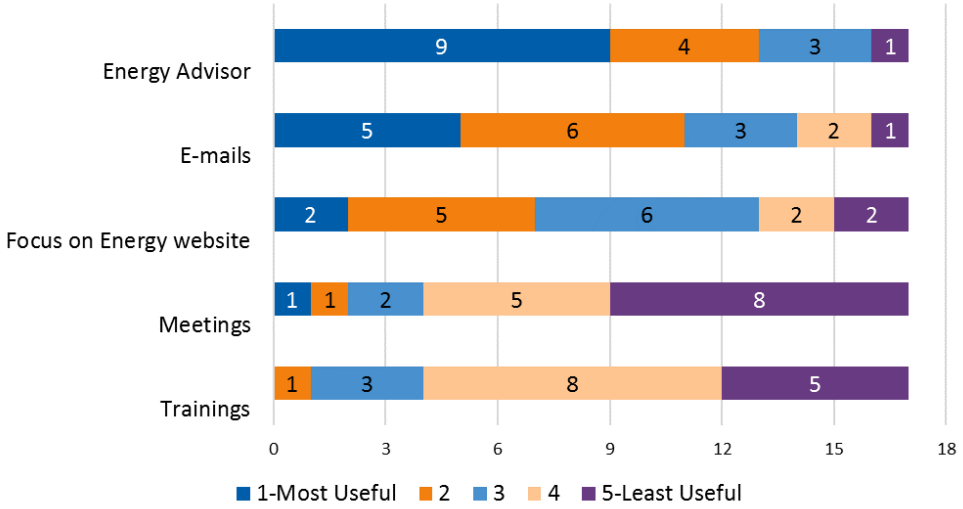


Source: CY 2016 Trade Ally Survey Question C1. "What are the reasons that your company chose to enroll in Focus on Energy's Trade Ally Network?" Multiple responses allowed (n=18)

The Evaluation Team asked the Trade Allies about their preferred source for staying informed about Focus on Energy programs and about the Trade Ally Network. Seven of the 18 respondents prefer email communication, six prefer to hear from their Energy Advisor, and five prefer to access the Focus on Energy website.

Although only six prefer to hear about Focus on Energy programs and the Trade Ally Network from their Energy Advisor, when asked to rate five sources of information from most useful to least useful, almost all Trade Allies (16 of 17) considered the Energy Advisors to be one of the top three useful sources of information (Figure 135). This compares to 14 of 17 who considered email to be one of the top three useful sources of information. The Trade Allies rated meetings and trainings as the two least useful ways to learn about and stay up to date on Focus on Energy programs and the Trade Ally Network.

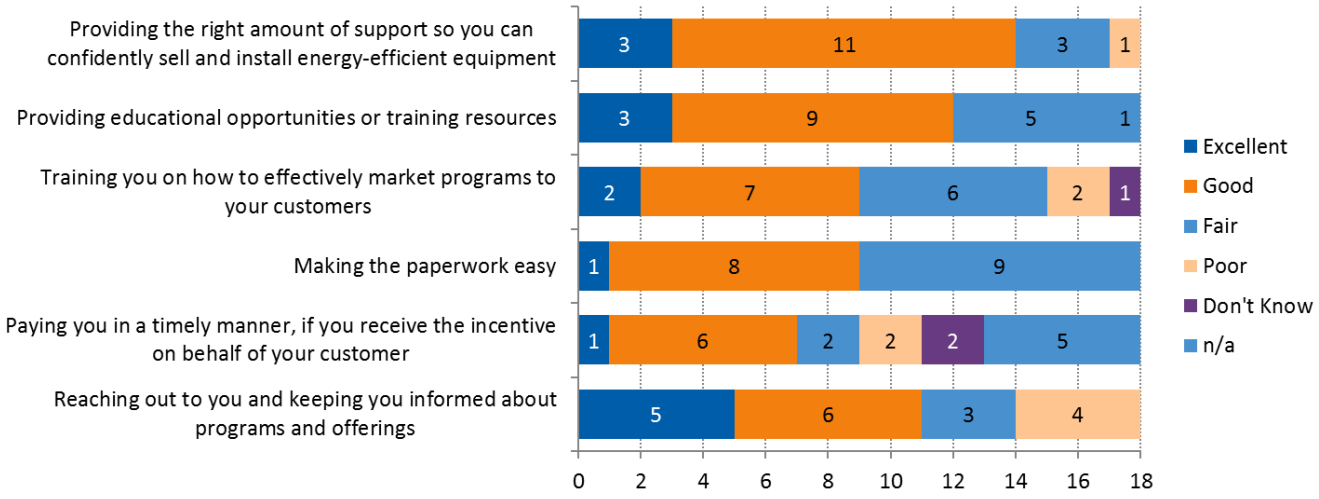
Figure 135. Usefulness of Program Information Sources



Source: CY 2016 Trade Ally Survey Question C3. "Please rank the following communication options from most useful to least useful." (n=17)

Trade Allies also rated Focus on Energy on how well they provide different types of support including training, Program information, and education. Overall, most Trade Allies gave Focus on Energy *excellent* or *good* ratings on how well they support Trade Allies (14 of 18; Figure 136). While half of the Trade Allies rated the simplicity of Focus on Energy's paperwork as just *fair* (rather than *excellent* or *good*), no one gave it a *poor* rating.

Figure 136. Trade Ally Perceptions on Focus on Energy Support



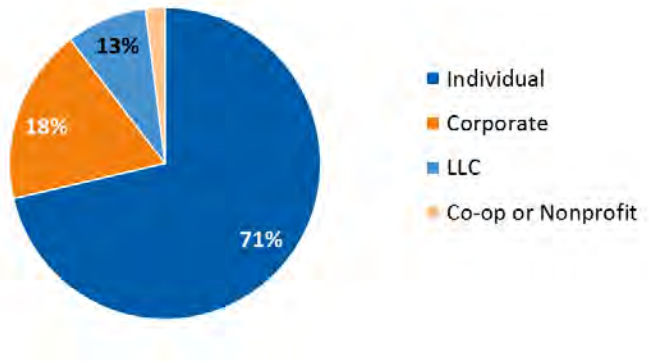
Source: CY 2016 Trade Ally Survey Question F1. "How is Focus on Energy doing when it comes to the following." (n=18)

Participant Demographics

Through the Agriculture, Schools, and Government Program, Focus on Energy provides services to a diverse set of farms, educational organizations, and institutional buildings. The incentive structure for government buildings and schools follows the structure for incentives offered in other nonresidential buildings, but the agricultural sector has more specific needs and the incentives need to be tailored to Wisconsin farmers and farm types.

The Evaluation Team asked the agricultural Program respondents a few demographic questions about their farms. Out of the 72 agricultural respondents, almost two-thirds (71%) consider their farm as individually run, while 18% run a corporate farm, 8% run an LLC, and 2% run a co-op or nonprofit.

Figure 137. Type of Farm



Source: CY 2016 Participant Survey Question J1. "How would you describe the type of farm or agriculture facility you run?" (n=72)

The Evaluation Team asked agricultural participants if they own or lease their farm. In CY 2015, 99% said they own their facilities, compared to 93% in CY 2016. Most (67%) of the agricultural facilities employ between two and 10 people. The majority of schools and government participants (56%) reported having between 11 and 100 employees (median reported value of 50).

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 189 lists the incentive costs for the CY 2015 and CY 2016 Agriculture, Schools and Government Program.

Table 189. Agriculture, Schools and Government Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$6,373,340	$5,656,868

The Evaluation Team found the CY 2016 Program was cost-effective (2.47). Table 190 lists the evaluated costs and benefits.

Table 190. Agriculture, Schools and Government Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$776,604	$762,602
Delivery Costs	$3,171,197	$3,114,023
Incremental Measure Costs	$27,047,432	$28,464,405
Total Non-Incentive Costs	**$30,995,232**	**$32,341,030**
Benefits		
Electric Benefits	$42,529,151	$49,956,749
Gas Benefits	$23,737,403	$47,207,282
Emissions Benefits	$10,146,612	$14,442,289
Total TRC Benefits	**$76,413,166**	**$111,606,319**
Net TRC Benefits	**$45,417,934**	**$79,265,289**
TRC B/C Ratio	**2.47**	**3.45**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1: Overall, the Program marketing strategy is focused on agricultural customers, with a successful outreach plan to increase the number of agricultural customers.

Recommendation 1: To continue to grow the customer base, perform broad outreach and identify ways to keep customers interested. The Program can benefit from a few marketing strategy improvements:

- **Continue to focus on Trade Allies, but do not forget other outreach methods**: Trade Allies are a key source of assistance for agricultural customers due to the trust that has been created in that relationship. However, putting too much emphasis on one group and foregoing other efforts can lead to increased risk if Trade Allies are unsuccessful. In CY 2017, continue to include direct mail and other outreach efforts focused on awareness.
- **Create different bonus schemes for participants:** Since many farmers conduct multiple projects at the same time, consider providing an incentive for signing up for multiple projects at once. Additionally, consider offering a referral bonus to help with awareness: this would come from another key trusted network, the farmers' peers. Both of these bonus schemes can be applied to the schools and government sector as well.
- **Consider limited-time offers:** Limited-time offers can help to raise the urgency and encourage someone to sign an agreement. These could take the form of small bonuses on savings or incentives on certain types of projects. Successful limited-time offers have an additional incentive above the normal incentive, target only one program at a time, and have a long

enough timeframe for customers to learn about it, apply, and receive the incentive. Limited-time offers rely on direct customer communication channels as much as possible. If Focus on Energy chooses to use Program Trade Allies to communicate the limited-time offer, consider hosting a competition to see who can generate the most sign ups. The success of these limited-time offers can be measured by comparing the numbers of sign ups during the limited-time offer to the number of sign ups during a baseline period without the limited-time offer.

Outcome 2. The Program marketing materials are easy to read and effectively target agricultural customers.

Focus on Energy adjusted the CY 2016 Program marketing strategy and materials to increase agricultural customer participation. Specifically, the marketing materials are heavily focused on the agricultural customer to Trade Ally relationship. Focus on Energy also targeted other relationships, such as farmer peer networks, as demonstrated by the Program's attendance at farm technology days and the utility farm show. The materials review demonstrated some inconsistency in the Program's call to actions, with some documents being very clear about next steps and others lacking important information such as a call to action or an explanation of benefits, or are not simple enough to understand.

Recommendation 2: To improve the marketing materials and ensure that they are reaching the target audience and provide clear next steps to encourage participation, Focus on Energy can implement the following materials recommendations:

- **Ensure that a strong call to action and next steps are prominent in all materials:** Some materials are great at telling the reader what to do next and why, but not all of the materials are as clear. Best practice is for every piece of marketing material to have a strong call to action up front, giving the reader a reason behind the program advertised. Best practice is also for the document to have a clear set of next steps listed at the end in order to act on that reason.
- **Clearly outline Program benefits:** Clearly state the Program benefits to capture the readers' attention early and give them a reason to care and take the next step. Make sure that the connection between energy-efficiency upgrades and incentives is clear in all relevant materials.
- **Expand the use of simplistic terms and material designs:** One of the main barriers to program participation in CY 2015 was confusion around the Program and application process. Make the marketing materials simple: this is an important first step to not lose the customers' attention. The Evaluation Team's material-specific recommendations are included in Table 191.

Table 191. Marketing Materials Recommendations

Cluster	Recommended Improvements
Program Overview Documents	• Summary of Services document: ▪ Create a hierarchy of the prescriptive incentive lists to make it easier to quickly scan and read. ▪ Put a small box on page 2 with a guide to the different sections of prescriptive incentives (e.g., Lighting page 5, Greenhouse page 11). ▪ Ensure that the placement of images is consistent across pages 3 through 12 (the current version has multiple images on pages 4 through 7 and no images on pages 8 through 12). • Catalogue Guide: ▪ Add a box with overall Program benefits information such as saving money and getting incentives.
Flyers	• Ensure that clear and easy next steps are present on all documents, telling the viewer where they should go to take action (e.g., phone number, website). • Make the call to action more prominent by making it a call-out box instead of being inside the body of the text (most of the current flyers have this included as the first line of the paragraph). • Call-out "energy savings" in the title of every flyer to clarify the subject at a glance.
Mailers	• Provide convincing information on the Trade Ally Co-Branding Opportunity mailer to ensure that prospective Trade Allies know why they should care about co-branding and how this benefits them. • Make the information about co-branding more prominent. In its current form, the requirements and restrictions catch the reader's eye first, before an explanation of how the co-branding offer works. • Ensure that elements are grouped into logical parts of the mailer so it is easy for the reader to follow.
Emails	• Add visual elements that complement other branding efforts, such as images in circles using the same color palette as other materials. • Ensure that facility upgrade emails clearly identify Program details and benefits so the reader knows why they should think about making energy-efficiency upgrades now. • Create a better call to action and next steps for the facility upgrade emails so readers are motivated to make energy-efficiency upgrades. • Add a button on the Power Connect Chat Session emails so readers can add a meeting to their calendar.
Press Releases	• Create clear next steps for the reader (e.g., where should they go, what should they do). • Improve the take-away message to make it more memorable.
Radio Ads	• Explore the possibility of offering additional radio ads.
Digital Ads	• Ensure that benefits to the viewer are outlined in the ads and that the success of the ad is not reliant on the reader simply clicking it. Add a phone number or a "Click Here" option to help ensure that the Program benefits are clear. • Keep the branding and look and feel consistent across all ads, regardless of where they are placed. • Make the connection between energy-efficiency upgrades and the available incentives more prevalent.

Outcome 3. Energy Advisors are useful for schools and government participants, while agricultural participants lean more on contractors and Trade Allies for their information and project needs.

The largest majority of schools and government participants (42%) learned about the Program from Energy Advisors and consider them to be trusted sources of information. Compared to CY 2015, participants were more likely to use the Energy Advisors in CY 2016 (at 51% versus 25% in CY 2015), but the difference is accounted for entirely by schools and government participants. Schools and government participants were much more likely to use the Energy Advisors to initiate their projects than agricultural participants (67% compared to 36%). The schools and government participants also had higher agreement with positive statements about Focus on Energy being a useful and trusted brand. Agricultural customers consider contractors to be a trusted source of information (57%), and they trust their own experts (10%).

During the interview, the Program Implementer implied that the Program is working diligently to gain trust with agricultural organizations by attending utility farm shows to reach more agricultural customers and increase trust.

Outcome 4. The Program reached a new level of maturity in CY 2016, with fewer reported application process issues and a more rigorous QC process decreasing the need for applications to be sent back to customers and Trade Allies to fix errors.

The Program Administrator focused on decreasing application errors in three ways for CY 2016. First, it redesigned the incentive catalog to have one application for all programs instead of different applications for each program. Fewer customers said that they found the application difficult to fill out (a decrease from 21% in CY 2015 to 10% in CY 2016). Second, the Program Administrator issued two KPIs to decrease errors. The application error rate decreased from about 5% in CY 2015 to a little over 1% in CY 2016 following a rigorous internal QC process from the Program Implementer, then a thorough review from the Program Administrator. The Program Implementer took even more steps to decrease application errors by reaching out to 149 Trade Allies to provide guidance. Third, in addition to streamlining the application process and decreasing application errors, the Program Administrator demonstrated that they understand their customer base by focusing more on Trade Allies, which the agricultural participants prefer.

Outcome 5. Measures that were not supported by current approved workpapers drove the deviation of evaluated savings from expected (*ex ante*) values.

The Wisconsin TRM is made of workpapers that have been reviewed and accepted by stakeholders. There are also several accepted workpapers not included in the TRM but that are still used to support SPECTRUM savings values. Finally, many measures in SPECTRUM are not supported by the current TRM or current accepted workpapers, but rather are based on old, outdated workpapers or other substandard documentation. These active measures with insufficient documentation are a major source of deviation from expected savings values, since the Evaluation Team must rely on other algorithms, input parameters, and sources.

Recommendation 5. Increase the measure management process rigor to mitigate the effects of old or insufficient documentation on current program savings. Consider employing sunset dates on all measures to restrict how long a measure savings value can persist in the SPECTRUM database. Also consider creating an opt-in process, in which only those measures with a current, approved methodology are listed for use in the current program year database.

Business Incentive Program

Through the Business Incentive Program, launched in 2012, Focus on Energy offers prescriptive and custom incentives for installation of energy efficiency measures to customers in the commercial and industrial sectors. Customers with an average monthly demand of 1,000 kW or less and who are not eligible for the Agriculture, Schools and Government, or Chain Stores and Franchises Programs[116] may participate in the Business Incentive Program.[117] The Program Implementer (Franklin Energy) oversees Program management and delivery. The Program Implementer primarily relies on Trade Allies to promote and deliver the Program to customers, with support from the Energy Advisors and the Program Administrator (CB&I).

The program performed well relative to its electric energy goals, but fell short of electric demand and natural gas energy savings goals. Freeridership was an issue for the program this year, as a 44% net-to-gross ratio is below normal standards and last year's 64% mark. Realization rates were relatively high (between 96% and 101%, across various parameters), and the Evaluation Team found the majority of sampled program measures to be aligned between claimed and evaluated savings values.

Table 192 lists the actual Program spending, savings, participation, and cost-effectiveness.

Table 192. Business Incentive Program Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$5,823,243	$6,943,989
Participation	Number of Participants	2,298	2,601
Verified Gross Lifecycle Savings	kWh	1,350,299,389	1,319,996,781
	kW	13,003	15,432
	therms	26,560,534	73,006,605
Verified Gross Lifecycle Realization Rate	MMBtu	97%	127%
Annual NTG Ratio	MMBtu	44%	64%
Net Annual Savings	kWh	40,868,245	65,591,587
	kW	5,721	9,876
	therms	920,671	5,216,163
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.25	3.61

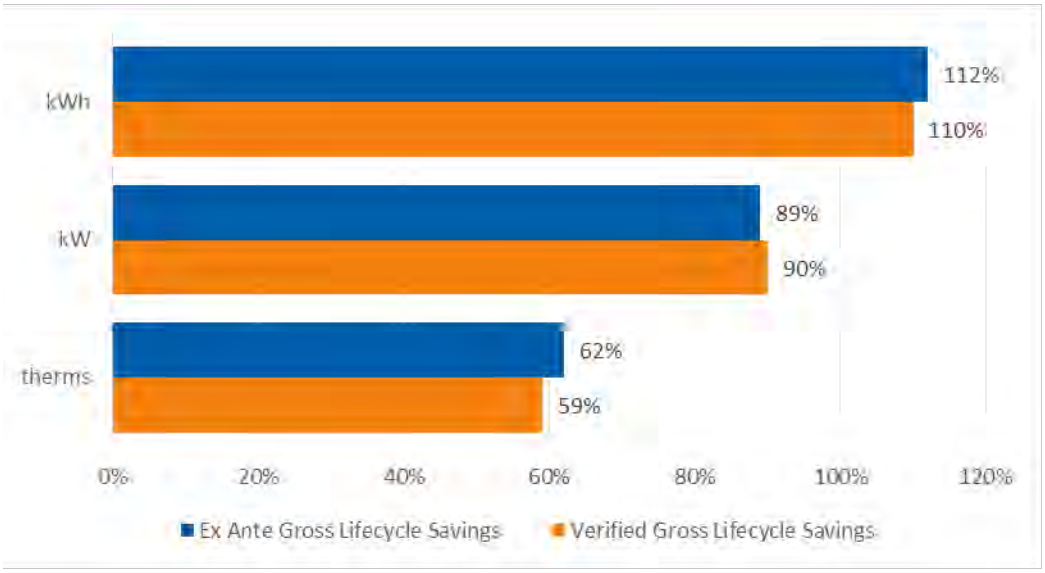
Figure 138 shows the percentage of gross lifecycle savings goals achieved by the Business Inventive Program in CY 2016. The Program exceeded its CY 2016 verified gross and *ex ante* lifecycle electric

[116] Effective January 2017, the Chain Stores and Franchises Program offerings will be captured through the Business Incentive Program.

[117] Small businesses may participate in the Business Incentive Program to receive incentives for energy efficiency measures that Focus on Energy does not offer through the Small Business Program.

energy savings goal, but did not meet its gross and *ex ante* lifecycle demand reduction and therms savings goals.

Figure 138. Business Incentive Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

EM&V Approach

The Evaluation Team conducted impact and process evaluations of the Business Incentive Program in CY 2016. The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing the Program performance. Table 193 lists the specific data collection activities and sample sizes used in the evaluations.

Table 193. Business Incentive Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant Surveys	70
Ongoing Participant Satisfaction Surveys[1]	506
Participating Trade Ally Surveys	20
Engineering Desk Reviews	57
Verification Site Visits	43

[1] The Program Implementer used data collected during ongoing participant satisfaction surveys to assess performance and help meet contractual obligations related to satisfaction KPIs.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator (CB&I) and the Program Implementer (Franklin Energy) in June and July 2016 to learn about the current state of the Business Incentive Program and to assess Program objectives, performance, and implementation challenges and solutions. The Evaluation Team also asked interviewees about their marketing and outreach efforts for engaging Trade Allies and customers.

Tracking Database Review

The Evaluation Team conducted a census review of the Business Incentive Program's records in the Focus on Energy database, SPECTRUM, which included the following tasks:

- Conducting a thorough review of the data to ensure that the totals in SPECTRUM matched the totals reported by the Program Administrator
- Reassigning savings from a number of database adjustment measures to the corresponding program measures
- Checking for complete and consistent application of information across data fields (measure names, application of first-year savings, application of EUL, etc.)

Participant Surveys

The Evaluation Team surveyed a random sample of 70 customers who participated in the Program in CY 2016 to assess their experience with the Program and to gather data to inform NTG calculations. Of the 70 respondents, five had completed custom projects and 65 had completed prescriptive or hybrid projects. At the time of the surveys, there were 571 unique participants in the Program (as determined by unique telephone numbers), of whom 28 had completed custom[118] projects and 543 had completed prescriptive or hybrid projects. Based on this population size, the number of completed surveys

[118] Custom participants may have also received prescriptive and/or hybrid incentives for their projects.

achieved ±10% precision, with 90% confidence at the program level. Participants also received a verification battery which was used to calculate a program-level ISR.

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the 2015 to 2018 quadrennial. The goal of these surveys is to provide a quick and easy feedback opportunity for recent Program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of the year, and identify energy efficiency opportunities for delivering follow-up to interested participants.

The Program Administrator deploys online surveys through SPECTRUM to all CY 2016 participants with e-mail addresses within two weeks of completing participation in the program. The Evaluation Team gathers online survey results via SPECTRUM and sends, receives, and scans mail survey responses, combining with the online results for quarterly and annual reporting.

In CY 2016, 506 Business Incentive Program participants responded to the ongoing customer satisfaction survey.

Participating Trade Ally Surveys

The Evaluation Team conducted an online survey of participating Trade Allies. The Evaluation Team sourced the population frame from SPECTRUM and included all registered Trade Allies who completed projects for the Business Incentive Program in CY 2016. Because of overlap between the nonresidential Focus on Energy programs, some Trade Allies worked on projects across multiple programs. To avoid response confusion, the Evaluation Team structured the first half of the online survey to ask general questions pertaining to Focus on Energy, whereas the second half of the survey asked questions specific to the Business Incentive Program. There were 444 registered Business Incentive Program Trade Allies, from whom the Evaluation Team e-mailed a sample of 149 and received 20 responses, for a response rate of 13%.

Engineering Desk Review

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 57 program measures. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Evaluation Team relied on the applicable TRMs (dated October 2015 and February 2016) and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue).

For prescriptive measures in Wisconsin, the Focus on Energy TRM and associated workpapers were the primary sources used by the Evaluation Team to determine methodology and data in nearly all cases. For custom and hybrid measures, the Evaluation Team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and

project documentation. The evaluation sample for these reviews is selected using a weighted, random stratified sampling approach known as PPS (Probability Proportional to Size, here lifecycle total energy savings).

Verification Site Visits

The Evaluation Team conducted 43 verification site visits for the Business Incentive Program in CY 2016. Site visits involved verifying the type and quantity of equipment installed, determining how the installed equipment is controlled, and documenting the operating hours of the installed equipment. During two verification site visits, the Evaluation Team also installed power meters to record equipment demand and operating hours. These projects were selected for power metering because they were hybrid measures with high savings relative to the sample. Both projects involved the installation of variable frequency drives on motors serving process equipment, which tend to have high levels of variation in demand and operating hours. The Evaluation Team collected seven months of post-installation natural gas utility bill data for one site to confirm the expected gas consumption.

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Program:

- Tracking database review
- Participant surveys
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data to determine reported installations, then applied the results from participant surveys (n=70), engineering desk reviews (n=57), and verification site visits (n=43) to calculate verified gross savings.

Cadmus found that the overall accounting of demand and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices. SPECTRUM offers a number of "date" fields which go above and beyond typical program tracking databases and normal "Paid Date" and "Application Received Date" fields, and these fields allow database users to track projects at a detailed level. SPECTRUM also employs unique customer identifier numbers, which is a best practice not followed in many other jurisdictions (where account numbers and customer contact information is used to classify unique customers with some difficulty). Nearly all database issues detected for this program could be classified as measure management issues related to a lack of current, accepted workpapers. One exception was an efficient (cooking) "steamer" measure which was claimed as a natural gas measure but installed as an electric measure. Another exception was a "VFD, HVAC Fan" measure which served a process load rather than the claimed "HVAC" load.

The Evaluation Team identified several types of measures where savings calculations did not align with the October 2015 or February 2016 TRM, or approved workpapers which are not included in the TRMs

but still offer accepted documentation of savings calculation methodology. These measures included the following measure identification numbers:

- 3269: Steam Trap Repair, < 50 psig, General Heating, 7/32”
- 3270: Steam Trap Repair, < 50 psig, General Heating, ¼”
- 3271: Steam Trap Repair, < 50 psig, General Heating, 5/16”
- 3272: Steam Trap Repair, < 50 psig, General Heating, 3/8”
- 3516: Steam Trap Repair, 50-125 psig, General Heating, 7/32” or Smaller
- 2309: ECM Evaporator Fan Motor, Walk-in Cooler, 1/20hp–1 hp
- 3105: LED Fixture, Replacing 320 Watt HID, Exterior
- 3102: LED Fixture, Replacing 250 Watt HID, Exterior
- 3276: Boiler, Hot Water, Condensing, >=90% AFUE, >=300 MBH

The Evaluation Team worked with the PSC and Program Administrator to assess the causes and impacts of these inaccuracies. For all of the steam trap measures (3269, 3270, 3271, 3272, and 3516), the verified savings for CY 2016 were higher than the savings to be applied in 2017 per a new TRM update. A measure that matched actual savings achievement was unavailable to this Program. The Strategic Evaluation Plan provides some guidance as to how to deal with this type of circumstance, noting that findings related to prescriptive measures with deemed savings will generally be applied on a prospective basis. Therefore, to stay consistent with the plan and the precedent from previous evaluations, the Team did not make any adjustments to the deemed values and used the *ex ante* SPECTRUM deemed savings values to calculate the final verified savings.

For measure 2309 (“ECM Evaporator Fan Motor, Walk-in Cooler, 1/20hp to 1 hp”), the Evaluation Team applied the deemed savings values from a March 2016 workpaper since measure 2309 was not included in the October 2015 or February 2016 TRMs. Existing SPECTRUM savings values for this measure are likely derived from some legacy workpaper or deemed savings manual which is no longer current or approved.

For measures 3102 and 3105 (“LED Fixture, Replacing HID, Exterior”), the Evaluation Team used the deemed savings values in the October 2015 TRM. The *ex ante* savings values do not align with any of the deemed savings values in TRM.

For measure 3276 (“Boiler, Hot Water, Condensing, >=90% AFUE, >=300 MBH”), the Evaluation Team referenced the October 2015 TRM algorithm for measure 3277 with project specifications from the application. No TRM entries or approved workpapers exist for measure 3276.

Site visits generally confirmed that program measures were installed and operating as planned. Any observed deviations were minor and captured in the realization rates for the program. One exception was a site where two electronically commutated (EC) motors were not found installed as planned. Other exceptions included several hybrid and custom measures which had different verified load profiles or hours of use based upon logged data or captured trend data from the site's controls system.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2016, the Evaluation Team conducted participant surveys to verify the installed measures and estimate ISRs at the measure level.

The Evaluation Team applied a combined, weighted ISR of 97.5% from these surveys to all engineering desk reviews without a completed site visit. The Evaluation Team applied a site-specific ISR to all measures where verification site visits were performed.

Verified Gross Savings Results

Table 194 lists the annual and lifecycle realization rates for the CY 2016 Program. Overall, the Program achieved a first-year evaluated realization rate of 98%, weighted by total (MMBtu) energy savings.[119] Realization rates are generally the same for a given savings type. This result represents a weighted average realization rate for the entire Program.

Table 194. CY 2016 Business Incentive Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
99%	101%	96%	98%	98%	101%	96%	98%

Table 195 lists the *ex ante* and verified annual gross savings for the CY 2016 Program.

Table 195. CY 2016 Business Incentive Program Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Air Sealing	0	0	34,308	0	0	32,780
Boiler	40,059	0	354,010	39,763	0	338,239
Chiller	3,149,517	213	0	3,126,254	215	0
Clothes Washer	294	0	3,519	292	0	3,362
Compressor	4,460,071	828	0	4,427,128	837	0
Controls	5,319,982	392	113,793	5,280,687	396	108,723
Delamping	619,700	125	0	615,123	126	0
Dishwasher, Commercial	238,371	1	4,461	236,610	1	4,262

[119] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Dryer	337,909	66	0	335,413	67	0
Energy Recovery	307,936	162	288,767	305,661	163	275,902
Filtration	78,100	15	71,133	77,523	16	67,964
Fluorescent, Compact (CFL)	102,530	31	0	101,773	31	0
Fluorescent, Linear	8,166,832	1,462	0	8,106,509	1,478	0
Fryer	0	0	1,980	0	0	1,892
Furnace	150,938	0	65,521	149,823	0	62,602
High Intensity Discharge (HID)	55,636	4	0	55,225	4	0
Hot Holding Cabinet	20,268	4	0	20,118	4	0
Infrared Heater	0	0	31,950	0	0	30,527
Insulation	92	0	3,788	91	0	3,619
Light Emitting Diode (LED)	43,327,542	6,194	0	43,007,512	6,259	0
Motor	747,370	89	0	741,850	90	0
Other	9,052,873	1,600	485,248	8,986,006	1,617	463,630
Oven	36,441	8	2,184	36,172	8	2,087
Packaged Terminal Unit (PTAC, PTHP)	1,038,127	0	0	1,030,459	0	0
Pre-Rinse Sprayer	142	0	104	141	0	100
Reconfigure Equipment	434,150	59	0	430,943	60	0
Refrigerated Case Door	260,301	20	13,230	258,378	21	12,641
Refrigerator/Freezer—Commercial	140,520	16	0	139,482	16	0
Rooftop Unit/Split System A/C	120,047	180	2,024	119,160	182	1,934
Steam Trap	0	0	651,263	0	0	622,249
Steamer	70,529	13	8,336	70,008	13	7,965
Supporting Equipment	423,941	48	0	420,810	49	0
Tune-Up/Repair/Commissioning	4,121,209	0	0	4,090,769	0	0
Unit Heater	0	0	23,649	0	0	22,595
Variable Speed Drive	10,643,665	1,300	0	10,565,048	1,314	0
Water Heater	-100	0	30,731	-99	0	29,362
Ice Machine	12,545	1	0	12,452	1	0
Nozzle	96,000	36	0	95,291	36	0
Total Annual	**93,573,536**	**12,867**	**2,189,999**	**92,882,376**	**13,003**	**2,092,434**

Table 196 lists the *ex ante* and verified gross lifecycle savings by measure type for the CY 2016 Program.

Table 196. CY 2016 Business Incentive Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Air Sealing	0	0	386,950	0	0	370,910
Boiler	801,192	0	7,080,103	787,502	0	6,786,607
Chiller	62,990,340	213	0	61,914,015	215	0
Clothes Washer	4,410	0	52,785	4,335	0	50,597
Compressor	66,901,006	828	0	65,757,859	837	0
Controls	50,283,711	392	1,249,116	49,424,506	396	1,197,336
Delamping	6,197,000	125	0	6,091,111	126	0
Dishwasher, Commercial	2,383,712	1	44,610	2,342,981	1	42,761
Dryer	5,068,635	66	0	4,982,026	67	0
Energy Recovery	4,619,060	162	4,331,505	4,540,133	163	4,151,949
Filtration	323,050	15	1,066,995	317,530	16	1,022,764
Fluorescent, Compact (CFL)	466,386	31	0	458,416	31	0
Fluorescent, Linear	115,447,067	1,462	0	113,474,407	1,478	0
Fryer	0	0	23,760	0	0	22,775
Furnace	2,716,259	0	1,179,068	2,669,846	0	1,130,192
High Intensity Discharge (HID)	662,320	4	0	651,003	4	0
Hot Holding Cabinet	243,216	4	0	239,060	4	0
Infrared Heater	0	0	479,250	0	0	459,383
Insulation	2,300	0	94,700	2,261	0	90,774
Light Emitting Diode (LED)	707,741,883	6,194	0	695,648,595	6,259	0
Motor	11,957,920	89	0	11,753,593	90	0
Other	127,435,498	1,600	6,800,634	125,257,989	1,617	6,518,723
Oven	437,286	8	26,208	429,814	8	25,122
Packaged Terminal Unit (PTAC, PTHP)	15,571,905	0	0	15,305,826	0	0
Pre-Rinse Sprayer	711	0	521	699	0	499
Reconfigure Equipment	6,351,025	59	0	6,242,504	60	0
Refrigerated Case Door	1,219,785	20	198,045	1,198,942	21	189,835
Refrigerator/Freezer—Commercial	1,686,240	16	0	1,657,427	16	0
Rooftop Unit/Split System A/C	1,800,705	180	30,360	1,769,936	182	29,101
Steam Trap	0	0	3,907,623	0	0	3,745,638
Steamer	775,819	13	91,696	762,562	13	87,895
Supporting Equipment	6,359,115	48	0	6,250,456	49	0
Tune-Up/Repair/ Commissioning	8,465,646	0	0	8,320,992	0	0
Unit Heater	0	0	354,730	0	0	340,025

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Variable Speed Drive	163,295,806	1,300	0	160,505,547	1,314	0
Water Heater	-1,150	0	310,520	-1,130	0	297,648
Ice Machine	125,394	1	0	123,251	1	0
Nozzle	1,440,000	36	0	1,415,395	36	0
Total Lifecycle	**1,373,773,252**	**12,867**	**27,709,179**	**1,350,299,389**	**13,003**	**26,560,534**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Business Incentive Program. The Evaluation Team calculated a NTG percentage of 44% for the CY 2016 Program.

Freeridership

The Evaluation Team used the self-report survey method to determine the Program's freeridership level for CY 2016. The Evaluation Team estimated an average self-reported freeridership of 56%, weighted by evaluated savings, for the CY 2016 Program.

In CY 2016, the Evaluation Team relied solely on the self-reported freeridership of 56% and applied this to all the Program measure categories. The three CY 2016 respondents with the greatest savings accounted for 48% of the total analysis sample gross savings, with an average weighted freeridership rate of 74%. In CY 2015, the three CY 2015 respondents with the greatest savings accounted for 34% of the total analysis sample gross savings, with an average weighted freeridership rate of 46%. Table 197 lists the CY 2015 and CY 2016 self-reported freeridership estimates, weighted by participant gross evaluated energy savings.

Table 197. CY 2015 and CY 2016 Self-Reported Freeridership

Year	Survey Respondents	Percentage of Freeridership
CY 2015	104	36%
CY 2016	70	56%

The main driver of the increase in freeridership from CY 2015 to CY 2016 is the higher freeridership observed for the three respondents with the greatest savings in the CY 2016 analysis compared to the three respondents with the greatest savings in the CY 2015 analysis.

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Business Incentive Program. The Evaluation applied evaluated and deemed savings values to the spillover measures that customers said they had installed as a result of their Program participation, as presented in Table 198.

Table 198. Business Incentive Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	32	120.96
Central Air Conditioner	1	14.13

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in the following equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 0% spillover estimate,[120] rounded to the nearest whole percentage point, for the Business Incentive Program respondents (Table 199).

Table 199. Business Incentive Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	135.09
Program Savings	69,962.45
Spillover Estimate	**0%**

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG estimate of 44% for the Program. Table 200 shows total net-of-freeridership, participant spillover, and total net savings in MMBtu, as well as the overall Program NTG.[121]

[120] Actual value is 0.2%.

[121] Although nonparticipant spillover was measured through Trade Ally interviews in CY 2016, these savings will be reviewed by the EWG and a determination of if and how these savings should be applied will occur at the end of the CY 2015–CY 2018 quadrennial, consistent with broader sampling practices design to draw full-quad conclusions.

Table 200. CY 2016 Business Incentive Program Annual Net Savings and NTG Ratio

Net-of-Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
231,510	0[1]	526,158	231,510	44%

[1] Although spillover activity of 0.2% was observed for the Program, the spillover percentage estimate was rounded to 0%, the nearest whole percentage, and the 0% spillover estimate was used throughout the impact analysis.

Table 201 shows the annual Program net demand and energy impacts (kWh, kW, and therms) by measure category. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 201. CY 2016 Business Incentive Program Annual Net Savings

Measure	Annual Net Savings		
	kWh	kW	therms
Air Sealing	0	0	14,423
Boiler	17,496	0	148,825
Chiller	1,375,552	95	0
Clothes Washer	128	0	1,479
Compressor	1,947,936	368	0
Controls	2,323,502	174	47,838
Delamping	270,654	56	0
Dishwasher, Commercial	104,109	0	1,875
Dryer	147,582	29	0
Energy Recovery	134,491	72	121,397
Filtration	34,110	7	29,904
Fluorescent, Compact (CFL)	44,780	14	0
Fluorescent, Linear	3,566,864	650	0
Fryer	0	0	832
Furnace	65,922	0	27,545
High Intensity Discharge (HID)	24,299	2	0
Hot Holding Cabinet	8,852	2	0
Infrared Heater	0	0	13,432
Insulation	40	0	1,592
Light Emitting Diode (LED)	18,923,305	2,754	0
Motor	326,414	39	0
Other	3,953,843	711	203,997
Oven	15,916	4	918
Packaged Terminal Unit (PTAC, PTHP)	453,402	0	0
Pre-Rinse Sprayer	62	0	44
Reconfigure Equipment	189,615	26	0

Measure	Annual Net Savings		
	kWh	kW	therms
Refrigerated Case Door	113,686	9	5,562
Refrigerator/Freezer—Commercial	61,372	7	0
Rooftop Unit/Split System A/C	52,431	80	851
Steam Trap	0	0	273,790
Steamer	30,804	6	3,504
Supporting Equipment	185,156	22	0
Tune-Up/Repair/Commissioning	1,799,938	0	0
Unit Heater	0	0	9,942
Variable Speed Drive	4,648,621	578	0
Water Heater	-44	0	12,919
Ice Machine	5,479	1	0
Nozzle	41,928	16	0
Total Annual	**40,868,245**	**5,721**	**920,671**

Table 202 lists the lifecycle Program net demand and energy impacts (kWh, kW, and therms) by measure category.

Table 202. CY 2016 Business Incentive Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
Air Sealing	0	0	163,200
Boiler	346,501	0	2,986,107
Chiller	27,242,167	95	0
Clothes Washer	1,907	0	22,263
Compressor	28,933,458	368	0
Controls	21,746,783	174	526,828
Delamping	2,680,089	56	0
Dishwasher, Commercial	1,030,912	0	18,815
Dryer	2,192,092	29	0
Energy Recovery	1,997,659	72	1,826,857
Filtration	139,713	7	450,016
Fluorescent, Compact (CFL)	201,703	14	0
Fluorescent, Linear	49,928,739	650	0
Fryer	0	0	10,021
Furnace	1,174,732	0	497,284
High Intensity Discharge (HID)	286,441	2	0
Hot Holding Cabinet	105,186	2	0
Infrared Heater	0	0	202,129
Insulation	995	0	39,941

Measure	Lifecycle Net		
	kWh	kW	therms
Light Emitting Diode (LED)	306,085,382	2,754	0
Motor	5,171,581	39	0
Other	55,113,515	711	2,868,238
Oven	189,118	4	11,053
Packaged Terminal Unit (PTAC, PTHP)	6,734,563	0	0
Pre-Rinse Sprayer	307	0	220
Reconfigure Equipment	2,746,702	26	0
Refrigerated Case Door	527,535	9	83,528
Refrigerator/Freezer—Commercial	729,268	7	0
Rooftop Unit/Split System A/C	778,772	80	12,805
Steam Trap	0	0	1,648,081
Steamer	335,527	6	38,674
Supporting Equipment	2,750,201	22	0
Tune-Up/Repair/Commissioning	3,661,237	0	0
Unit Heater	0	0	149,611
Variable Speed Drive	70,622,441	578	0
Water Heater	-497	0	130,965
Ice Machine	54,231	1	0
Nozzle	622,774	16	0
Total Lifecycle	**594,131,731**	**5,721**	**11,686,635**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities. The Evaluation Team focused its process evaluation on these key Business Incentive Program topics:

- Customer satisfaction with Program components and customer value propositions
- Barriers to participation and opportunities in other market segments or customer types
- Trade Ally engagement, satisfaction, and value propositions
- The impact of enhanced Trade Ally outreach on satisfaction
- Program tracking processes and coordination among the Program Administrator, Program Implementer, and utility partners

Program Design, Delivery, and Goals

The Evaluation Team interviewed key staff members of the Program Administrator and Program Implementer to get an overview of the Program design and delivery process and any associated changes or challenges.

Program Design

Focus on Energy launched the Program in April 2012 as one of three core nonresidential programs organized around energy usage and organizational decision-making instead of industry sectors. Through the Program, Focus on Energy offers incentives for a variety of prescriptive measures, including lighting, HVAC, refrigeration, and compressed air (see Appendix C for list of measures). Custom incentives are available for nonstandard projects that involve either more complex technologies or equipment changes with more than just a one-for-one replacement. The Program Administrator pays for custom incentives on a performance basis for demand reduction, electric, and/or natural gas savings.

Program Goals

The overall objective of the Program is to encourage businesses to use more energy-efficient products. The CY 2016 Program had these savings goals:

- Demand reduction of 14,500 kW
- Lifecycle electric savings of 1,231,500,000 kWh
- Lifecycle natural gas savings of 45,000,000 therms

In CY 2016, the Program met its electric savings goals, but fell short of its therms savings and demand reduction goals. The Program Implementer said the incentive reductions that occurred in CY 2016, along with low natural gas prices, limited businesses' interest in the Program. As a result, the Program Administrator reported that the number of applications received in CY 2016 decreased compared to CY 2015. According to SPECTRUM data, Program participation decreased by nearly 12% from CY 2015 to CY 2016.

In addition to the energy goals, the Program Administrator and Program Implementer track several KPIs. Focus on Energy added four new KPIs to the Program in CY 2016: new customer participation, Trade Ally participation, customer satisfaction rating, and the introduction of emerging technologies into the measure mix. The Program Implementer noted that while the KPI is assigned to emerging technologies in the Business Incentive Program, KPI achievement is reliant on the Emerging Technologies Program.[122]

The Program Administrator and Program Implementer revised the Business Incentive Program's prescriptive application processing KPI—which is the number of days an incentive is outstanding for complete prescriptive applications (that is, the time it takes to process each project incentive payment after a customer submits a complete application)—from 45 days in CY 2015 to 35 days in CY 2016. Table 203 shows the results for these KPIs as reported through the Program interviews, which the Evaluation Team confirmed with SPECTRUM data. The Program met its 2016 KPI goals, except the custom project pre-approval KPI.

[122] CleanTech Partners implements the Emerging Technologies Program, and provides the Business Incentive Program Implementer with prescriptive or custom savings calculations for new measures introduced to the nonresidential market.

Table 203. Business Incentive Program KPIs

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Days from preapproval of application to preapproval granted for custom projects	20 calendar days	Fell short of goal (28 days)	SPECTRUM, Submit for Preapproval Date against the Pre Approved Date[1]
Days an incentive is outstanding for complete prescriptive applications	35 calendar days; includes the Program Implementer's time to process incentive applications and the Program Administrator's time to cut incentive checks	Reached goal (27 days)	SPECTRUM, Application Received/Received Complete Date against the Date of Status Change to Paid
New customer participation	New customers, defined as those who did not submit and receive payment for a project in CY 2015, accounting for at least 15% of participating customer base	Reached goal (82%)	SPECTRUM ID comparison, CY 2015 to CY 2016
Trade Ally participation	Maintain participation rates by Trade Ally ranking: A—80% participation B—70% participation C—60% participation D—10% participation	Reached goal A—100% participation B—93% participation C—60% participation D—26% participation	SPECTRUM, compared to 2016 Trade Ally listing by rank
Customer satisfaction	Maintain 8.0 overall satisfaction score, on scale of 0 to 10	Reached goal (9.0)	Evaluation Team's ongoing customer satisfaction survey
Incorporate emerging technologies	Add four new emerging technologies to the Program by December 31, 2018	Three technologies added: • Spring-loaded garage door hinge • Pool pump controls • Pump electronically commuted motor	Reported by Program Implementer

[1] The Program Implementer measured the average number of days to process measures through its preapproval workflow at 5 days.

Program Changes

The Business Incentive Program experienced several changes in CY 2016. The Program Administrator and Program Implementer reduced the therms savings target in CY 2016 while increasing the Program demand reduction and electric savings target. To accomplish this, the Program Administrator and Program Implementer reduced incentive levels to address the increased goals without an increased incentive budget; they also did this to ensure that adequate funding was available in other programs

throughout the year. They reduced the prescriptive incentive levels by about 20%, the custom demand incentives by 20%, and the custom electric and therms incentives by 25% and 50%, respectively. The Program Implementer and Program Administrator said application activity levels had decreased, and speculated that the incentive reductions had a greater negative effect on custom applications than on prescriptive applications. The Program Implementer also said low natural gas costs have had a greater impact on custom application activity than incentive changes. In CY 2016, 136 unique customers received custom project incentives compared to 234 customers in CY 2015. These volume changes are not reflected as strongly in the prescriptive project activity; 2,232 customers received prescriptive incentives in CY 2016 compared to 2,450 in CY 2015.

The Program Administrator and Program Implementer said a key barrier to participation is the complexity and time needed to complete the application paperwork. Previous evaluation results confirm customer frustration with the application process. CY 2013 participant survey data show 12 of 21 respondents who reported they were less than satisfied with the incentive application said it was because the paperwork took a long time to fill out or was too complex. In CY 2015, more than one-quarter (26%) of surveyed participants who were involved in the application process (n=64) said the application was challenging, describing concerns with the amount of information and time necessary to complete the application. In response, the Program Implementer made the following changes in CY 2016:

- Expanded the incentive catalogs to include commercial kitchen and process system measures so that all prescriptive measures are now available in the catalog format
- Revised the exterior lighting optimization guide and the custom application form to offer detailed submittal guidance and cover all applicable programs in the nonresidential portfolio, similar to the catalog format

The Program Implementer said that staff used to track whether the incentive catalog format improved processing times and reduced follow-up for missing information compared to the original format; however, now that everything is in the new format, the Program Implementer staff only track current application processing times. In CY 2015, the average processing time for complete prescriptive applications was 29 days, and the Program Implementer processed complete CY 2016 applications in 27 days (as noted in Table 203).

The Program Implementer also said it focused marketing efforts on better engaging Trade Allies in CY 2016. Details of the Program Implementer's Trade Ally outreach campaign are described in the *Marketing and Outreach* section below.

Program Management and Delivery Structure

Franklin Energy has implemented the Program since its inception. A Franklin Energy program manager is supported by Energy Advisors (up to 14) and staff members who handle marketing, Trade Ally engagement, quality assurance, and general strategy. Energy Advisors primarily conduct outreach marketing to Trade Allies and/or small and mid-sized industrial customers. Some Energy Advisors have

subject matter or customer segmentation expertise, such as in lighting or mechanical technologies or food processing and refrigeration industries. Other Energy Advisors support different geographical regions and, by virtue of these regional assignments, some Energy Advisors work more closely with rural customers, whereas others focus on urban customers. Energy Advisors coordinate with utility account representatives to streamline customer outreach.

Trade Allies are a key component to delivering the Program to customers. The Trade Ally network currently includes more than 760 contractors and vendors (registered and nonregistered). To manage the Trade Ally network communications and support to registered installation contractors, the Program Implementer categorizes Trade Allies with an "A," "B," "C," or "D" ranking depending on two factors: their quantity of applications and their projects' lifecycle kWh savings and lifecycle therms savings (where A and B rankings signify the most active and engaged Trade Allies). The ranking is intended to help the Program Implementer prioritize outreach efforts and resources for managing the large network.

Table 204 shows the number and percentage of Trade Allies active in each ranking in CY 2015 and CY 2016.

Table 204. Business Incentive Program Trade Ally Activity Tiers

Trade Ally Ranking Group	CY 2015 Business Incentive Program Ranked Trade Allies			CY 2016 Business Incentive Program Ranked Trade Allies		
	Count	Percentage of Trade Allies	Percentage of Overall Savings (Lifecycle kWh)	Count	Percentage of Trade Allies	Percentage of Overall Savings (Lifecycle kWh)
A (most active)	71	8%	28%	11	2%	9%
B (moderately active)	128	15%	18%	68	12%	19%
C (less active)	493	59%	19%	300	55%	18%
D (new)	148	18%	1%	170	31%	4%
Total	**840**	**100%**	**67%***	**549**	**100%**	**50%[1]**

[1] This percentage is based on SPECTRUM data. Of all completed projects in CY 2015 and CY 2016, 33% and 50% of savings were attributed to unranked Trade Allies (i.e., distributors, retailers, or new contractors), respectively.

Data Management and Reporting

In CY 2016, the Program Implementer continued to manage data and generate reports through SPECTRUM. The Program Administrator reported that staff have access to a new dashboard that streamlines data analysis needs.

The Program Administrator and Program Implementer reported that their level and frequency of reporting and communication works well.

Marketing and Outreach

The CY 2016 marketing plan aimed to increase awareness of Focus on Energy programs, increase promotion of programs by Trade Allies and other stakeholders, and build affinity with Focus on Energy programs. The Program Implementer delivered a number of materials and activities to support the marketing plan objectives. The Program Administrator designed web pages summarizing top opportunities for specific market segments, such as manufacturing, breweries, hospitality, and supermarkets. The Program Implementer developed an exterior lighting optimization handout for Trade Allies to use during the sales process. The Program Implementer also maintained qualified product lists to assist customers with determining equipment eligibility.

The Program Implementer partnered with the City of Milwaukee's Better Buildings Challenge, which is a City of Milwaukee energy efficiency program developed through the U.S. Department of Energy to increase business buildings' efficiency by 20% over 10 years. Milwaukee's Better Buildings Challenge offers information and individualized energy efficiency project support to business participants.

Although in previous years the Program Implementer sought to engage the commercial real estate and craft brewery sectors, staff continued outreach but deprioritized these efforts initiated in CY 2015. The Program Implementer said it instead focused marketing activities on maintaining or increasing registered Trade Ally participation and engagement with the Program. (See the *Trade Ally Outreach* section for more details on the Program Implementer's CY 2016 efforts to engage Trade Allies.) Further, Program Implementer staff opted not to target the real estate sector because focus groups conducted in CY 2015 did not yield a specific outreach strategy other than persistence.

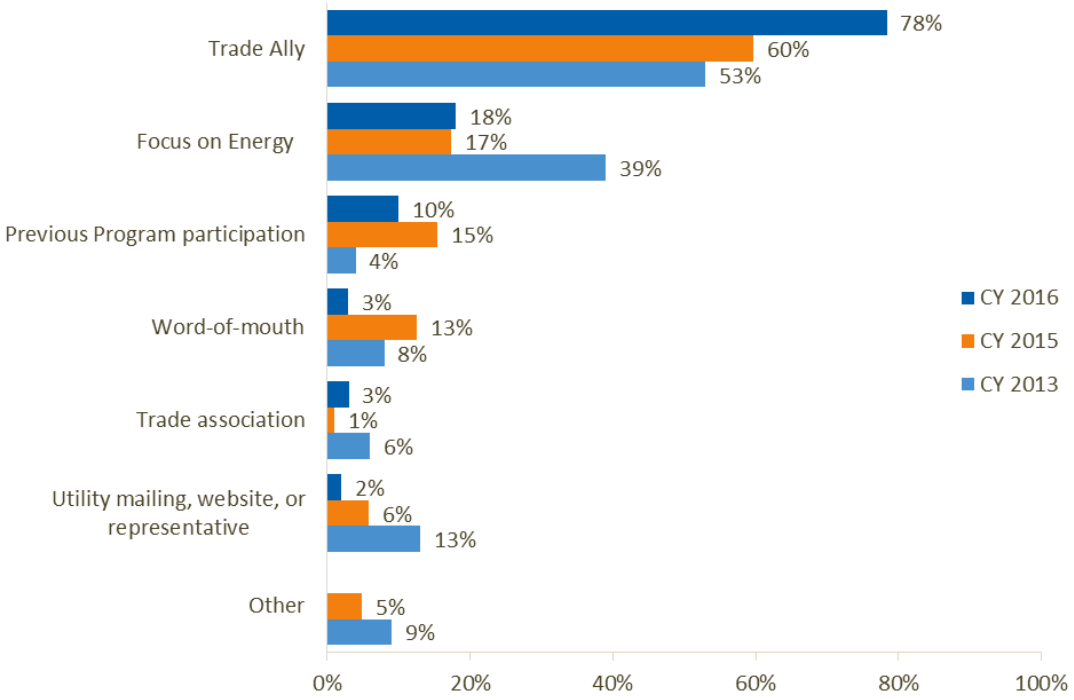
Customer Program Awareness

Customers learned about the Program through many different sources. Surveyed participants (n=68) most frequently said they learned about the Program from Trade Allies (78%). This represents a statistically significant increase from CY 2015, when 60% of participants said they heard about the Program from a Trade Ally.[123] In addition, 18% of respondents said they learned about the Program directly from Focus on Energy. Of that percentage of respondents, 10% learned via the Program Implementer or Energy Advisors; 7% learned from the Program website; and 1% learned from Program mailings, e-mail, or other materials. Furthermore, 10% of respondents had previously participated in the Program, whereas 3% said they learned by word of mouth, 3% through a trade association, and 2% from utility staff or materials. In CY 2015, 13% of respondents said they heard about the Program from word-of-mouth sources, indicating a statistically significant decrease from CY 2015 to CY 2016.[124] Figure 139 shows customer sources of awareness.

[123] $p < 0.01$ using a binomial t-test.

[124] $p < 0.01$ using a binomial t-test.

Figure 139. Source of Program Awareness



Source: CY 2016 and CY 2015 Participant Survey. Question A5; CY 2013 Participant Survey. Question B2: "How did your organization learn about the incentives available for this project?" Multiple responses allowed (CY 2016 n=68, CY 2015 n=104, CY 2013 n=194)

Customer Messaging Preferences

To assist the Program Administrator in enhancing Focus on Energy messaging, the Evaluation Team asked participant survey respondents to share insights on which messages resonate with them. The Evaluation Team asked Program participants about the first three words that come to mind when they think about Focus on Energy. As shown in Figure 140, the most common words were "conservation" and "savings," followed by "lighting," "efficiency," and "incentives."

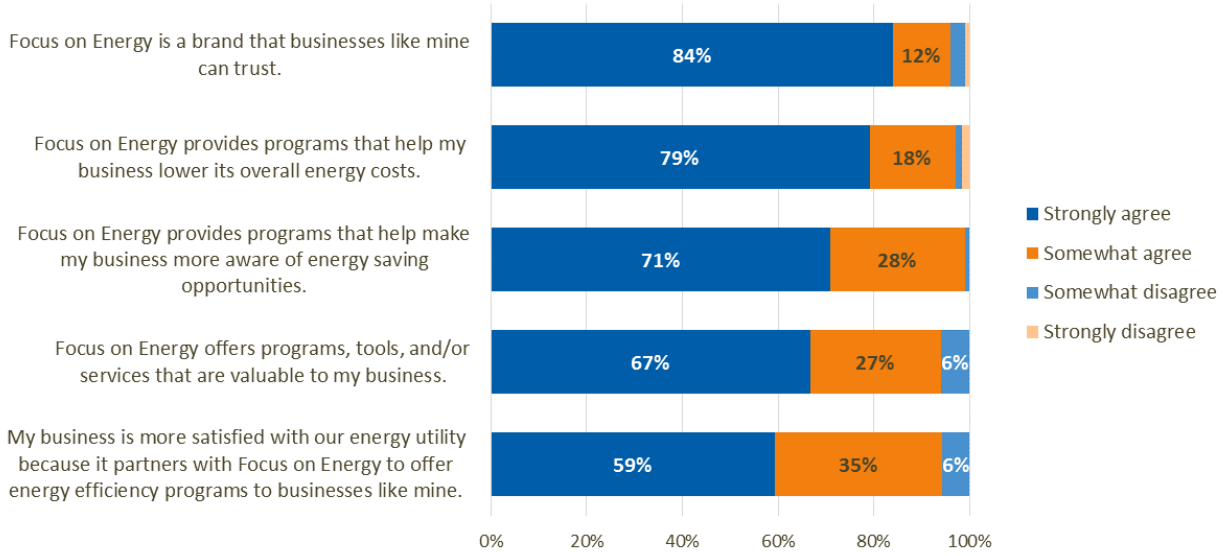
Figure 140. Respondent Word Association with "Focus on Energy"



Source: CY 2016 Participant Survey. Question B1: "What are the first three words that come to mind when you hear 'Focus on Energy'?" (n=67)

To gauge Focus on Energy brand affinity, the Evaluation Team asked Program respondents to what extent they agreed with several marketing statements. The vast majority of respondents agreed with all of the statements. The two messages that respondents agreed with most strongly were that Focus on Energy is a trustworthy brand and helps businesses lower overall energy costs. Figure 141 details a breakdown of agreement with the five brand affinity statements.

Figure 141. Agreement with Focus on Energy Claims



Source: CY 2016 Participant Survey. Question B2: "Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with these statements." (n=66-69)

The Evaluation Team asked survey respondents to identify which of the statements shown in Table 205 would make them most interested in learning more about Focus on Energy. Respondents gravitated toward cost-oriented statements: 38% said that reducing their energy costs and saving money resonated the most.

Table 205. Participant Reaction to Marketing Statements

Focus on Energy helps Wisconsin businesses….	Top Statements by Percentage of Respondents
Reduce their energy costs and save money	38%
Lower their energy costs	29%
With solutions to use energy smarter and save money	22%
Grow by making smarter decisions about their energy use	12%

Source: CY 2016 Participant Survey. Question B3: "Which of the following statements would make you most interested in learning more about Focus on Energy?" (n=69)
Percentage exceeds 100% because of rounding.

Application and Paperwork

The Evaluation Team asked Business Incentive Program Trade Allies and participants about their experiences with the application process.

Trade Allies' Application Process

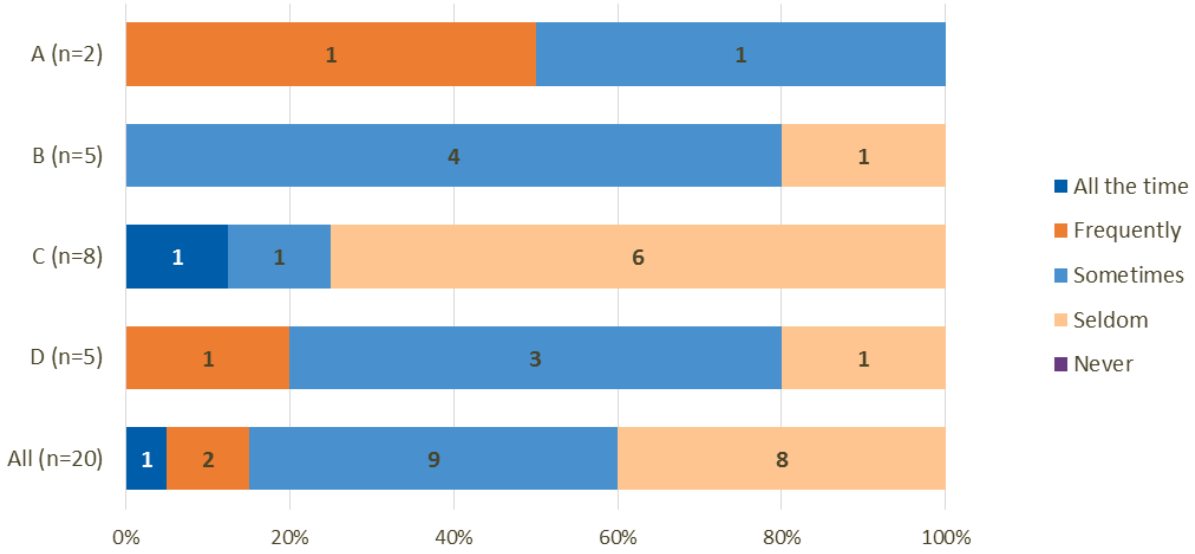
Generally, Trade Allies reported that the application process works well. Every Trade Ally survey respondent reported assisting their customers with the application paperwork, with 15 of 19 respondents saying that they assist customers "all the time." However, while four of five custom incentive participants said their Trade Ally took the lead role or contributed to the application process, only two of five hybrid incentive participants and 23% of prescriptive incentive participants (n=60) said their Trade Ally had a lead or supporting role in the application.

Eight of the 20 Trade Ally respondents said they "seldom" run into challenges with the application process. However, nine respondents said they "sometimes" run into challenges, and three Trade Allies said they encounter application issues "frequently" or "all the time." Application process challenges include the following:

- Too many supporting documents required (six responses)
- Too much information required (five responses)
- Too many requirements for eligible equipment (five responses)
- Took too long for approval (five responses)
- Took too much time (two responses)
- It was difficult to get in touch with Program Implementer staff with questions (two responses)

The data did not clearly suggest that challenges associated with paperwork correspond to a Trade Ally's ranking as A, B, C, or D. For example, the A-ranked Trade Allies reported that they "frequently" or "sometimes" experienced challenges with the paperwork despite the likelihood that these companies submit more applications than Trade Allies with lower rankings (see Figure 142).

Figure 142. Trade Ally Challenges with Paperwork by Ranking



Source: CY 2016 Trade Ally Survey. Question G3: "How often do you run into challenges with the incentive application process?"

The Evaluation Team asked Trade Allies for specific ways Focus on Energy could improve the application process. Of the 11 suggestions, four recommended a simplified, shorter application process. Three Trade Allies requested application training or increased communication. Four Trade Allies provided general commentary about difficulties in finding the right incentive code or requesting faster processing times or timely incentive payment status information.

Participants' Application Process

Most Business Incentive Program participants were satisfied with the application process. Of those participants who were involved in the application process (n=36), 42% said it was "very easy" to complete the paperwork, 31% said it was "somewhat easy," 19% said it was "somewhat challenging," and 8% said the paperwork was "very challenging." CY 2016 participant responses were consistent with those in CY 2015. Most CY 2016 respondents who reported the application process as challenging described concerns with qualifying equipment and the amount of information needed to complete the application. Respondents noted confusion with the mechanics of the application, product information needed, and where to submit the application for the incentive.

Participants also expressed satisfaction with the time it took to receive an incentive check. Two-thirds of respondents (67%, n=48) said they were "very satisfied," which is consistent with CY 2015 (59%, n=104).

The remaining 33% of CY 2016 respondents said they were "somewhat satisfied" with the timing, which is consistent with CY 2015 (34%, n=104). One-fifth of CY 2016 respondents (19%) reported that they received their incentive within three weeks, and 57% said their incentive arrived within four to six weeks, which is consistent with the Program Implementer's KPI to deliver incentives within an average of five weeks.

The Evaluation Team reviewed CY 2016 SPECTRUM data and found that 41% of CY 2016 completed project applications were identified as having been submitted with incomplete information or documentation; 38% of CY 2015 applications were noted in SPECTRUM as incomplete. To assess the Program application materials' effectiveness, the Evaluation Team reviewed the custom incentive guide, the prescriptive application form, incentive catalogs, and qualified product lists. The custom incentive guide's "How to Apply" section gives applicants step-by-step instructions that include supporting documentation requirements. The prescriptive incentive catalogs also include a "How to Apply" section and effectively describe eligible equipment categories, measure requirements, and incentives per unit. The qualified product lists provide the information necessary to determine product eligibility.

However, the Program prescriptive application form includes an "Incentive Product Information" section with a checkbox for applicants to identify whether the application includes an itemized invoice and the manufacturer's specification sheet, but the application does not otherwise indicate what supporting documentation is required. The prescriptive application refers to a "Program Descriptions and Submittal Information" page for mailing addresses and fax numbers, but does not detail where to find this page (e.g., catalog reference or web link to the catalog), nor does it reference the catalog's "How to Apply" section.

Trade Ally Experience

Trade Allies serve an important Program outreach and project initiation role and are supported by the Program's Energy Advisors.

Trade Ally Program Promotion

According to the Program Implementer, Program Trade Allies have a crucial role in increasing Program awareness and initiating projects. Most of the Trade Ally survey respondents reported actively promoting Focus on Energy. The majority (14 of 20 respondents) said they promote the Program "all the time," and two respondents said they promote it "frequently." Trade Allies who only "sometimes" promote the Program (four respondents) provided the following reasons for not promoting the Program more often (with some providing more than one reason):

- Not confident about program details (two responses)
- Too much paperwork (two responses)
- The incentives are not worth the hassle (two responses)
- Perceived financial risk to the Trade Ally or customer (one response)

Trade Allies primarily reported promoting the Program because of the financial benefit to their customers, with 19 of 20 respondents citing this reason. The remaining respondent said he/she promoted the Program because it increased business activity.

The Evaluation Team asked Trade Allies how Focus on Energy could better support them in promoting the program to property owners and managers of mixed-use buildings. Of the five who had advice, one Trade Ally suggested that Focus on Energy "get us in the door to do assessments" for these prospective customers. The remaining Trade Allies suggested that Focus on Energy provide targeted incentives; marketing materials that covered the business, common area, and residential aspects of the building; or customer outreach goals for relevant Program Implementer staff.

Trade Ally Outreach

Focus on Energy engages Program Trade Allies through a number of channels. The outreach to Trade Allies in CY 2016 included webinars and optional trainings; e-mails, telephone calls, and one-on-one engagement with Energy Advisors through office walk-in hours and in-person visits; and specialized sell sheets for various offerings such as exterior lighting optimization. Registered Trade Allies received a monthly newsletter, had access to Program information on the website, and were listed on the "Find a Trade Ally" tool on the Program website.

To increase Trade Ally participation and engagement in CY 2016, the Program Implementer introduced a Trade Ally performance feedback and recognition system, partly in response to feedback from Trade Allies in CY 2015 for greater transparency in Program and individual performance. The Program Implementer shared its ranking system with registered Trade Allies, which is based on the number of applications and energy savings generated by each Trade Ally. Instead of the A, B, C, and D[125] rankings, the Program Implementer informed Trade Allies of their status as platinum, gold, silver, or green so that they would be aware of their Program standing relative to other participating Trade Allies. The Program Implementer said this strategy successfully built trust and helped Trade Allies develop a stronger association with the Program delivery.

Trade Ally Performance Feedback

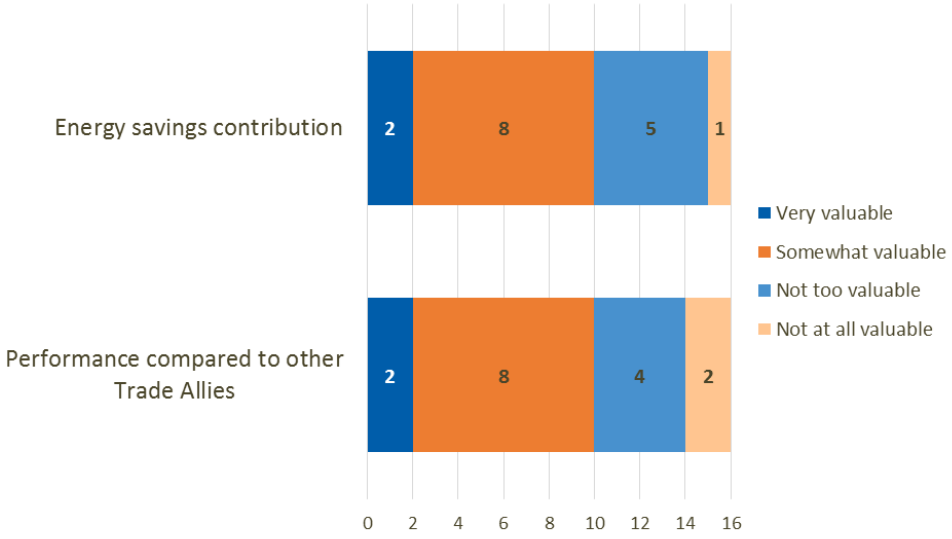
In addition to sharing the Trade Ally rankings, the Program Implementer provided Trade Allies with feedback via a quarterly performance summary. The summary included a customized letter delivered by mail that detailed overall Program savings and budget status, and individual Trade Ally contributions to the budget and savings goals. Trade Allies also received a tent card displaying their ranking, which they could use to promote their status with visiting customers. According to the Program Implementer, its intent is to provide Trade Allies with visibility of their standing relative to other participating Trade Allies and to encourage increased performance leading to a ranking promotion. Trade Allies shared positive feedback with the Program Implementer during advisory group meetings, saying the timing and content

[125] The Program Implementer continues to use the A, B, C, and D rankings internally to track Trade Allies' status.

of the feedback is relevant to their businesses, but also that they would find the information more useful if the ranking information was expanded across the Business Program Portfolio.

As part of the online survey of participating Trade Allies, the Evaluation Team collected feedback from respondents on the value of the new performance letters. Most Trade Allies (16 of 20) reported they had read the letter. Of those who were aware of their performance letter, most (10 of 16 respondents) said that knowing their energy savings contributions and how their performance ranking compared to other Trade Allies was valuable to their business. Figure 143 shows Trade Allies' assessment of the level of value of two aspects of the Program performance letter.

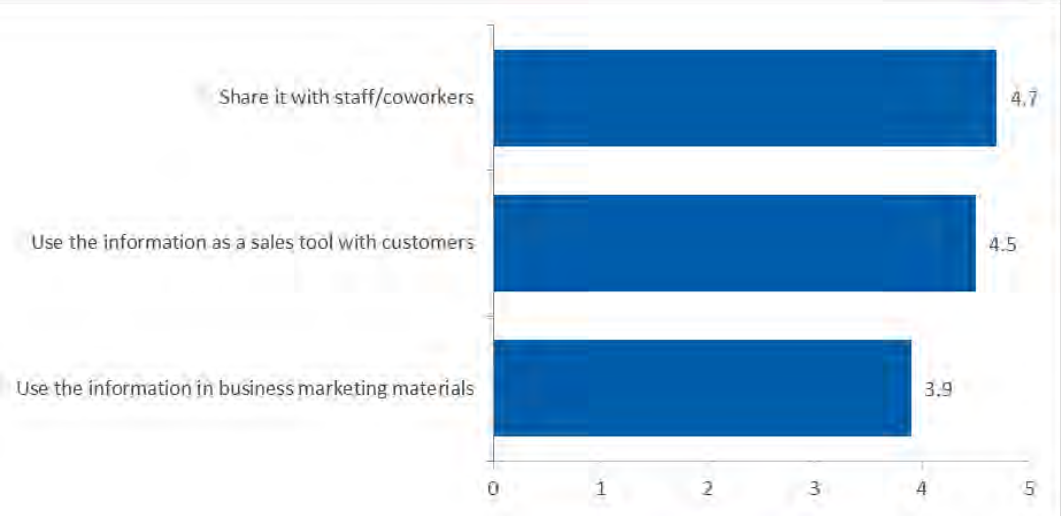
Figure 143. Value of Trade Ally Program Performance Feedback



Source: CY 2016 Trade Ally Survey. Questions J2 and J3: "How valuable is knowing your company's energy savings contribution to the Program?" and "How valuable is knowing your company's Program performance compared to other Trade Allies?" (n=16)

While Trade Allies considered the information valuable, they were not likely to share the information with staff or potential customers. Trade Allies ranked their likelihood of sharing the information with staff or fellow coworkers as 4.7 out of 10, where 0 is "extremely unlikely" and 10 is "extremely likely" (n=15). Trade Allies were even less likely to use the information as a sales tool (4.5 out of 10) or in their marketing materials (3.9 out of 10), as shown in Figure 144.

Figure 144. Mean Likelihood of Sharing or Promoting Performance Feedback



Source: CY 2016 Trade Ally Survey. Question J5: "Regarding the Program contribution and ranking information, how likely are you to…" (n=15)

Two of the six Trade allies who found the information less valuable gave feedback on the contribution and ranking information:

- "[Provide] comparable businesses in the area. They don't have to be named specifically, but maybe the nearest five companies."
- "[Companies] vary year to year with the come and go of incentive dollars... So while a great tool, I don't find it a good measure of work done."

Trade Ally Recognition

As part of its CY 2016 marketing plan, the Program Implementer introduced a recognition system to encourage Trade Allies' promotion of the Program in conjunction with its Performance Feedback Initiative. The Program Implementer set a number of Trade Ally goals, depending on their level of historic Program activity. The Program Implementer then recognized Trade Allies for meeting these goals through personal letters and Focus on Energy-branded gifts as well as publicly through Focus on Energy social media postings and the Trade Ally newsletter. The Program Implementer said the Program recognized 146 Trade Allies through this process, some of whom were recognized in multiple ways, as noted in Table 206.

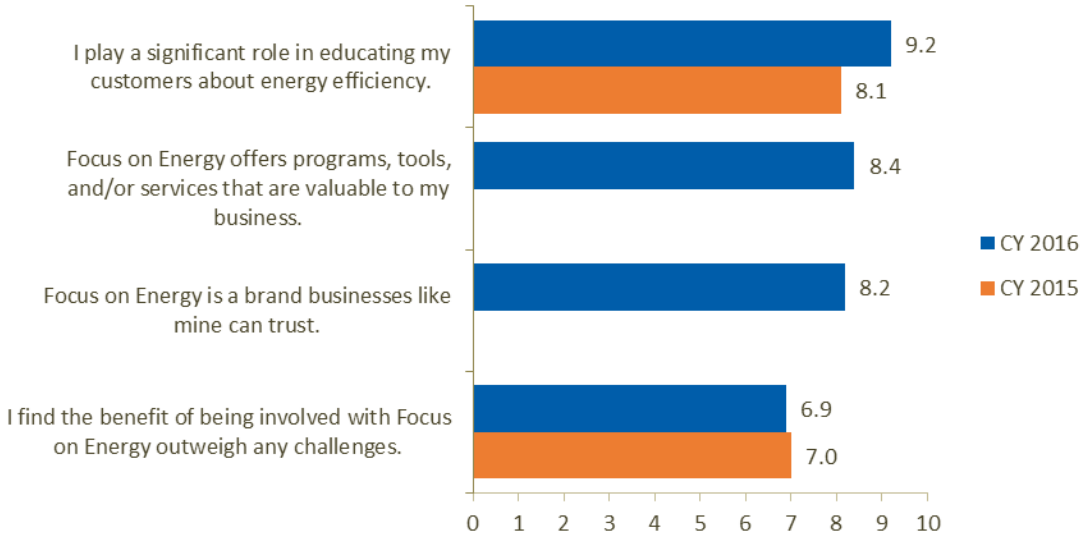
Table 206. Trade Ally Recognition

Milestone	Trade Allies Recognized
Exceed previous year's energy savings and/or number of applications	97 surpassed savings 69 surpassed application quantity
Ranking status promotion	n/a (rankings are updated annually; Trade Allies will be recognized for this milestone in CY 2017)
For C and D ranked Trade Allies, submittal of first and fifth application	27 submitted first application 21 submitted fifth application

Trade Ally Engagement

Trade Allies identified strongly with statements regarding customer education and involvement with Focus on Energy. Figure 145 shows Trade Allies' level of agreement with several statements about Focus on Energy and, where available, shows CY 2016 results as compared to CY 2015 mean scores. While scores for the statement, "I find the benefit of being involved with Focus on Energy outweigh any challenges," were consistent from CY 2015 to CY 2016, Trade Allies in CY 2016 had a mean score of 9.2 for agreement with the statement, "I play a significant role in educating my customer about energy efficiency," which was significantly higher than the average score of 8.1 in CY 2015.[126]

Figure 145. Trade Ally Mean Scores for Focus on Energy Statements

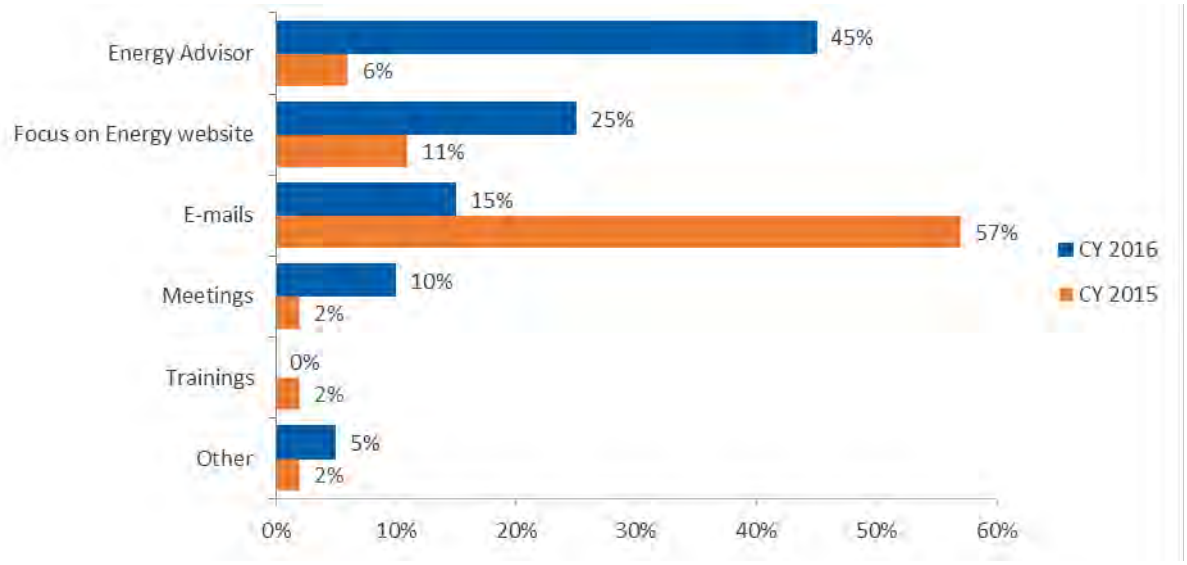


Source: CY 2016 Trade Ally Survey. Question B6 and CY 2015 Trade Ally Survey. Question F5: "On a 10-point scale where 0 means 'strongly disagree' and 10 means 'strongly agree,' please select your level of agreement with the following statements." (CY 2016 n=20, CY 2015 n=61)

[126] $p < 0.05$ using a t-test for the difference in proportions.

Energy Advisors are the preferred source of Program information, according to CY 2016 Business Incentive Program Trade Ally respondents (Figure 146). This response differed significantly from CY 2015, when 57% of Trade Allies noted e-mail as their preferred source for Program information.[127] However, the Program Administrator noted the Energy Advisors' outreach frequency and approach had not differed from CY 2015 to CY 2016.

Figure 146. Trade Ally Preferred Information Sources



Source: CY 2016 Trade Ally Survey. Question C2 and CY 2015 Trade Ally Survey. Question E3: "What is your preferred source for staying informed about Focus on Energy's programs and Trade Ally network?" (CY 2016 n=20, CY 2015 n=54)

Program Impacts on Trade Ally Business

The Evaluation Team asked Trade Allies about the Program's impact on their business. Trade Allies estimated that over half (55%, n=20) of their projects were eligible and received an incentive from Focus on Energy in CY 2016, which was similar to CY 2015 (50%, n=63). Most Trade Allies reported that participating in Focus on Energy Programs increased their volume of sales (with three of 19 saying it "significantly increased" their sales volume and nine saying it "somewhat increased" sales). Five of the 12 businesses that experienced an increase in sales responded by hiring more staff, while two Trade Allies added more products or equipment and two expanded their service territory. One respondent noted that they added more services, and another added more vehicles as a result of the increase in sales.

To determine the impact of the CY 2016 incentive reductions on Trade Allies' business, the Evaluation Team asked Business Incentive Program Trade Ally respondents about their perception of incentive levels inside and outside of Wisconsin. Most Trade Allies (17 of 20 respondents) were aware that Focus

[127] $p < 0.01$ using a binomial t-test.

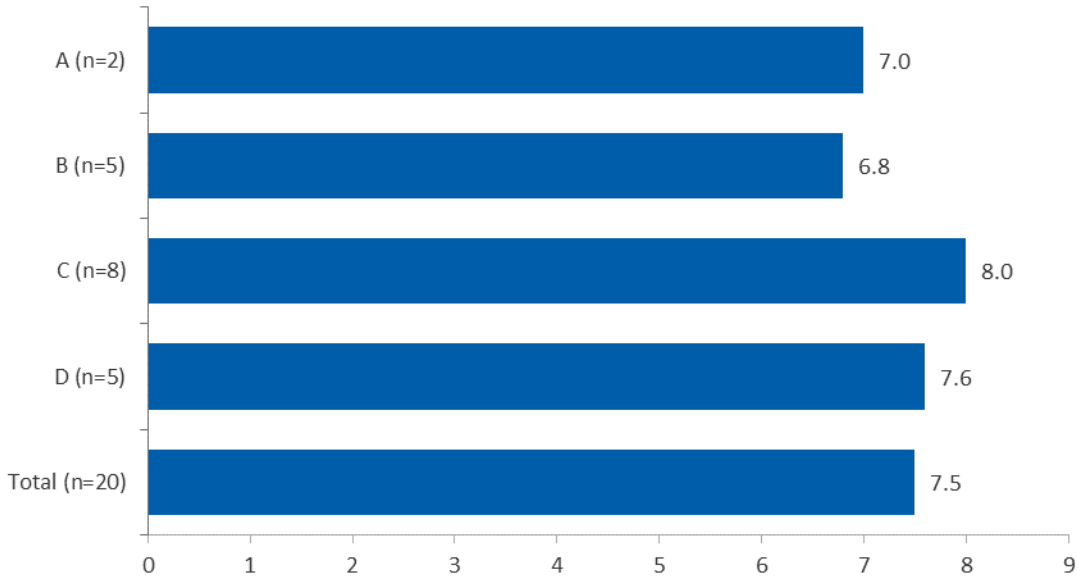
on Energy reduced incentives across all of their nonresidential programs. Of those who were aware of incentive changes, most reported that it had no major impact on their ability to sell projects: 14 of the 17 respondents said the reductions have not changed how often they promote nonresidential programs, whereas two respondents said they promote the programs less often and one said he/she promote the programs more often.

Less than one-third of Program Trade Ally respondents (six of 20) work outside of Wisconsin. Only one of the six respondents who provides services in other states said that they do so because programs in other states offer higher financial incentives. However, three of the six respondents were more satisfied with Focus on Energy's incentives than the incentives offered outside of Wisconsin.

Trade Ally Satisfaction

Business Incentive Program Trade Allies rated their satisfaction with Focus on Energy overall as an average of 7.5 on a scale of 0 to 10, where 0 is "not at all satisfied" and 10 is "extremely satisfied." The overall Trade Ally satisfaction in CY 2016 was consistent with the CY 2015 average score of 7.3. Sample sizes are small among these rankings, but, based on survey results, the A, B, C, and D Trade Ally rankings do not appear to have an effect on Trade Allies' satisfaction and perceptions of Focus on Energy (Figure 147).

Figure 147. Trade Ally Satisfaction with Focus on Energy by Business Incentive Program Performance Rating



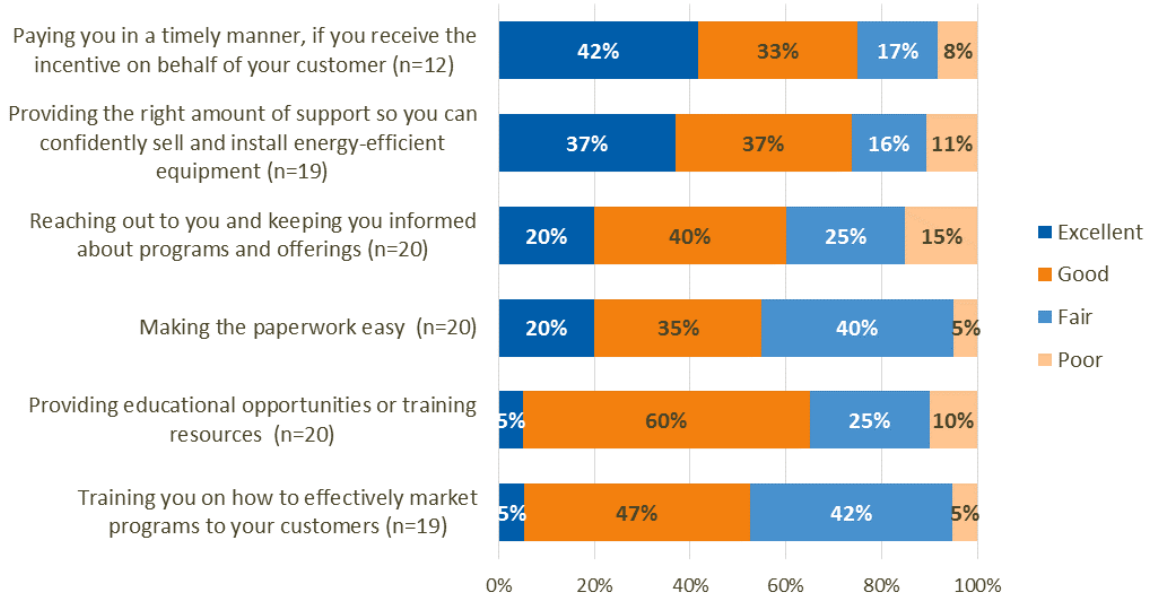
Source: CY 2016 Trade Ally Survey. Question F5: "How satisfied are you with Focus on Energy overall?" (n=20)

Six of the 20 Trade Allies said they have attended Focus on Energy-sponsored training in the past two years, with five attending formal webinars or technology-specific trainings and one noting a one-on-one training with a Focus on Energy representative. When asked how useful Program training was in

providing the information they needed, six Trade Allies who attended Program training gave an average rating of 6.8 on a scale of 0 to 10, where 0 is "not at all useful" and 10 is "extremely useful." Two of these six Trade Allies said the training was "very important" in their decision to promote Focus on Energy programs, while four said the training was "not too important" or "not at all important." The one Trade Ally who had a suggestion for improving Focus on Energy training said speakers should prepare for the training and provide organized, relevant material.

As shown in Figure 148, Trade Allies reported having confidence in Focus on Energy regarding a number of factors. For example, 75% of respondents (nine of 12) said that Focus on Energy was doing an "excellent" or "good" job paying them in a timely manner. Nearly three-quarters (14 of 19) said Focus on Energy was providing the right amount of support so they can confidently sell and install energy efficiency equipment. Twenty percent (four of 20 Trade Ally respondents) noted that Focus on Energy was doing an "excellent" job making the paperwork easy, with another 35% (seven of 20) rating the Program as having done a "good" job. However, 45% (nine of 20) indicated that there was room for improvement on simplifying application paperwork, giving a rating of "fair" or "poor." Trade Allies also offered lower ratings for the Program providing educational opportunities or training resources, and for the Program providing training on how to effectively market the Program.

Figure 148. CY 2016 Focus on Energy Performance Ratings



Source: CY 2016 Trade Ally Survey. Question F1: "How is Focus on Energy doing when it comes to the following?"

Energy Advisor Support

Trade Allies reported high levels of satisfaction regarding their interactions with Energy Advisors. Thirteen of 20 Trade Allies (65%) were "very satisfied" with the support they received from their Energy Advisor, five (25%) were "somewhat satisfied," one (5%) was "not too satisfied," and one (5%) did not work with Program Energy Advisors. These satisfaction levels are consistent with those from CY 2015,

when 23 of 48 Trade Allies (48%) were "very satisfied" with the support they received from their Energy Advisor, 15 of 48 (31%) were "somewhat satisfied," three (6%) were "not too satisfied," and seven (15%) said they did not work with Energy Advisors.

Of the respondents who knew their Energy Advisor (n=18), 13 said their communication levels with their Energy Advisors were sufficient, and five said they would like to hear from their Energy Advisor more frequently. These responses are similar to those from CY 2015, when 21 of 25 Trade Allies who knew their Energy Advisor said their communication level was sufficient, and four said they would like more interaction with their Energy Advisor.

One-quarter of CY 2016 Trade Allies (five of 20 respondents) offered suggestions for ways Energy Advisors could better support them in promoting the Program. Three of the five respondents requested a more proactive approach to managing their relationships, whereas the remaining two suggested that Program Implementer and Program Administrator staff make more concerted efforts to work collaboratively with them on promoting the Program or submitting incentive applications.

Suggestions for Overall Program Improvements

When the Evaluation Team asked what Focus on Energy could do to increase its satisfaction overall, eight Trade Allies offered a wide range of suggestions. Trade Allies most commonly recommended that Program staff collaborate equitably and offer application training and support (five of eight respondents), as evidenced by the following statements:

- "Help train on how to [estimate] incentives. Provide someone to talk to for advice on paperwork, etcetera."
- "Work with us more and work against us less."
- "Make the Program and participation in [Small Business and Business Incentive] Programs…fair, and [provide] a level playing field."
- "Do a better job with the "Find a Trade Ally" section [of the website]. Limit enrollment to those actively participating in the Programs they promote. Stop changing the Programs every year; keep things consistent."
- "Allow sales professionals to participate in Programs that [who] pay [for] part of the cost of product and installation."

Five of the Trade Allies recommended faster incentive application processing times or simplified paperwork:

- "I find the catalog somewhat confusing. Maybe having a user interface website where you select each condition to [determine] the proper rebate incentive code."
- "Simpler [Simplify the] process with consistency [in] product approvals."
- "Ease of paperwork."

- "Getting paid within a week or two like Xcel [Energy] did for us when we did a project in Minnesota. I was shocked when I saw the check so quickly. This helps us move forward on projects and doesn't hinder us to do more projects. A lot of our vendors have short terms and some products we have to purchase up front, which hurts our cash flow."
- "Expedite incentive payback times."

Two Trade Allies requested a broader range of prescriptive products:

- "[Offer] more LED products [through the prescriptive application process] instead of [through the] custom [application process]."
- "Increase residential [multifamily] existing fixture replacement categories."

Customer Experience

The Evaluation Team surveyed a sample of Program participants about their experiences with the Business Incentive Program. Program participants provided feedback through an ongoing customer satisfaction survey, administered quarterly, and through an annual, in-depth participant survey. Whenever possible, the Evaluation Team compared the CY 2016 participant survey results to the CY 2015 and CY 2013 participant survey results to document any changes or progress.

Decision-Making Process

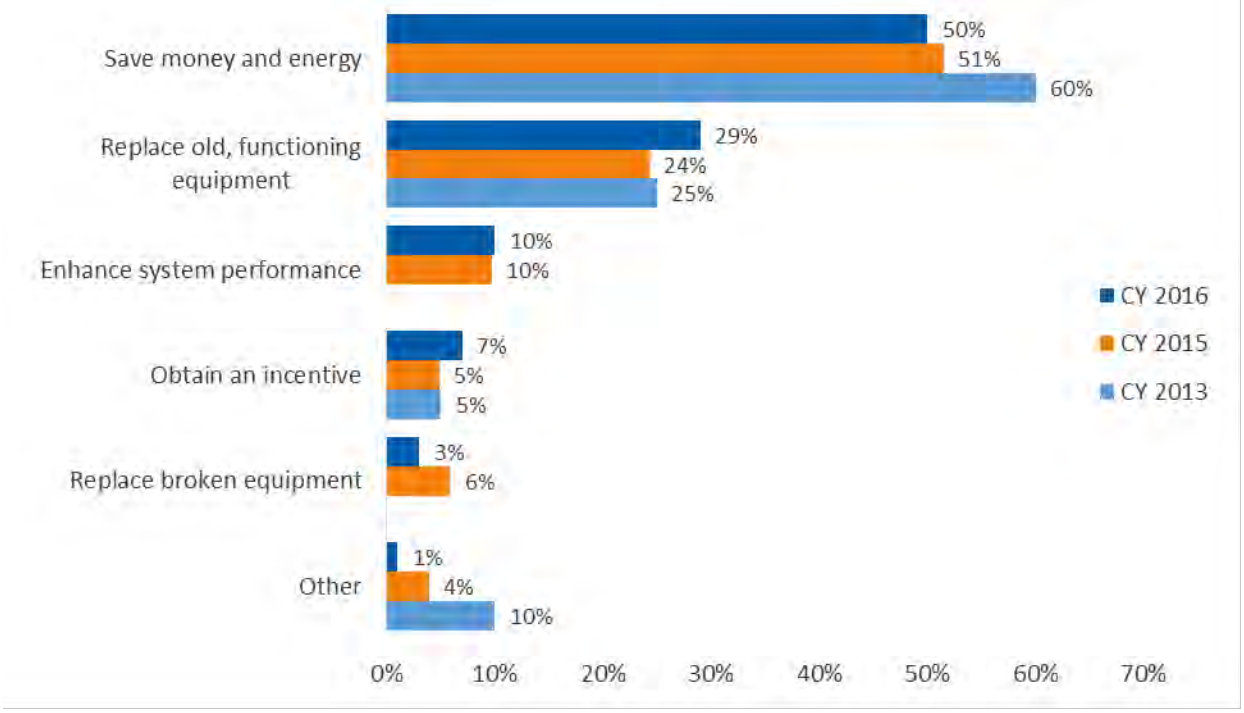
CY 2016 Business Incentive Program participants shared their reasons for implementing an energy efficiency project through the Program. Half of respondents (50%, n=70) said that saving money and energy was the most important factor in choosing to participate in the Program. This was followed by replacing old, but still functioning equipment (29%) and enhancing the performance of existing equipment (10%).

Figure 149 shows the full breakdown of CY 2016 survey respondents' motivations for participating as compared to CY 2013 and CY 2015. There are no significant differences in the motivations between CY 2016, CY 2015, and CY 2013 survey respondents.

In response to a separate question, most CY 2016 respondents (73%, n=70) also indicated that energy efficiency is "very important" to their organization when making capital upgrades or improvements.

Contractors, Energy Advisors, and utility account managers all have a role in providing information and encouraging customers to initiate a project through the Business Incentive Program. CY 2016 survey respondents (n=70) most often cited contractors (84%), followed by Energy Advisors (38%) and utility account managers (15%, multiple responses allowed), as people who helped initiate their Program project. Respondents (n=69) also identified multiple resources as trusted sources of information. Their most trusted source was contractors (74%), followed by Energy Advisors (33%), utility account managers (14%), web resources (14%), and other business owners (7%).

Figure 149. Business Incentive Program Participation Motivations

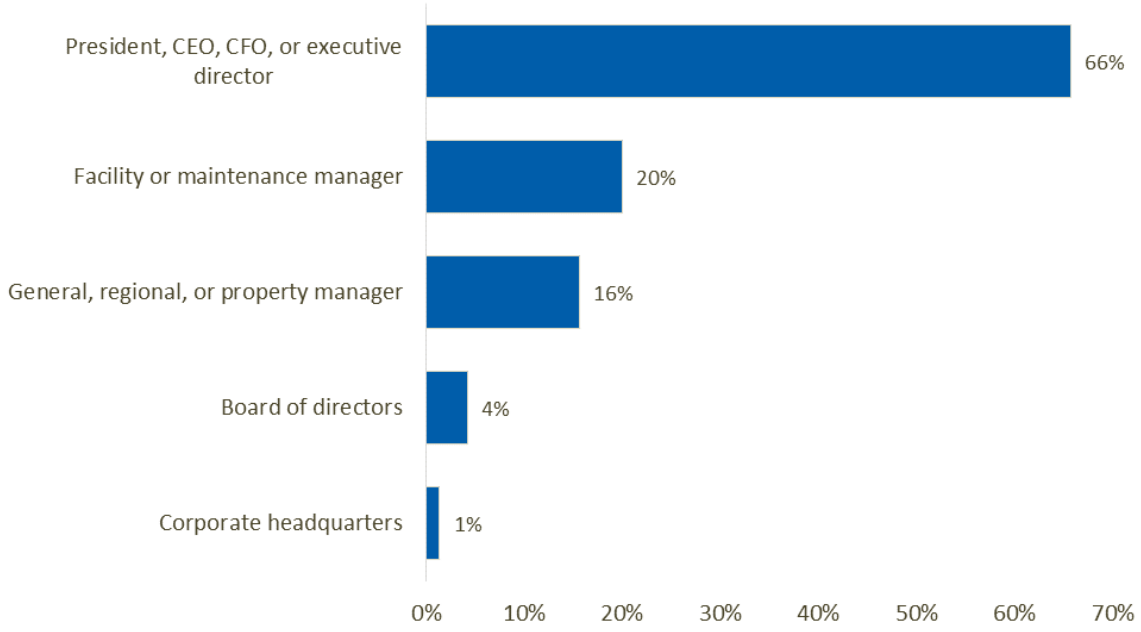


Source: CY 2016 and CY 2015 Participant Survey. Question C1 and CY 2013 Participant Survey. Question C6: "What factor was most important to your company's decision to make these energy-efficient upgrades?" (CY 2016 n=70, CY 2015 n=103, CY 2013 n=209)

The company decision-makers varied among business customers, and half of respondents (50%, n=70) said they required project approval from another member of their organization. Half (50%, n=32) of the respondents requiring project approval said they are able to receive approval within three weeks. Respondents most commonly said the businesses' owner or president (66%) was involved in building upgrade decisions, followed by the facility or maintenance manager (20%) and the property manager (16%). Figure 150 details businesses' capital upgrade decision-makers.

The Evaluation Team asked participants if they had attended a Focus on Energy-sponsored training in the past two years, and only five respondents said they had, with two out of the five reporting the training as "very important" in their decision to move forward with energy-efficient upgrades.

Figure 150. Business Participant Decision-Makers



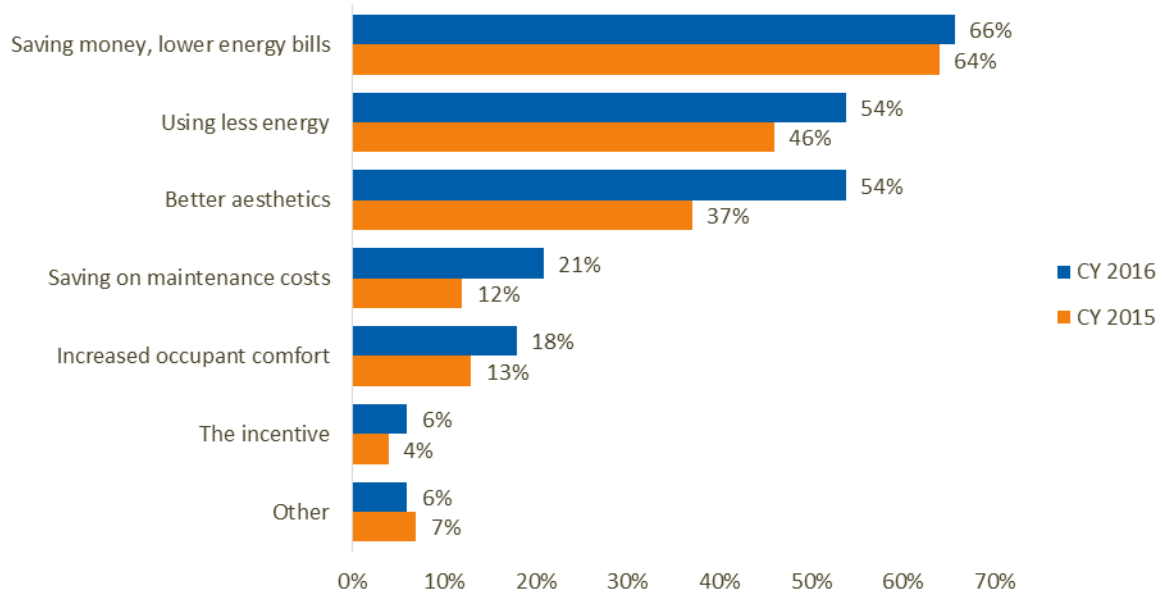
Source: CY 2016 Participant Survey. Question C5: "Who at your organization is involved in making decisions about energy efficiency when making capital upgrades or improvements?" Multiple responses allowed (n=70)

Benefits of Participation

Business Incentive Program participants described numerous benefits their companies experienced as a result of the energy efficiency upgrades they made through the Program. The majority of respondents (66%) said that saving money on utility bills was a benefit of participating in the Program. Additionally, participants mentioned using less energy (54%), better aesthetics (54%), and saving money on maintenance costs (21%) as benefits. A significantly higher percentage of respondents mentioned aesthetics in CY 2016 (54%) than in CY 2015 (37%);[128] most respondents (86%, n=36) who mentioned aesthetics installed LEDs through the Program. Figure 151 details the benefits that participants reported from implementing energy-efficient upgrades.

[128] $p < 0.05$ using a binomial t-test.

Figure 151. Business Incentive Program Participation Benefits



Source: CY 2016 and CY 2015 Participant Survey. Question D1: "What would you say are the main benefits your company has experienced as a result of the energy efficiency upgrades we've discussed?" Multiple responses allowed (CY 2016 n=70, CY 2015 n=100)

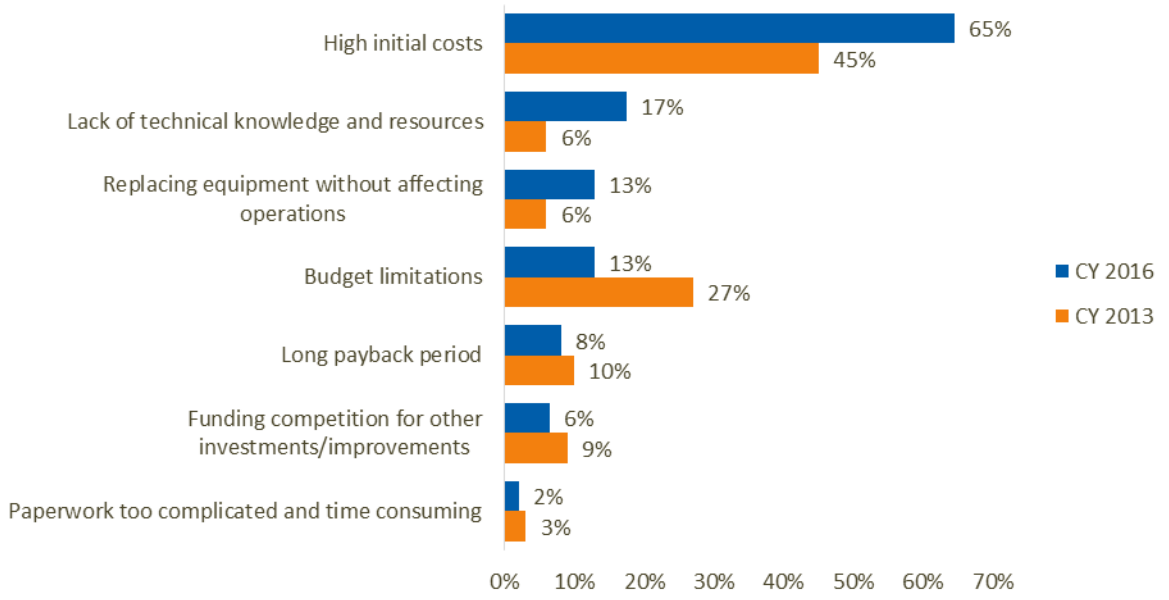
Customer Participation Barriers

Surveyed participants said the biggest barriers to making energy-efficient improvements were high initial costs (65%) and lack of technical knowledge about energy-efficient products and services (17%). A significantly higher percentage of CY 2016 respondents mentioned these barriers than CY 2013 respondents[129] (the Evaluation Team did not ask this question in CY 2015). However, CY 2016 respondents mentioned budget limitations significantly less than CY 2013 respondents,[130] which could explain the differences within these two budget and cost response categories. Figure 152 shows respondents' perceived barriers to Business Incentive Program participation in CY 2016 and CY 2013.

[129] $p < 0.01$ using a binomial t-test.

[130] $p < 0.01$ using a binomial t-test.

Figure 152. Perceived Barriers to Business Incentive Program Participation



Source: CY 2016 Participant Survey. Question D2 and CY 2013 Participant Survey. Question E1: "What do so see as the biggest challenges to making energy-efficient improvements inside your company?" Multiple responses allowed (CY 2016 n=62, CY 2013 n=202)

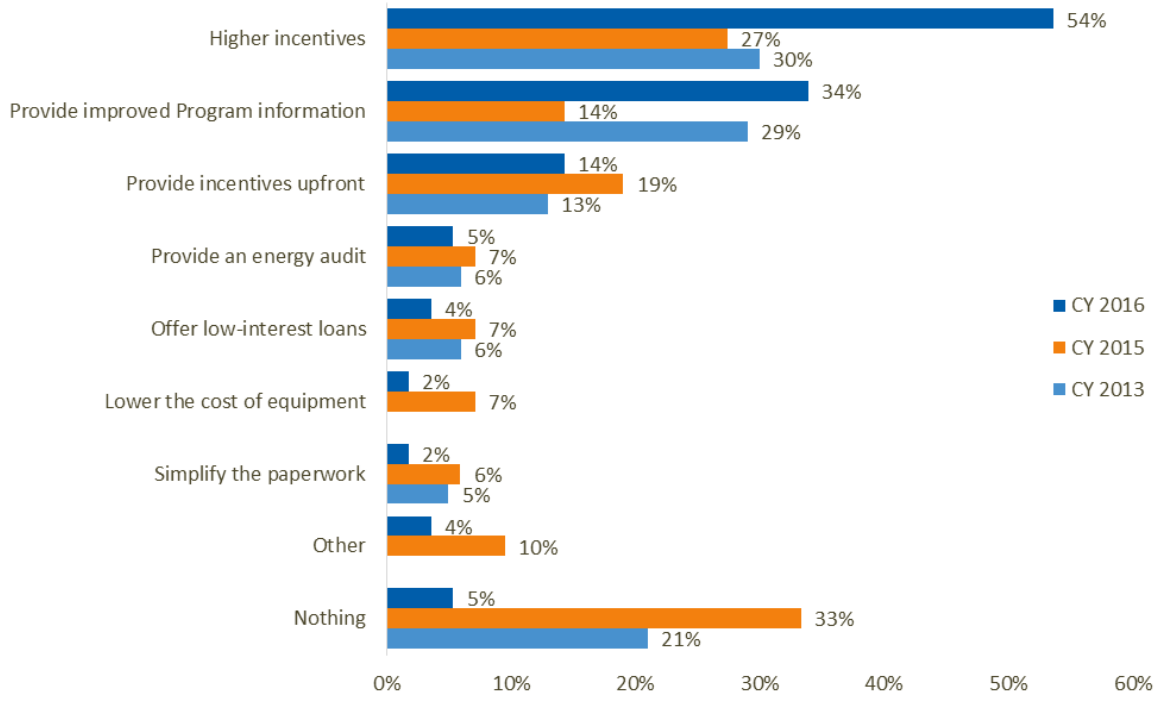
The Evaluation Team asked participant survey respondents what could be done to help their companies overcome the challenges they experienced. Half of the CY 2016 respondents (54%, n=56) said higher incentives would help them mitigate challenges, which was a significantly higher percentage compared to CY 2015 (27%, n=84) and CY 2013 (30%, n=189).[131] A significantly higher percentage of CY 2016 participants suggested making improvements to program information (34%), compared to 14% in CY 2015.[132] Only 5% of CY 2016 respondents said there was nothing that could be done to overcome challenges to implementing improvements, a significantly lower percentage than CY 2015 (33%) and CY 2013 (21%) respondents.[133] Figure 153 details respondents' suggestions from CY 2013, CY 2015, and CY 2016.

[131] $p < 0.01$ using a binomial t-test.

[132] $p < 0.01$ using a binomial t-test. Differences between percentages in CY 2016 and CY 2013 were not significant.

[133] $p < 0.01$ using a binomial t-test.

Figure 153. Suggestions for Overcoming Energy-Efficient Improvement Barriers

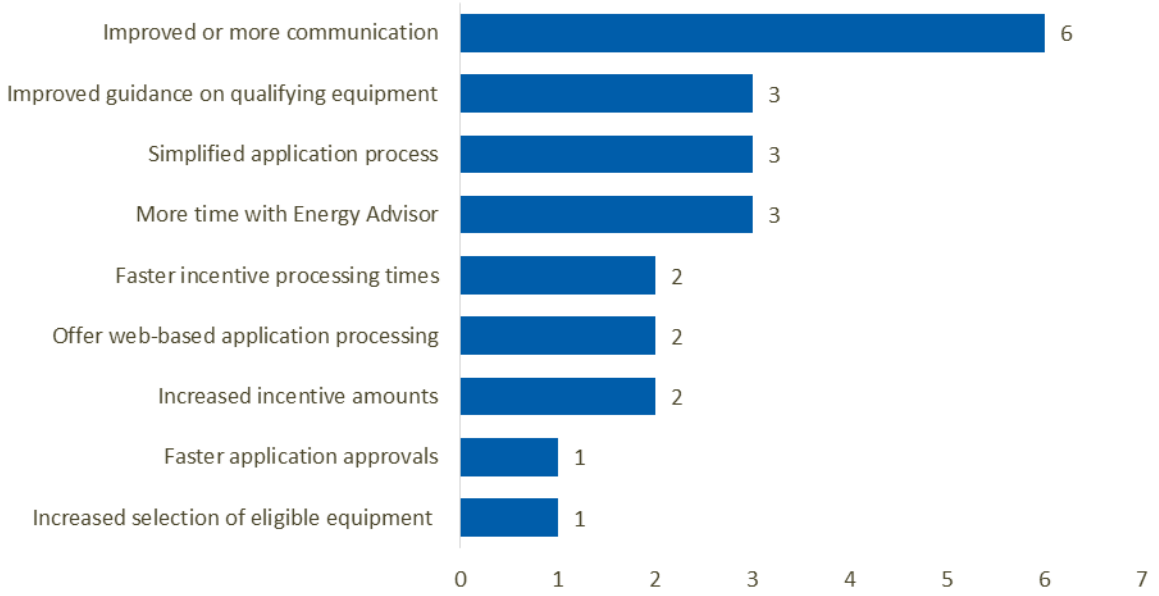


Source: CY 2016 Participant Survey. Question D3; CY 2015 Participant Survey. Question D3; and CY 2013 Participant Survey. Question E2: "What could be done to help your company overcome challenges with energy efficiency improvements?" Multiple responses allowed (CY 2016 n=56, CY 2015 n=84, CY 2013 n=189)

Participant Suggestions for Improvement

When asked how Focus on Energy could improve their experience with the Program, 71% of Program participants (n=70) offered no suggestions. The most common recommendation from those who had a suggestion(s) was to improve the level and quality of communication from Program Implementer staff, indicating a preference for more interaction with staff to determine whether products met Program eligibility requirements and participants received maximum incentive levels. Figure 154 shows a full breakdown of respondents' suggested improvements.

Figure 154. Suggestions for Improving the Business Incentive Program



Source: CY 2016 Participant Survey. Question E5: "Is there anything that Focus on Energy could have done to improve your overall experience with the Business Incentive Program?" Multiple responses allowed (n=19)

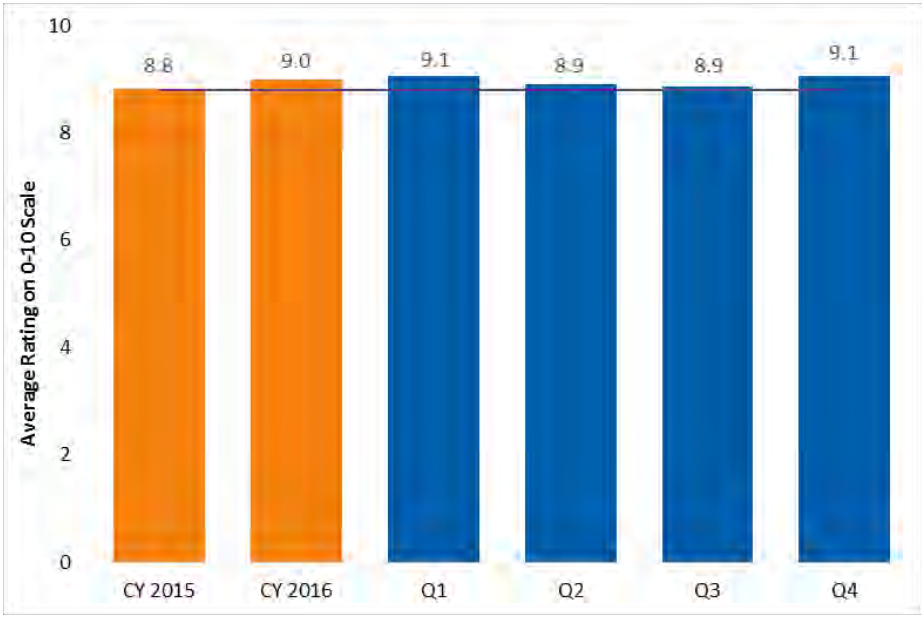
Annual Results from Ongoing Participant Satisfaction Survey

Throughout CY 2016, the Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Business Incentive Program.[134] Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.

[134] The Evaluation Team found that some surveys did not include identifying information to allow it to match survey responses to program participation dates. Survey responses without participation dates were included in the year-end total but not the quarterly breakdown.

Figure 155 shows that average overall Program satisfaction was 9.0 among CY 2016 participants, significantly higher[135] than the portfolio baseline of 8.8 (indicated by the purple line).[136] Satisfaction ratings in CY 2016 showed a statistically insignificant increase from the CY 2015 Program (8.8).[137]

Figure 155. CY 2016 Overall Program Satisfaction



Source: Business Incentive Program Participant Satisfaction Survey Question: "Overall, how satisfied are you with the Program?" (CY 2015 n=372, CY 2016 n=493, Q1 n=80, Q2 n=116, Q3 n=70, Q4 n=190). The portfolio baseline (8.8) is indicated by a purple line.

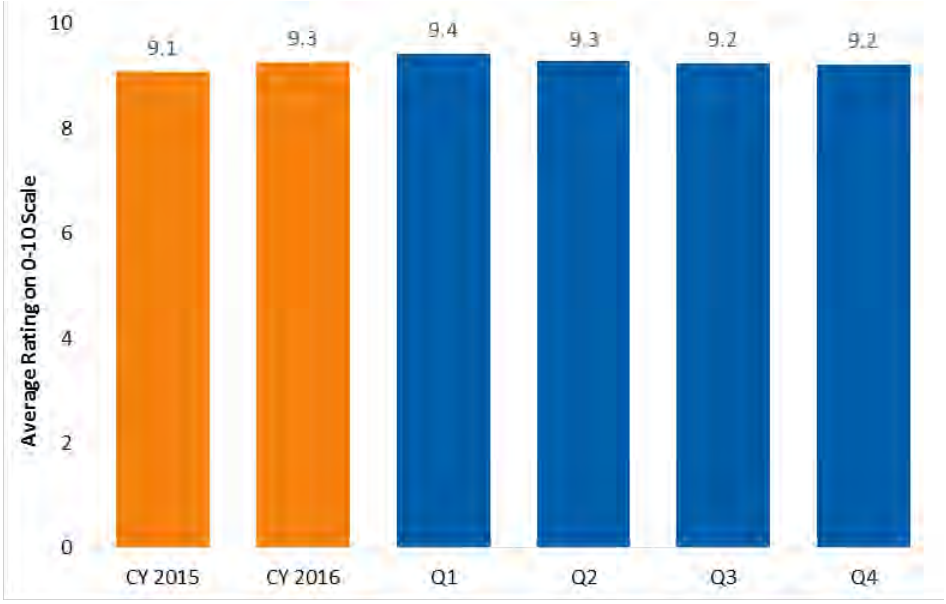
[135] $p < 0.05$ using binomial t-test.

[136] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015-2018 quadrennium).

[137] $p < 0.10$ for Q4 compared to CY 2015 using binomial t-test. Ratings for CY 2016 overall and all other quarters were not statistically different from CY 2015.

As shown in Figure 156, respondents' satisfaction with the upgrades they received through the Program received an average rating of 9.3, representing a statistically significant increase from the CY 2015 Program.[138] The highest ratings were provided by those who participated during Q1 (9.4).

Figure 156. CY 2016 Satisfaction with Program Upgrades

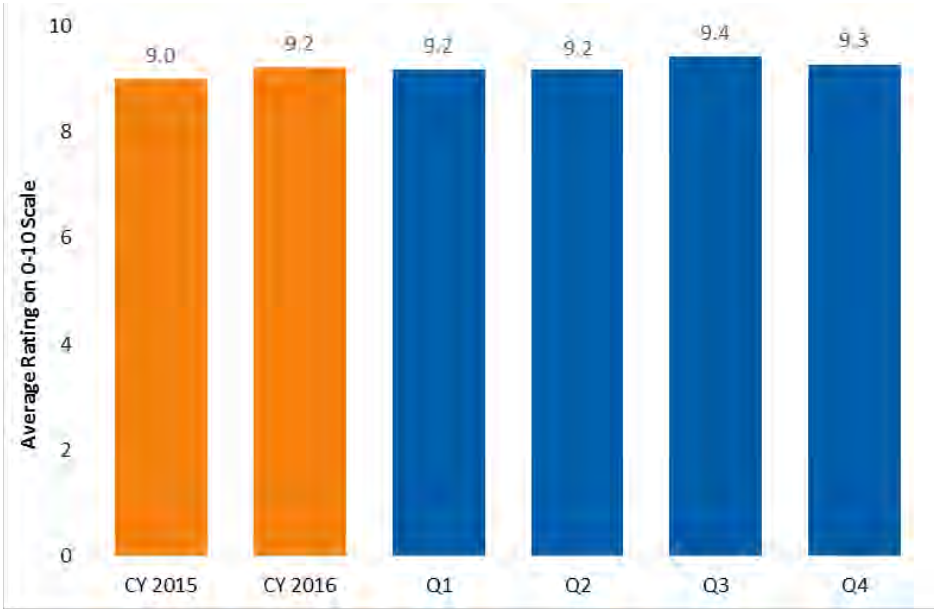


Source: Business Incentive Program Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient upgrades you received?" (CY 2015 n=355, CY 2016 n=484, Q1 n=82, Q2 n=116, Q3 n=66, Q4 n=185)

[138] $p < 0.10$ for CY 2016 compared to CY 2015, and $p < 0.05$ for Q1 compared to CY 2015, using binomial t-tests. Ratings for all other quarters were not statistically significantly different from CY 2015.

Participants gave the Focus on Energy staff who assisted them significantly higher satisfaction ratings than CY 2015, averaging 9.2 for CY 2016 (Figure 157).[139] These ratings were highest during the second half of the year (9.4 in Q3 and 9.3 in Q4).

Figure 157. CY 2016 Satisfaction with Focus on Energy Staff

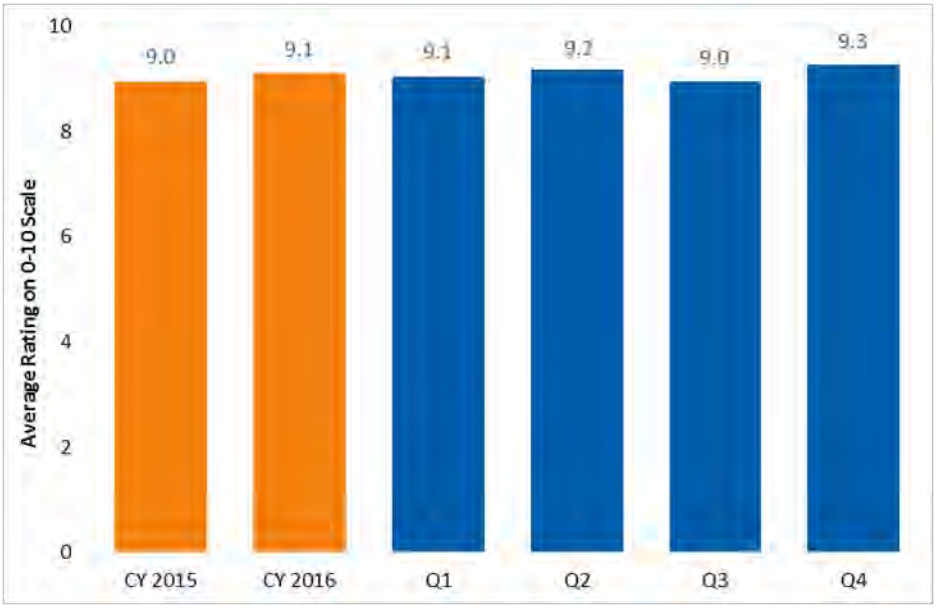


Source: Business Incentive Program Participant Satisfaction Survey Question: "How satisfied are you with the Energy Advisor or Focus on Energy staff who assisted you?" (CY 2015 n=291, CY 2016 n=360, Q1 n=57, Q2 n=79, Q3 n=54, Q4 n=141)

[139] $p < 0.10$ for CY 2016 and Q4 compared to CY 2015, and $p < 0.05$ for Q3 compared to CY 2015, using binomial t-tests. Ratings for all other quarters were not statistically significantly different from CY 2015.

Respondents gave an average rating of 9.1 for the Trade Ally who provided services for them (Figure 158). Ratings provided by Q4 participants were higher (9.3) than CY 2015, but overall CY 2016 ratings were equivalent to the previous year. [140]

Figure 158. CY 2016 Satisfaction with Program Contractors

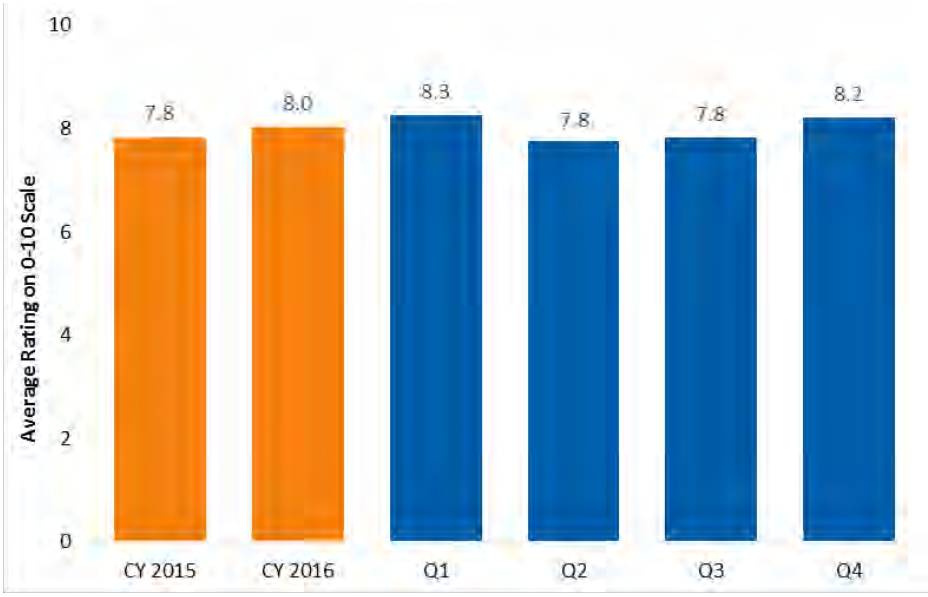


Source: Business Incentive Program Participant Satisfaction Survey Question: "How satisfied are you with the contractor who provided the service?" (CY 2015 n=332, CY 2016 n=445, Q1 n=71, Q2 n=111, Q3 n=65, Q4 n=164)

[140] $p < 0.05$ for Q4 compared to CY 2015 using binomial t-test. Ratings for all other quarters and CY 2016 overall were not statistically significantly different from CY 2015.

Respondents gave an average rating of 8.0 for their satisfaction with the incentive they received (Figure 159). This represented an increase over the CY 2015 Program, although the difference between program years was not statistically significant.[141]

Figure 159. CY 2016 Satisfaction with Program Incentives

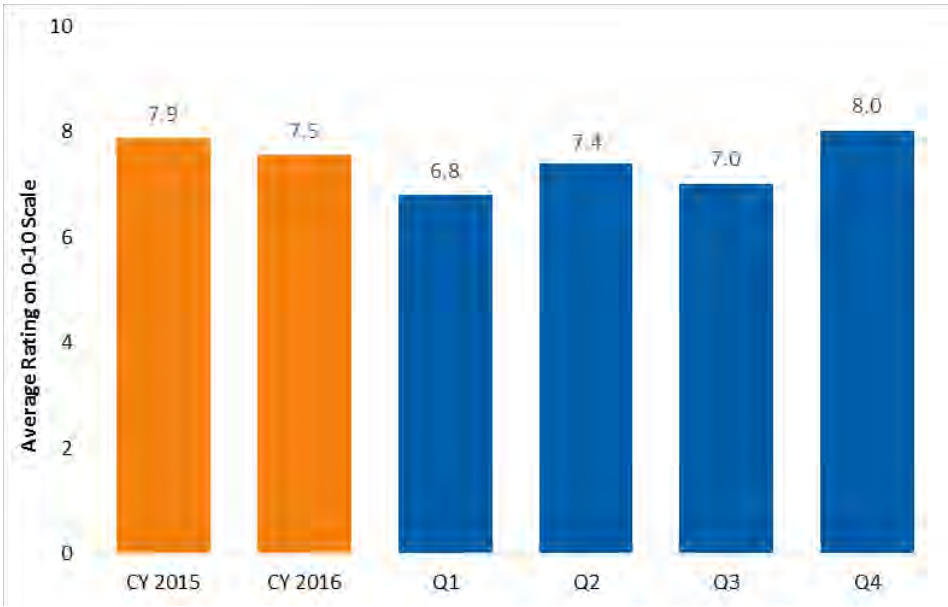


Source: Business Incentive Program Participant Satisfaction Survey Question: "How satisfied are you with the amount of incentive you received?" (CY 2015 n=366, CY 2016 n=489, Q1 n=80, Q2 n=117, Q3 n=71, Q4 n=185)

[141] $p < 0.10$ for Q1 and Q4 compared to CY 2015 using binomial t-tests. Ratings for all other quarters and CY 2016 overall were not statistically significantly different from CY 2015.

As shown in Figure 160, respondents' likelihood they will initiate another energy efficiency project in the next 12 months on average was 7.5. This represented a decrease from the CY 2015 Program, although the difference between Program years was not statistically significant.[142]

Figure 160. CY 2016 Likelihood of Initiating Energy Efficiency Improvement



Source: Business Incentive Program Participant Satisfaction Survey Question: "How likely are you to initiate another energy efficiency improvement in the next 12 months?" (CY 2015 n=340, CY 2016 n=437, Q1 n=73, Q2 n=110, Q3 n=58, Q4 n=165)

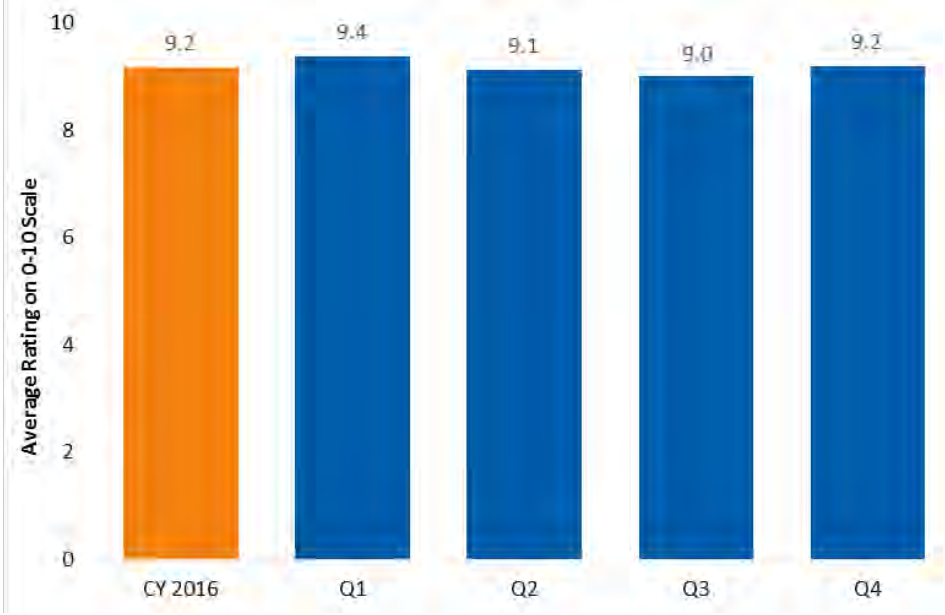
Figure 161 shows respondents' rating for likelihood they would recommend this Program to other businesses was 9.2. [143] Using these survey data, the Evaluation Team calculated a Net Promoter Score (NPS) based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Business Incentive Program NPS is +74, based on 80% of participants identifying as promoters and 7% identifying as detractors.[144]

[142] $p < 0.05$ for Q1, and $p < 0.10$ for Q3, compared to CY 2015 using binomial t-tests. Ratings for all other quarters and CY 2016 overall were not statistically significantly different from CY 2015.

[143] Customers who responded that they "already have" recommended the Program were counted in mean ratings as a rating of 10 (most likely).

[144] Reported numbers do not sum due to rounding error. Including another decimal place, NPS is +73.7 based on 80.4% identifying as promoters and 6.7% as detractors.

Figure 161. CY 2016 Likelihood of Recommending the Program

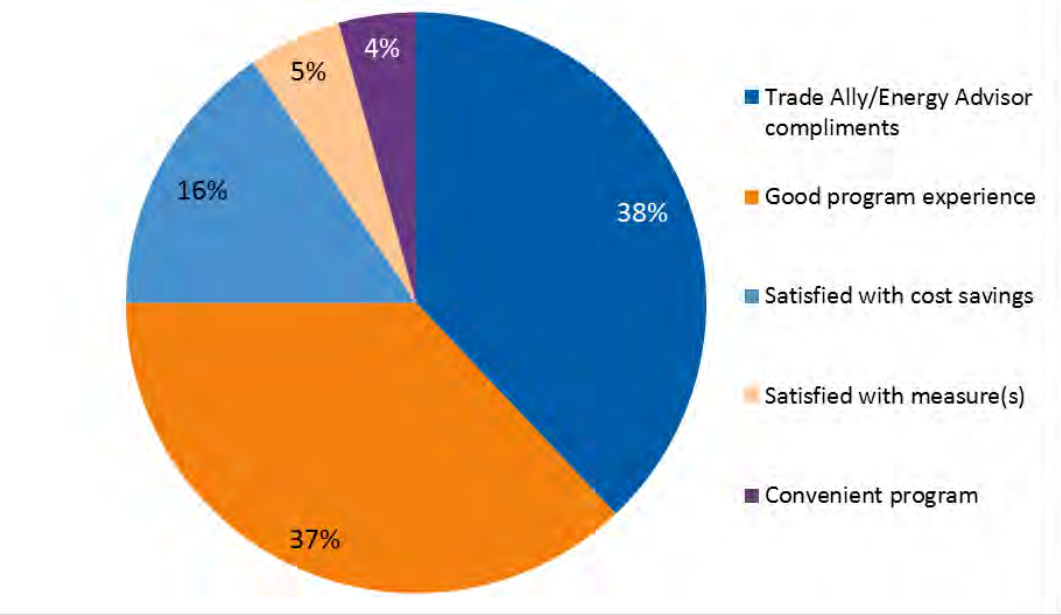


Source: Business Incentive Program Participant Satisfaction Survey Question: "How likely is it that you would recommend this program to others?" (CY 2016 n=494, Q1 n=80, Q2 n=117, Q3 n=72, Q4 n=188)

During the customer satisfaction surveys, the Evaluation Team asked participants if they had any comments or suggestions for improving the Program. Of the 506 participants who responded to the survey, 147 (29%) provided open-ended feedback, which the Evaluation Team coded into a total of 194 mentions. Of these mentions, 116 were complimentary comments (60%) and 78 were suggestions for improvement (40%).

Respondents' positive comments are shown in Figure 162. A majority of these comments were complimentary of Trade Allies and Energy Advisors (38%) or reflected a positive Program experience (37%). Compared to CY 2015 responses, satisfaction with cost savings was mentioned more often (16% up from 10%), whereas the convenience of the Program was mentioned less often (4% down from 18%).

Figure 162. CY 2016 Positive Comments about the Program



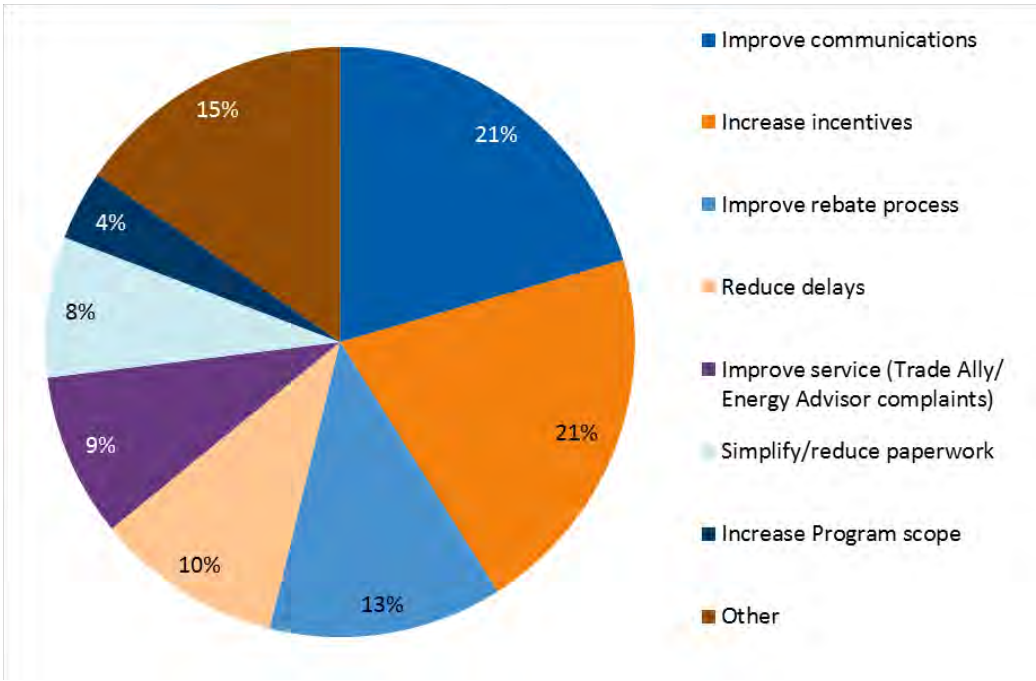
Source: Business Incentive Program Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total positive mentions: n=116)

The most frequent suggestions were to improve communications about the Program and to increase incentives (both 21% of mentions). Increasing the scope of equipment covered by the Program was a top mention in CY 2015, but was rarely mentioned in CY 2016 (down to 4% from 16%). Similar to the increase in respondents' mentions of "higher incentives" to reduce energy efficiency improvement barriers noted above, the largest increase in mentions from the previous year in the ongoing participant satisfaction survey was for increasing incentives (up to 21% from 11%). Several CY 2016 suggestions relating to Program communications mentioned a lack of sufficient explanation when incentive amounts decreased or equipment covered by the Program changed. Another suggestion was that Energy Advisors could provide more and better information about Trade Allies who can perform the recommended upgrades. Additional program communication suggestions for improvement requested Energy Advisors and Trade Allies make more timely responses to inquiries and contact customers more frequently, as well as generally increasing promotion and outreach for the Program.

Another 40% of suggestions dealt with key processes for delivering the Program: improving rebate processing (13%), reducing delays (10%), improving customer service (9%), and simplifying paperwork (8%). Suggestions about rebate processing generally related to situations where applications had to be revised or resubmitted, as well as a few cases where incentive checks had to be reissued. Many of the suggestions about improving service also related to applications, in that several participants felt that their Trade Ally had not delivered on a perceived promise to smoothly handle the application process on behalf of the customer. Other service suggestions mentioned receiving communications from Focus on Energy staff (such as letters in the mail) requesting updated application information, but the customers then having difficulty reaching Focus on Energy staff to clarify these requests and answer questions.

Suggestions for improvement are shown in Figure 163.

Figure 163. CY 2016 Suggestions for Improving the Program



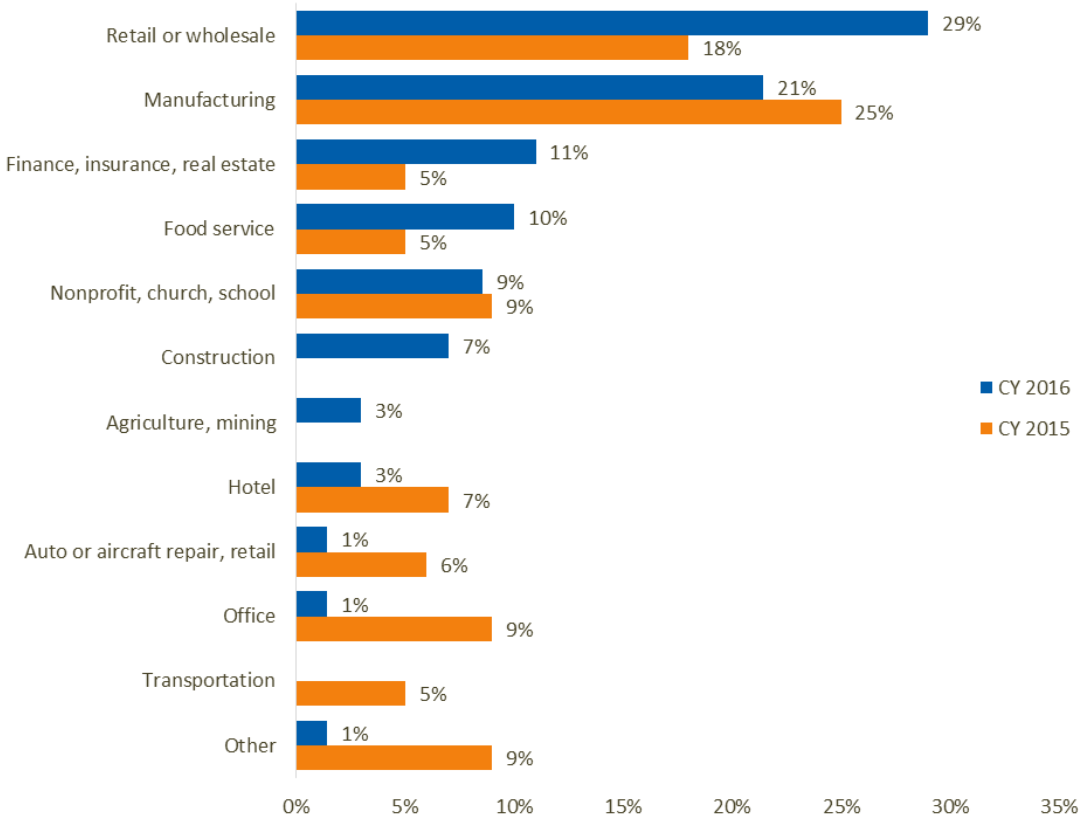
Source: Business Incentive Program Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions: n=78)

Participant Firmographics

The Business Incentive Program attracts participants from many different industries; the industries reported by CY 2016 participant respondents (shown in Figure 164) largely mirror the SPECTRUM data, where participants are predominantly in manufacturing (25%) or retail or wholesale (16%).

The Business Incentive Program Implementer specifically targeted industrial customers in CY 2015, including craft breweries. The Evaluation Team assessed whether the results of CY 2015 efforts carried into CY 2016 Program activity. As shown in Figure 164, manufacturing industry participants in CY 2016 (21%) were down from CY 2015 (25%), but the difference is not significant. The Evaluation Team reviewed the list of survey respondents and found that none own a craft brewery.

Figure 164. Distribution of Surveyed Participants by Industry



Source: CY 2016 Participant Survey. Question J1 and CY 2015 Participant Survey. Question K1: "What industry is your company in?" (CY 2016 n=70, CY 2015 n=102)

Thirteen percent of the respondents lease their facility, while 86% own their facility. One respondent reported that their organization owns some of their buildings and leases others. Ninety-eight percent of respondents had 10 or fewer facilities in Wisconsin, and most (81%) reported having 50 or fewer employees, which correlates with the Program's small- to mid-sized business customer targets.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 207 lists the CY 2015 and CY 2016 incentive costs for the Business Incentive Program.

Table 207. Business Incentive Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$5,820,692	$6,943,989

The Evaluation Team found the CY 2016 Program was cost-effective (2.25). Table 208 lists the evaluated costs and benefits.

Table 208. Business Incentive Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$943,943	$941,845
Delivery Costs	$3,854,513	$3,845,947
Incremental Measure Costs	$20,001,455	$25,188,784
Total Non-Incentive Costs	**$24,799,911**	**$29,976,576**
Benefits		
Electric Benefits	$39,469,899	$57,009,772
Gas Benefits	$8,431,618	$37,219,059
Emissions Benefits	$7,855,712	$14,059,978
Total TRC Benefits	**$55,757,229**	**$108,288,809**
Net TRC Benefits	**$30,957,319**	**$78,312,233**
TRC B/C Ratio	**2.25**	**3.61**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. The Program Implementer completed transitioning the prescriptive incentive application to a catalog format, with instructions for submitting complete applications to simplify the process for customers and Trade Allies. While participant satisfaction remained consistent with CY 2015 results, many participants and Trade Allies still find the application process challenging.

Average overall Program satisfaction was 9.0 among CY 2016 participants, which was consistent with CY 2015 (8.8). However, more than half of Trade Allies and over one-quarter of participants reported having challenges with the incentive application paperwork. Forty-one percent of CY 2016 applications were incomplete (compared to 38% in CY 2015). Most Trade Allies who find the applications challenging noted the supporting documentation, the amount of information required, and the equipment eligibility requirements as their primary issues with the application process. Most CY 2016 respondents also described concerns with determining what equipment qualified and the amount of information needed to complete the application. Because most prescriptive participants are leading the application process, it may need more detailed submittal instructions.

Recommendation 1: Although the Program's prescriptive incentive catalog guides applicants through the process, consider adding web links to the catalog's guidance materials in the application. Consider formatting the required application fields to discern whether an application is complete. Similar to the

residential Heating and Cooling Incentive application's form submittal section,[145] consider identifying what supporting documentation is required with submittal (e.g., invoice and specifications). Consider adding an application-specific telephone number to the form to support businesses in qualifying equipment and supplying required documentation.

Outcome 2. Participants are interested in receiving more information from Program Implementer staff directly, particularly to ensure they receive maximum incentives for their projects. Although the Program Implementer and Program Administrator developed materials and messaging to highlight energy-efficient technologies and target customer opportunities by business segment, participating businesses requested greater transparency in determining project incentive levels and eligibility.

Three-fourths of businesses said contractors are their most common source of energy efficiency awareness and project initiation, but many would like information from Focus on Energy regarding product eligibility and maximizing incentives to reinforce their contractor's recommendations. The Program Implementer and Program Administrator developed market- and technology-specific web pages and marketing materials to assist customers with understanding opportunities and next steps, but these materials may not be reaching businesses or they may not provide information that is useful at the project level. Trade Allies also expressed challenges and confusion with determining project eligibility, which is likely carried into their conversations with business customers.

Recommendation 2: There are several low-cost ways Focus on Energy, the Program Implementer, and the Program Administrator could provide more transparency for Trade Allies and business customers. First, consider having the Program Implementer develop materials and tools that complement contractor sales activities and reinforce their program and equipment eligibility claims. For example, the Program Implementer could enhance the qualified product lists by creating an incentive calculator tool that helps customers determine eligibility and calculate estimated incentives. Consider encouraging Trade Allies to use the qualified product lists in their bidding process to show customers which projects are eligible for incentives.

Second, consider having Program Implementer staff offer one-on-one support during the businesses' product selection process to enable a potential participant to compare energy savings and program incentive opportunities specific to their project. One way to facilitate more direct support is to provide greater access to Program Implementer and Program Administrator contact information on the Focus on Energy website.[146] Ensure this information is easy to find when navigating from the Focus on Energy website's homepage or subsequent Program page.

---

[145] Focus on Energy. "Heating and Cooling Improvements Incentive Application." Accessed April 2017: https://focusonenergy.com/sites/default/files/1216-FOE-HP-558656-HeatingCoolingApplication-R4d_Fillable.pdf

[146] Focus on Energy. "Energy Advisor Map." Accessed April 2017: https://focusonenergy.com/energy-advisor-map

Lastly, continue to have Program staff encourage Trade Allies to take advantage of registering as a Focus Trade Ally. Emphasize with Trade Allies the importance of offering instant incentives to diminish businesses' concerns with product eligibility and obtaining the maximum incentive dollars for their project.

Outcome 3. Trade Allies want comprehensive training and support on Program applications and procedures.

Trade Allies rated their overall satisfaction with the Program as an average of 7.5 on a scale of 0 to 10. Most Trade Allies said the Program staff could do better at simplifying the paperwork and providing training opportunities. Only six of the 20 Trade Ally respondents said they have attended Focus on Energy-sponsored training, and their ratings of the training usefulness (averaging 6.8 on a scale of 0 to 10) were not as strong as their overall satisfaction score (averaging 7.5). Many Trade Allies suggested the need for proactive support from Program staff and in-depth training on application procedures.

Recommendation 3: Consider encouraging the Program staff to provide relevant training and support to Trade Allies, particularly regarding application materials and submittal procedures. Consider promoting trainings through newsletters and mailings, and setting stronger outreach goals to ensure that Energy Advisors are proactively engaging Trade Allies and promoting Program-sponsored trainings. Consider partnering with distributors to host in-depth application process training that uses specifications of products the distributor sells. Also, consider offering one-on-one training for Trade Allies who consistently struggle with the application process.

Outcome 4. Trade Allies would benefit from education, marketing materials, and sales strategies to reach owners and operators of mixed-use buildings.

Trade Allies requested a focused approach to reaching mixed-use building customers, such as targeted incentives, marketing materials, and goals for the Program Implementer staff to reach prospective customers. Business Incentive Program Trade Allies are likely knowledgeable about the incentives available for the commercial spaces within the building, but they may not be aware of the incentives available for the residential tenant units or common areas of the building.

Recommendation 4: Consider offering informational materials and training that addresses mixed-use buildings and that describes commercial leasing models, the incentives available for residential and commercial or common area spaces, and how to determine and approach the decision-makers. Consider developing a fact sheet for mixed-use property managers and owners that highlights the energy savings and incentives available for building upgrades. Consider developing a targeted outreach campaign and setting participation goals to engage property managers and owners of mixed-use buildings.

Outcome 5. Trade Allies appreciate the performance tracking system that the Program Implementer established in CY 2016, but the tracking system may have opportunities for enhancement.

Trade Allies requested greater transparency in the Program's performance over the year and how their company has contributed to the Program goal. The Program Implementer introduced an awareness campaign that identified Trade Ally contributions and rankings compared to others in the network, and

rewarded Trade Allies for increased performance. Trade Allies valued this new communication and reward system, but said it would have been more useful if it had captured activity across the Business Program Portfolio. Many Trade Allies participate in multiple programs and expressed an interest in knowing their performance in other Focus on Energy programs as well.

Recommendation 5: Consider expanding the Trade Ally performance tracking and recognition system to include information across the Franklin Energy-managed Programs that are part of the nonresidential portfolio, including the Business Incentive, Small Business, and Multifamily Programs, or across the full nonresidential portfolio, if feasible. This activity would require a more substantial level of coordination, but may bring greater value and increase individual Trade Ally performance.

Outcome 6. Measures which were not supported by current approved workpapers drove the deviation of evaluated savings from expected (*ex ante*) values.

The Wisconsin TRM is made up of workpapers which have been reviewed and accepted by stakeholders. There are also a number of accepted workpapers which are not included in the TRM but are still used to support SPECTRUM savings values. Finally, a number of measures in SPECTRUM are not supported by the current TRM or current accepted workpapers, but rather are based on old, outdated workpapers or other substandard documentation. These active measures with insufficient documentation are a major source of deviation from expected savings values, since the Evaluation Team must rely upon other algorithms, input parameters, and sources.

Recommendation 6. Increase the measure management process rigor to mitigate the effects of old or insufficient documentation on current program savings. Consider employing sunset dates on all measures to restrict how long a measure savings value can persist in the SPECTRUM database. Consider also creating an “opt-in” process where only those measures with current, approved methodology are listed for use in the current program year database.

Chain Stores and Franchises Program

Through the Chain Stores and Franchises Program (the Program), Focus on Energy offers financial incentives to businesses (in sectors such as retail, food sales, and food service) that have at least five locations in Wisconsin. Focus on Energy offers two incentive paths— custom and prescriptive—and allows participants to consolidate projects at multiple locations on one rebate application. The Program also offers direct installation, through which the Program Implementer (Franklin Energy) installs a limited set of energy efficiency products (e.g., LED lamps, faucet aerators, pre-rinse sprayers) at no cost to eligible customers. The Program Administrator (CB&I), the Program Implementer, Trade Allies, and National Rebate Administrators all have key roles in Program delivery.

The program performed very well relative to its demand and electric energy savings targets, but fell well short of its natural gas energy savings goals. Realization rates were very high compared to expected values (between 102% and 136%, across various parameters). No major trends or issues were identified as part of the impact evaluation. Beginning in January 2017, the Program will merge with the Business Incentives Program and continue as a component of that offering. These customers will also be eligible to participate in the Small Business Program.

Table 209 lists the actual Program spending, participation, savings, and cost-effectiveness.

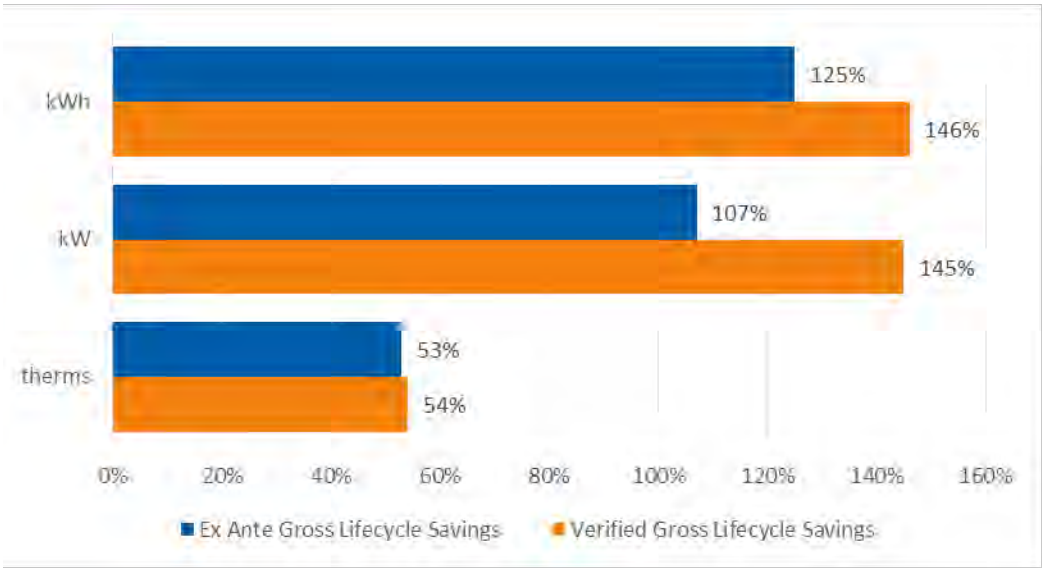
Table 209. Chain Stores and Franchises Program Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$2,799,790	$3,027,391
Participation	Number of participants	264	242
Verified Gross Lifecycle Savings	kWh	974,247,457	604,355,620
	kW	9,434	5,750
	therms	4,737,758	9,328,582
Verified Gross Lifecycle Realization Rate	MMBtu	115%	100%
Annual Net-to-Gross Percentage	MMBtu	63%	77%
Net Annual Savings	kWh	35,977,885	36,602,329
	kW	5,944	4,428
	therms	211,335	458,838
Cost-Effectiveness	Total Resource Cost Test: benefit/cost ratio	2.80	2.26

Figure 165 shows the percentage of gross lifecycle savings goals achieved by the Chain Stores and Franchises Program in CY 2016. Goals for both electric energy and peak demand were exceeded, although only about half of the target CY 2016 natural gas savings were captured. Compared to the CY 2015 values, therms savings were significantly lower (70% or less) for all measure categories except commercial dishwasher, furnace, refrigerated case door, and other. Notably, boiler and energy recovery

measure savings were 14% and 48% of CY 2015 values, which together accounted for 46% of program therms savings in 2015.

Figure 165. CY 2016 Chain Stores and Franchises Program Achievement of Gross Lifecycle Savings Goals[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Chain Stores and Franchises Program in CY 2016. The Evaluation Team designed the evaluation, measurement, and verification (EM&V) approach to integrate multiple perspectives in assessing the Program's performance. Table 210 lists the specific data collection activities and sample sizes used in the evaluations.

Table 210. Chain Stores and Franchises Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant Surveys	70
Franchise Owner/Operator Interviews	8
National Rebate Administrator Interviews	3
Ongoing Participant Satisfaction Surveys[1]	51
Participating Trade Ally Surveys	4
Engineering Desk Review	42
Verification Site Visits	11

[1] The Program Implementer used data collected during the ongoing participant satisfaction surveys to assess performance and help meet contractual obligations related to key satisfaction performance indicators.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and the Program Implementer in June and July 2016 to learn about the current state of the Chain Stores and Franchises Program and to understand Program objectives, performance, and implementation challenges and solutions. Interview topics included these:

- Changes to the Program since CY 2015
- Program successes and challenges
- Marketing and outreach strategies
- Trade Ally roles and feedback
- Participant feedback
- Data tracking, rebate processing, and other processes

Tracking Database Review

The Evaluation Team conducted a census review of the Program's records in the Focus on Energy database, SPECTRUM, which included the following tasks:

- A thorough review of the data to ensure the totals in SPECTRUM matched the totals that the Program Administrator reported
- Reassigning savings from a number of database adjustment measures to the corresponding program measures
- Checking for complete and consistent application of information across data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Participant Surveys

The Evaluation Team attempted to survey a sample of 213 customers who participated in the Chain Stores and Franchises Program in CY 2016 to assess their experience and to gather data to inform net-to-gross calculations. At the time of the survey, the population of unique participants in the Program (as determined by unique phone numbers) was 240. Based on this population size, the number of completed surveys (n=70) achieved 90% confidence at ±10% precision at the Program level.

Franchise Owner/Operator Interviews

The Evaluation Team contacted eight franchise operators who participated in the Program in CY 2016 to gather in-depth feedback about their experience.[147] These interviews focused on decision-making processes regarding energy efficiency upgrades, effectiveness of Program marketing, gaps in energy efficiency knowledge, and preferred information-sharing mechanisms.

The eight franchise operators represented various business types.[148] Table 211 lists the type of business, titles of the respondents, and number of business locations.

Table 211. Franchise Operators Interviewed

Business Type	Respondent Title	Number of Locations
Mixed	Facilities Director	50
Hardware store (n=2)	Chief Operation Officer	3
	Owner	1
Restaurant (n=2)	Director of Operations	10
	Director of Operations	6
Supermarket (n=3)	President	7
	Managing Partner	2
	Store Manager	1

National Rebate Administrator Interviews

The Evaluation Team interviewed three of the six National Rebate Administrators who processed energy efficiency projects for participants in CY 2016. These interviews focused on the how well the Program competes with similar programs nationwide and on collecting information to inform net-to-gross calculations.

[147] Cadmus selected a random sample of franchise operators to contact from a list of participating franchises provided by the Program Implementer in August 2016.

[148] The two restaurant respondents belonged to the same franchise organization. The three supermarket respondents belonged to the same franchise organization.

Ongoing Participant Satisfaction Surveys

The Public Service Commission of Wisconsin (PSC) requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the 2015–2018 quadrennial. The goal of these surveys is to provide an opportunity for recent program participants to quickly and easily give feedback, ensure that that feedback is close to the participation experience, enable problems to be identified at any time of year, and establish opportunities for delivering follow-up information about energy efficiency to interested participants.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2016 participants with email addresses within two weeks of completing participation in the program. The Evaluation Team gathered online survey results via SPECTRUM and sent, received, and scanned mail survey responses, which were combined with the online results for quarterly and annual reporting.

In CY 2016, 51 Chain Stores and Franchises Program participants responded to the customer satisfaction survey.

Participating Trade Ally Surveys

The Evaluation Team conducted an online survey of registered Trade Allies listed in SPECTRUM who completed projects for the Chain Stores and Franchises Program in CY 2016. Because some Trade Allies work on projects through other Focus on Energy nonresidential programs, the Evaluation Team avoided confusion by structuring the first half of the online survey to ask general questions pertaining to Focus on Energy and the second half to ask questions specific to the Chain Stores and Franchises Program. The Evaluation Team emailed a sample of 58 of the 90 registered Trade Allies (after removing those who had already been contacted through another program) and received four responses, a response rate of 7%.

Engineering Desk Review

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 42 program measures. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Evaluation Team's primary sources for methodology and data were the applicable TRMs (dated October 2015 and February 2016). Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue). For prescriptive measures in Wisconsin, the Focus on Energy TRM and associated workpapers were the primary sources used by the Evaluation Team to determine methodology and data in nearly all cases. For custom and hybrid measures, the Evaluation Team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation. The evaluation sample for these reviews is selected using a weighted, random stratified sampling approach known as PPS (Probability Proportional to Size, here lifecycle total energy savings).

Verification Site Visits

The Evaluation Team conducted 11 site visits for the Chain Stores and Franchises Program in CY 2016. Site visits involved verifying that reported measures were installed and operating in a manner consistent with the claimed savings estimates and program requirements. Field technicians documented the type, quantity, performance data, and hours of operation of the equipment, then compared findings to project documents, manufacturer's specifications, and other relevant sources. The Team also referenced TRM parameters and algorithms to confirm alignment or justify deviation.

Impact Evaluation

The Evaluation Team used these methods to conduct an impact evaluation of the Program:

- Tracking database review
- Participant & national rebate program administrator surveys
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data to determine reported installations then applied the results from the participant surveys (n=70), engineering desk reviews (n=42), and verification site visits (n=11) to calculate verified gross savings.

Cadmus found that the overall accounting of demand and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices. No major discrepancies or data issues were found as part of this process, although some minor data entry issues were detected (wattage values swapped with fixture counts, outdated effective useful life values, etc.). The Team also identified several measure management issues where outdated savings values were used in SPECTRUM.

As part of the engineering desk review process, the Evaluation Team adjusted the savings calculation methodology of one custom refrigeration measure with master measure I.D. (MMID) #2520, which in turn reduced the realization rate. The Evaluation Team could not audit the documented method used to determine *ex ante* savings because photographs were missing from available project files, so it used an alternate method of savings calculation from a similar custom measure and a penalty for increased fan power.

Three other custom measure projects, two LED projects (MMID #2455) and one heat recovery project (MMID #2377), did not achieve 100% realization rates because incorrect values (such as quantities, wattages, or CFM values) had been input into SPECTRUM, and because the type of waste heat recovery equipment, desuperheater or condensing, was not specified for the MMID #2377 project.

All three hybrid measures that were evaluated achieved realization rates of close to 100%, with minor variances due to In-Service Rate adjustments (two measures received the program-level ISR, while the

third received a site-specific 100% ISR). These measures were for a chiller (MMID #2251) and two variable-frequency drives (VFDs) (MMID #2648).

Many of the evaluated prescriptive measures achieved realization rates well above 100%. The Evaluation Team used the October 2015 or February 2016 TRM values to calculate *ex post* savings for all of them, but a number of measures had outdated or undocumented savings values which were applied by the SPECTRUM database. These adjustments accounted for realization rate discrepancies ranging from 130% to 185%; affected measures included LED Replacement (MMID #3511) and reach-in refrigerator (MMID #2509).

The Evaluation Team used new or upcoming workpaper methodologies to calculate *ex post* savings in several cases where no current approved savings documentation was available—boiler (MMID #2218), anti-sweat heater controls (MMID #2201), and ECM evaporator motor (MMID #2308). One LED replacement measure (MMID #3511) was included in the TRM, but savings values were incorrect in SPECTRUM. Here, the Evaluation Team used an upcoming workpaper for this measure as well. Finally, one LED fixture measure (MMID #3105) had two TRM entries, so the Evaluation Team used the most recent version.

Site visits generally confirmed that program measures were installed and operating as planned. Any observed deviations were minor and captured in the realization rates for the program. One example of a deviation identified from a site visit was a custom lighting project (MMID #2455) which was installed with a line voltage of 277V, rather than 120V as claimed. The Evaluation Team adjusted the savings analysis based on this observed voltage, and the measure savings increased from the *ex ante* value by roughly 40%.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating properly following installation by the Program Implementer. In CY 2016, the Evaluation Team conducted participant surveys to verify the installed measures and estimate the ISR at the measure level.

The Evaluation Team applied a combined, weighted ISR of 97.8% from these surveys to all engineering desk reviews without a completed site visit. The Evaluation Team applied a site-specific ISR to all measures where verification site visits were performed.

CY 2016 Verified Gross Savings Results

Overall, the Program achieved an annual evaluated realization rate of 109%, weighted by total (MMBtu) energy savings.[149] Totals in Table 212 represent a weighted average realization rate for the entire Program.

[149] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 212. CY 2016 Chain Stores and Franchises Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
112%	136%	102%	110%	117%	136%	102%	114%

Table 213 lists the *ex ante* and verified annual gross savings for the Program for CY 2016. The Program Implementer includes a category called Bonus measures in the tracking database to capture funds paid out to various participants and Trade Allies. Because no demand or energy savings are associated with these measures, they are omitted from the following tables.

Table 213. CY 2016 Chain Stores and Franchises Program Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	58,009	13	1,704	65,011	18	1,742
Boiler	0	0	19,920	0	0	20,364
Chiller	828,779	59	0	928,809	80	0
Compressor	54,152	10	0	60,688	13	0
Controls	5,369,322	65	17,418	6,017,373	89	17,806
Delamping	306,816	64	0	343,847	87	0
Dishwasher, Commercial	36,923	0	1,082	41,380	0	1,106
Economizer	15,439	0	0	17,302	0	0
Energy Recovery	97,394	23	69,952	109,149	31	71,511
Fluorescent, Linear	2,188,458	508	0	2,452,594	689	0
Fryer	14,745	3	11,484	16,525	4	11,740
Furnace	1,362	0	594	1,527	0	607
Griddle	5,208	1	0	5,837	2	0
Hot Holding Cabinet	3,132	1	0	3,510	1	0
Ice Machine	3,998	0	0	4,481	1	0
Infrared Heater	0	0	8,000	0	0	8,178
Light Emitting Diode (LED)	29,408,308	4,621	0	32,957,748	6,271	0
Motor	4,171,940	488	0	4,675,473	662	0
Other	3,644,269	310	1,627	4,084,115	420	1,663
Oven	0	0	1,370	0	0	1,401
Pre-Rinse Sprayer	6,699	2	252	7,508	2	258
Reconfigure Equipment	956,085	141	0	1,071,480	192	0
Refrigerated Case Door	1,812,414	213	165,272	2,031,164	290	168,955
Refrigerator / Freezer - Commercial	451,955	52	0	506,504	70	0
Rooftop Unit / Split System A/C	204,488	282	22,296	229,169	383	22,793
Strip Curtain	6,776	0	0	7,594	0	0
Tune-up / Repair / Commissioning	7,551	0	0	8,462	1	0
Variable Speed Drive	1,303,217	96	0	1,460,509	130	0
Water Heater	0	0	7,168	0	0	7,328
Total Annual	**50,957,439**	**6,952**	**328,139**	**57,107,754**	**9,434**	**335,452**

Table 214 lists the *ex ante* and verified gross lifecycle savings by measure type for the Program in CY 2016.

Table 214. CY 2016 Chain Stores and Franchises Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Aeration	580,092	13	17,043	677,815	18	17,315
Boiler	0	0	398,398	0	0	404,767
Chiller	16,575,580	59	0	19,367,905	80	0
Compressor	812,277	10	0	949,113	13	0
Controls	55,248,705	65	232,935	64,555,911	89	236,659
Delamping	3,068,160	64	0	3,585,023	87	0
Dishwasher, Commercial	369,232	0	10,820	431,433	0	10,993
Economizer	154,394	0	0	180,403	0	0
Energy Recovery	1,161,404	23	1,049,280	1,357,054	31	1,066,054
Fluorescent, Linear	31,695,216	508	0	37,034,597	689	0
Fryer	176,940	3	137,808	206,747	4	140,011
Furnace	24,514	0	10,682	28,644	0	10,853
Griddle	57,288	1	0	66,939	2	0
Hot Holding Cabinet	37,584	1	0	43,915	1	0
Ice Machine	39,982	0	0	46,718	1	0
Infrared Heater	0	0	120,000	0	0	121,918
Light Emitting Diode (LED)	547,451,398	4,621	0	639,675,149	6,271	0
Motor	66,685,048	488	0	77,918,822	662	0
Other	56,216,902	310	4,135	65,687,210	420	4,201
Oven	0	0	16,440	0	0	16,703
Pre-Rinse Sprayer	33,495	2	1,260	39,138	2	1,280
Reconfigure Equipment	9,560,850	141	0	11,171,472	192	0
Refrigerated Case Door	15,735,138	213	2,254,548	18,385,882	290	2,290,590
Refrigerator / Freezer - Commercial	5,423,460	52	0	6,337,097	70	0
Rooftop Unit / Split System A/C	3,067,320	282	334,440	3,584,041	383	339,787
Strip Curtain	33,880	0	0	39,587	0	0
Tune-up / Repair / Commissioning	30,204	0	0	35,292	1	0
Variable Speed Drive	19,548,420	96	0	22,841,550	130	0
Water Heater	0	0	75,420	0	0	76,626
Total Lifecycle	**833,787,483**	**6,952**	**4,663,209**	**974,247,457**	**9,434**	**4,737,758**

Evaluation of Net Savings

The Evaluation Team used participant surveys and interviews with National Rebate Administrators (NRA) to assess net savings for the Chain Stores and Franchises Program and calculated a net-to-gross ratio of 63% for CY 2016.

Freeridership

The Evaluation Team used the self-report survey method to determine the Program's freeridership level for CY 2016. The Team estimated an average self-reported freeridership of 40% for projects not associated with a National Rebate Administrator, weighted by evaluated savings, for the CY 2016 Program.

In CY 2016, the Evaluation Team relied solely on self-reported freeridership. In addition to the participant customer surveys, the Evaluation Team collected new self-report data from third-party market actors called National Rebate Administrators during CY 2016. In CY 2016, there were 39 companies that pursued projects through the Program by using a National Rebate Administrator. These organizations help national chains maximize their return on investment when making store upgrades or installing new equipment by "matching" them with various utility incentive programs around the country. National Rebate Administrators will often help national companies process incentive applications, advise them on program-qualifying equipment, and navigate eligibility guidelines. Because they play a significant role in customer decision-making and work with companies representing a notable share of program savings (11% of total MMBtu in CY 2016), the Evaluation Team interviewed the three National Rebate Administrators operating in Wisconsin to help inform freeridership in CY 2016.

The three CY 2016 participant customer respondents with the greatest savings accounted for 36% of the total non-NRA analysis sample gross savings, with an average weighted freeridership rate of 55%. This compares with CY 2015, where one respondent represented 44% of the total non-NRA gross savings for the survey sample and had an estimated freeridership score of 0%. This CY 2015 respondent was the main driver in the lower self-report non-NRA freeridership estimate observed in CY 2015 compared to CY 2016. As a direct comparison with consistent methods, Table 215 lists the CY 2015 and CY 2016 self-reported freeridership estimates, weighted by participant gross evaluated energy savings.

Table 215. CY 2015 and CY 2016 Self-Reported Non-NRA Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	45	23%
CY 2016	70	40%

According to the interviewed group of National Rebate Administrators, freeridership was low (Table 216). All three interviewed National Rebate Administrators reported that Focus on Energy was very influential in how their clients decide on facility upgrades. Two interviewees reported that their clients occasionally will purchase and install equipment prior to learning about the rebates and this activity accounts for all of the overall 10% savings-weighted freeridership estimate.

Table 216. CY 2016 National Rebate Administrator Respondent Freeridership Scores

Respondent	Freeridership Score
NRA #1	0%
NRA #2	10%
NRA #3	15%
Overall Savings-weighted NRA Freeridership Score	**10%**

After calculating a savings-weighted average freeridership score of 10% based on the interview responses, the Evaluation Team applied this percentage to the proportion of savings associated with National Rebate Administrator projects. For the remainder of the program savings, the Team applied the self-report freeridership score that was determined through the CY 2016 participant customer survey. Overall, this approach resulted in a program-level freeridership score of 37% for CY 2016.

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Chain Stores and Franchise Program. The Evaluation Team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table 217.

Table 217. Chain Stores and Franchise Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LEDs	48	71.5
LED Cooler Lights	9	33.7
Cooler Door Gaskets	20	61.4
Central Air Conditioner	1	83.3

Next, the Evaluation Team divided the sample spillover savings by the program gross savings from the entire survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 0% spillover estimate,[150] rounded to the nearest whole percentage point, for the Chain Stores and Franchise Program respondents (Table 218).

[150] Actual value is 0.2%.

Table 218. Chain Stores and Franchise Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	250
Program Savings	103,552
Spillover Estimate	**0%**

CY 2016 Verified Net Savings Results

To calculate the Program's NTG ratio, the Evaluation Team combined the self-report freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG ratio estimate of 63% for the Program. Table 219 shows total net-of-freeridership savings, participant spillover savings, and total net savings in MMBtu, as well as the overall Program NTG ratio.[151]

Table 219. CY 2016 Chain Stores and Franchises Program Annual Net Savings and NTG Ratio

Net-of-Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
143,890	0[1]	228,397	143,890	63%

[1] Although spillover activity of 0.2% was observed for the Program, the percentage estimate of spillover was rounded to 0%, the nearest whole percentage, and the 0% spillover estimate was used throughout the impact analysis.

Table 220 shows the annual net demand and energy impacts (kWh, kW, and therms) by measure category for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 220. CY 2016 Chain Stores and Franchises Program Annual Net Savings

Measure	Annual Net Savings		
	kWh	kW	therms
Aeration	40,957	11	1,098
Boiler	0	0	12,829
Chiller	585,149	50	0
Compressor	38,233	8	0
Controls	3,790,945	56	11,218

[151] Although nonparticipant spillover was measured through Trade Ally interviews in CY 2016, these savings will be reviewed by the EWG and a determination of if and how these savings should be applied will occur at the end of the CY 2015–CY 2018 quadrennial, consistent with broader sampling practices design to draw full-quad conclusions.

Measure	Annual Net Savings		
	kWh	kW	therms
Delamping	216,624	55	0
Dishwasher, Commercial	26,069	0	697
Economizer	10,901	0	0
Energy Recovery	68,764	20	45,052
Fluorescent, Linear	1,545,134	434	0
Fryer	10,411	3	7,396
Furnace	962	0	382
Griddle	3,677	1	0
Hot Holding Cabinet	2,211	0	0
Ice Machine	2,823	0	0
Infrared Heater	0	0	5,152
Light Emitting Diode (LED)	20,763,381	3,951	0
Motor	2,945,548	417	0
Other	2,572,992	265	1,048
Oven	0	0	882
Pre-Rinse Sprayer	4,730	1	162
Reconfigure Equipment	675,032	121	0
Refrigerated Case Door	1,279,633	182	106,442
Refrigerator / Freezer - Commercial	319,097	44	0
Rooftop Unit / Split System A/C	144,376	241	14,360
Strip Curtain	4,784	0	0
Tune-up / Repair / Commissioning	5,331	0	0
Variable Speed Drive	920,121	82	0
Water Heater	0	0	4,616
Total Annual	**35,977,885**	**5,944**	**211,335**

Table 221 lists the lifecycle net demand and energy impacts (kWh, kW, and therms) by measure category for the Program.

Table 221. CY 2016 Chain Stores and Franchises Program Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
Aeration	427,023	11	10,909
Boiler	0	0	255,003
Chiller	12,201,780	50	0
Compressor	597,941	8	0
Controls	40,670,224	56	149,095
Delamping	2,258,564	55	0
Dishwasher, Commercial	271,802	0	6,926
Economizer	113,654	0	0

Measure	Lifecycle Net		
	kWh	kW	therms
Energy Recovery	854,944	20	671,614
Fluorescent, Linear	23,331,796	434	0
Fryer	130,251	3	88,207
Furnace	18,045	0	6,837
Griddle	42,171	1	0
Hot Holding Cabinet	27,667	0	0
Ice Machine	29,432	0	0
Infrared Heater	0	0	76,809
Light Emitting Diode (LED)	402,995,344	3,951	0
Motor	49,088,858	417	0
Other	41,382,943	265	2,647
Oven	0	0	10,523
Pre-Rinse Sprayer	24,657	1	806
Reconfigure Equipment	7,038,028	121	0
Refrigerated Case Door	11,583,106	182	1,443,072
Refrigerator / Freezer - Commercial	3,992,371	44	0
Rooftop Unit / Split System A/C	2,257,946	241	214,066
Strip Curtain	24,940	0	0
Tune-up / Repair / Commissioning	22,234	0	0
Variable Speed Drive	14,390,176	82	0
Water Heater	0	0	48,274
Total Lifecycle	**613,775,898**	**5,944**	**2,984,787**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the Chain Stores and Franchises Program process evaluation activities, which focused on these key topics:

- Franchise operator experience with the Program and obstacles to installing energy efficiency measures
- Customer knowledge gaps and ways to inform participants about Program offerings and energy efficiency measures

Program Design, Delivery, and Goals

The Evaluation Team interviewed key staff members of the Program Administrator and Program Implementer to get an overview of the Program design, delivery process, and any changes or challenges in implementation.

Program Design

Launched in CY 2012, the Chain Stores and Franchises Program offers eligible customers these benefits:

- Advice from a Program Implementer Energy Advisor and a free energy assessment, if requested
- Free direct installations of products such as LED lamps, faucet aerators, pre-rinse sprayers, and cooler misers (installed by an Energy Advisor)
- Prescriptive and custom incentives for qualifying energy efficiency measures

Customers have the following four possible entry points into the Program:

- **Direct outreach to an individual location.** Energy Advisors reach out directly to potential participants via email, in-person visits, and telephone calls. According to the participant survey, franchises or chains with 11 or more store locations typically learned about the Program through an Energy Advisor or Focus on Energy workshop or event.
- **Trade Ally referral.** Trade Allies direct customers to the Program by referring their clients to the Program Implementer. According to the participant survey, franchises or chains with up to 10 locations typically learned about the Program through a contractor.
- **A National Rebate Administrator.** Large, national chains may work with a National Rebate Administrator, although Energy Advisors also recruit these corporate accounts directly. National Rebate Administrators work for third-party rebate aggregation and management companies that help clients calculate potential incentives and prioritize energy efficiency projects nationwide.
- **Corporate referral.** In some cases, franchise operators learn about the Program through referrals from their respective corporate headquarters.

Focus on Energy designed the Program to take advantage of the efficiencies for paperwork processing and decision-making from engaging a single point-of-contact/decision maker who can represent multiple business locations at the chain store or franchise.[152]

Through the Program, Focus on Energy offers dozens of eligible measures for prescriptive and custom incentives, primarily in the refrigeration, lighting, HVAC, and food service categories. Focus on Energy also offers custom incentives for nonstandard projects that either include more complicated technologies or involve equipment changes that require more than one-for-one replacement. A summary of the custom incentives and prescriptive measure offerings and their associated incentive levels are found in Appendix C.

Lighting measures continued to be the most widely adopted Program measures in CY 2016, representing 48% of total Program measures. Motors, controls, and refrigeration measures followed lighting, with 9.2%, 8.1%, and 6.9%, of total Program measures, respectively. The Program Implementer noted that

the popularity of lighting measures (because of the ease of documenting and quantifying energy savings) has not caused these measures to reach saturation.

The Program Implementer also said there are strong savings opportunities with HVAC measures but that customers are still somewhat unfamiliar with these opportunities, which may limit uptake. According to the Program Implementer, advanced rooftop unit controllers are a particularly promising measure. Although a special offering for advanced rooftop unit controllers was introduced in CY 2015,[153] the Program Implementer noted that uptake did not meet expectations.

According to a memo from the Program Implementer, Trade Allies who were involved in this offering said Program participants took longer to make decisions than did customers with only one location who participated in a different program. Trade Allies said this longer timeline made it more difficult to implement projects during the special offering. They also said they could have more successfully marketed the offering if it had been implemented through a prescriptive process with fewer constraints.[154]

In CY 2016, only 0.8% of Program measures were advanced rooftop unit controllers. Trade Allies recommended that the Program continue to help generate customer interest in this measure and to provide training to Trade Allies on how to sell these projects.

Program Management and Delivery Structure

Franklin Energy has implemented the Program since its inception. A senior Program Manager is supported by Energy Advisors and staff members who handle marketing, Trade Ally engagement, quality assurance, and general strategy. Energy Advisors typically work with a specific segment (e.g., big-box retail stores, restaurants, convenience stores) and one Energy Advisor is specifically assigned to work with franchise customers. Energy Advisors also coordinate with National Rebate Administrators when applicable, and they provide direct installations.

[153] From mid-2015 to mid-2016, Focus on Energy provided a special Program offering of $100 per ton for retrofitting a rooftop HVAC unit. Existing units had to be older than 15 years and have seven or more tons of cooling capacity. The advanced rooftop controller unit had to have demand control ventilation, multispeed or variable speed controls on the supply fan, and integrated economizer functionality.

[154] Focus on Energy will offer advanced rooftop controllers through its prescriptive rebate process beginning in CY 2017. Through June 2016 advanced rooftop unit controllers were offered through a special offering that was implemented like a prescriptive measure. The special offering required and incentive code as well a reservation code.

Program Changes

In CY 2016, the Program Implementer introduced these changes to increase franchise participation, a customer segment the Program Implementer believed had been underserved in previous years:[155]

- Announced a participation milestone offering where franchise operators qualify for a 25% rebate in addition to the regular incentives after the whole franchise exceeds its CY 2015 energy savings by 10%. This offering is intended to encourage franchise organizations to implement projects by pooling savings. Franchise organizations' headquarters varied in their efforts to convey details about the Program to their franchises; some actively promoted the offering and others did not. The Program Implementer sent monthly emails to franchise operators to share the franchise organization's progress toward meeting its goals.
- Assigned a specific Energy Advisor to focus on franchises and on additional marketing to franchise operators through email.

Additionally, in CY 2016 Focus on Energy introduced new Program catalogues that simplify the application process for kitchen measures and process system measures.

Similar to the rest of the Focus on Energy nonresidential portfolio, the CY 2016 Program incentive levels were decreased by approximately 20% compared to CY 2015.[156]

Program Goals

The overall objective of the Program is to encourage chain stores and franchises to use more energy-efficient products. In CY 2016, the Program had the following savings goals:

- Demand reduction of 6,500 kW
- Electric savings of 668,000,000 lifecycle kWh
- Natural gas savings of 8,730,000 lifecycle therms

In CY 2016, relative to CY 2015 goals, Focus on Energy increased the Program goals by 500 kW for demand reduction and by 148,000,000 lifecycle kWh for electric savings. It decreased the Program goal for natural gas savings by 770,000 therms. At the same time, it lowered incentive levels.

In addition to the savings goals, the Program Administrator and Program Implementer tracked these four KPIs:

- Maintain or increase participation from underserved customers (including franchises)
- Maintain or increase customer satisfaction above CY 2015 levels

---

[155] The Program Implementer noted, historically, franchise participation generated only 10% to 12% of total Program MMBtu savings.

[156] Program-specific details about CY 2016 incentive level reductions are included in this report's program chapters.

- Keep pre-approval processing time under 20 days
- Keep the timeline that incentive payments are outstanding under 35 days

Table 222 shows the CY 2016 results for the KPIs as reported by the Program stakeholders and verified by the Evaluation Team via SPECTRUM. The Program met two of its KPIs. It achieved its goals for franchise participation and customer satisfaction. However, the Program did not meet its preapproval and incentive processing timeline goals.

Table 222. Chain Stores and Franchises Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Franchise Participation	Achieve 15% of total Program MMBtu savings from franchise organizations	Reached goal: achieved 16% of total MMBtu saving from franchises	Review of Program Implementer data – list of franchises provided February 2017
Customer Satisfaction	Achieve overall customer satisfaction of at least 8.0 on a scale of 0 to 10	Reached goal: in CY 2016, overall program satisfaction was 8.8	Ongoing participant satisfaction survey
Preapproval Processing Time	Achieve an average timeline to process measures through the Program Implementer's preapproval workflow of under 20 days	Did not reach goal: preapproval processing averaged 79 days[1]	SPECTRUM, averaging the days between 2016-paid projects' Submit for Preapproval Date and the Pre Approved Date.
Incentive Processing Time	Keep annual average incentive processing time under 35 days for standard applications	Did not reach goal: incentive processing averaged 38 days[2]	SPECTRUM, Application Received/Received Complete Date against the Date of Status Change to Paid

[1] The Program Implementer measured the average number of days to process measures through its preapproval workflow at six days.

[2] The Program Implementer removed 67 projects withheld from CY 2015 because of funding limitations and measured the average number of days to process applications through its workflow at 33 days.

Data Management and Reporting

In CY 2016, the Program Implementer continued to manage data and generate reports through SPECTRUM. According to the Program Implementer and the Program Administrator, the Program data management systems continued to meet the needs of the Program. They said no new features or processes had been introduced for CY 2016.

In CY 2015, the Program Implementer introduced a "parent name" field in the Program database to track the relationship between different customer accounts, such as if the account belongs to the same franchise. In CY 2016, the Program Implementer reported using this feature successfully to track progress in the franchise participation milestone offering.

Marketing and Outreach

Focus on Energy designed the overall Program and marketing efforts to realize the economies of scale inherent in its customers' business models. Focus on Energy can market the Program to a single franchise or chain store operator who can make multiple upgrades at multiple locations with a single application. According to the Program Implementer, chain stores have traditionally implemented larger projects, while franchises have implemented smaller projects. With the addition of a new KPI in CY 2016, the Program Implementer aimed to reach more franchise operators through its marketing efforts.

The CY 2016 marketing plan is aimed at providing special offerings to specific customer segments via traditional and digital methods. The Program Implementer introduced email messages to franchise operators.[157] It also continued to market the Program through direct customer contact with Energy Advisors.

Focus on Energy also began developing a new marketing initiative that would involve sending co-branded communications to franchise operators. Focus on Energy worked with a Wisconsin-based restaurant franchise to design co-branded letters and boxes of LEDs to franchise operators. Although materials were not sent out in CY 2016, the Program Implementer is continuing to work on this initiative in CY 2017 and is developing similar initiatives with other franchise operators.

In CY 2016, Focus on Energy introduced a new Program interactive guide that is tailored to restaurants and includes information on energy savings from interior and exterior lighting, refrigeration, kitchen equipment, and HVAC equipment upgrades.

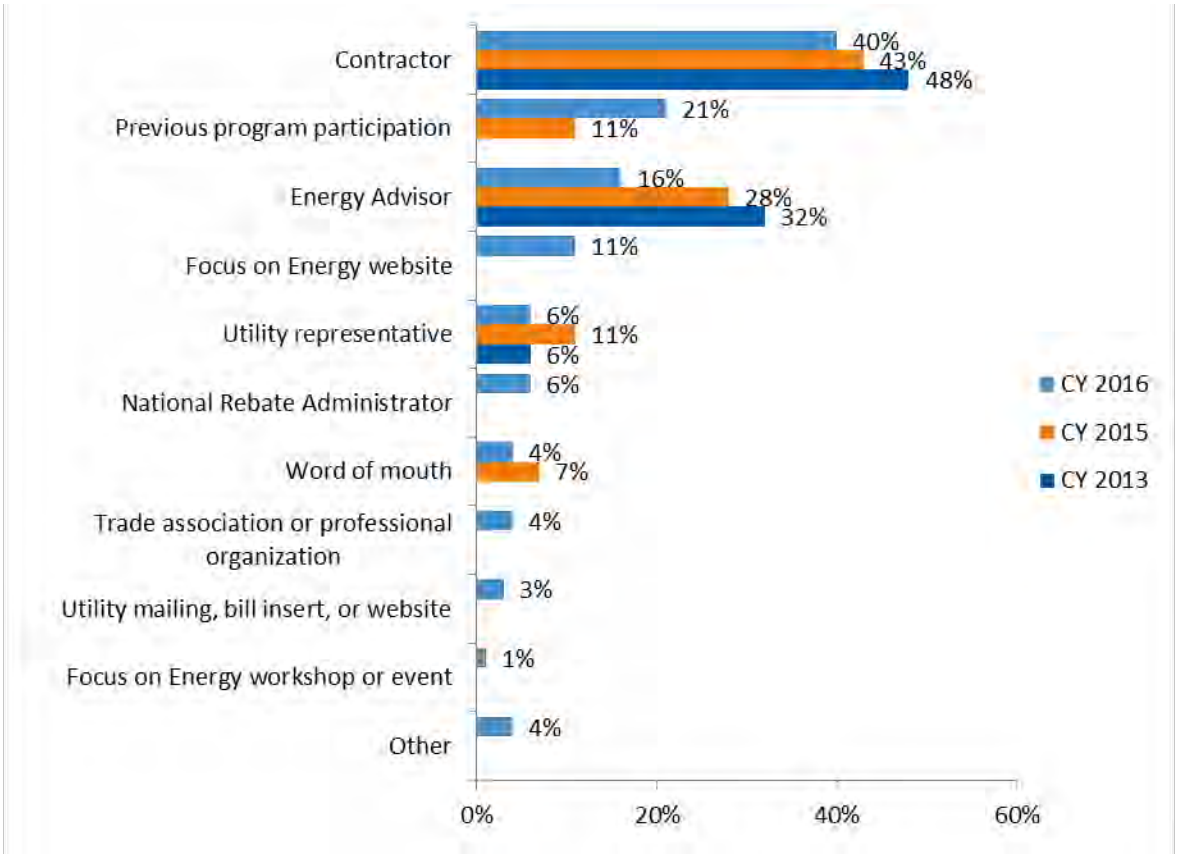
The Program Administrator noted that, given the range of businesses types (franchises and chain stores), business segments, and different ways that franchises operate, there is no single "most effective" way of reaching customers.

Customer Program Awareness

CY 2016 customers learned about the Program through many different sources, most frequently from contractors (40%), as shown in Figure 166. Respondents also learned about the Program through previous participation (21%), Energy Advisors (16%), the Focus on Energy website (11%), a utility representative (6%), or a National Rebate Administrator (6%). In CY 2015, 43% of participants learned about the Program from a contractor, 11% from previous participation, and 28% from an Energy Advisor. The differences between CY 2015 and CY 2016 are not statistically significant.

[157] The recipients of the email messages are mostly customers who participated in the Program in CY 2016 or previous years. In some instances, the Program Implementer received additional operator email addresses from franchise headquarters.

Figure 166. Source of Chain Stores and Franchises Program Awareness



Source: CY 2016 Participant Survey. Question A6; CY 2015 Participant Survey. Question A5; and CY 2013 Participant Survey. Question B1: "How did your organization learn about the incentives available for this project?" Multiple responses allowed (CY 2016 n=70; CY 2015 n=46; CY 2013 n=60)

The Evaluation Team examined how participants learned about the Program by the number of customer locations and by business type (franchise or chain store), as shown in Table 223. Consistent with how the Program should theoretically operate, customers with 10 or fewer locations were more likely to have learned about the Program from a contractor, while businesses with 11 or more locations were more likely to have learned about the Program from an Energy Advisor. Franchises were more likely than chain stores to have learned about the Program through word of mouth (11% and 0%, respectively). Three franchises respondents (in the "Other" category) learned about the Program through their respective franchise organization.

Table 223. Source of Chain Stores and Franchises Program Awareness by Number of Business Locations and Ownership Structure

	Contractor	Previous Program Participation	Energy Advisor	Utility Representative	Focus on Energy Website	Focus on Energy Workshop or Event	National Rebate Administrator	Word of Mouth	Trade Association or Professional Organization	Utility Mailing, Bill Insert, or Website	Other
Number of Locations											
1 to 10 (n=45)	**49%**	16%	**4%**	4%	7%	0%	4%	2%	4%	2%	7%
11 to 20 (n=21)	**19%**	19%	**33%**	0%	14%	5%	0%	5%	0%	5%	0%
Ownership Structure											
Chain (n=41)	39%	22%	15%	5%	15%	2%	5%	**0%**[1]	5%	5%	2%
Franchise (n=28)	43%	18%	18%	4%	7%	0%	7%	**11%**[1]	4%	0%	7%

Source: CY 2016 Participant Survey Question A6. "How did your organization learn about the incentives available for this project?" Multiple responses allowed (n=70); Question L2: "How many locations does your company operate in Wisconsin?" (n=66); and Question A1. "Is your organization a franchise or a corporate branch?" (n=69)

[1] The difference between the word of mouth response between chain stores and franchises is statistically significant at the 95% confidence level ($p < 0.05$ using a binomial t-test). The Evaluation Team was not able to test the significance for the difference by number of locations, as the overall population distribution of participants is not known.

Awareness of Franchise Participation Milestone Offering

During the in-depth franchise operator interviews and in the participant survey, the Evaluation Team asked franchise operators about their awareness and participation in the milestone offering. Of the eight franchise operators interviewed, only two had heard of the franchise participation milestone offering (all franchises qualify for the offering). Of these two, only one participated, and he said he hoped the franchise would reach the participation threshold. He noted that there were no challenges to participation (describing the Program as "self-functioning"), expressed that the Program worked well to "band the group together to make good choices," and said he had heard about the milestone offering from both headquarters and from Focus on Energy. The other franchise operator was unclear about how the milestone offering worked and said his company was not yet in a position to participate because he does not yet have a process to track energy-saving data. He hopes to participate in CY 2017 when he plans to hire an energy manager.

According to SPECTRUM data, three of the eight franchise operators had received a franchise participation milestone offering incentive payment. As shown in Table 224, none of the three franchise operators who received an incentive payment were aware of the milestone offering.

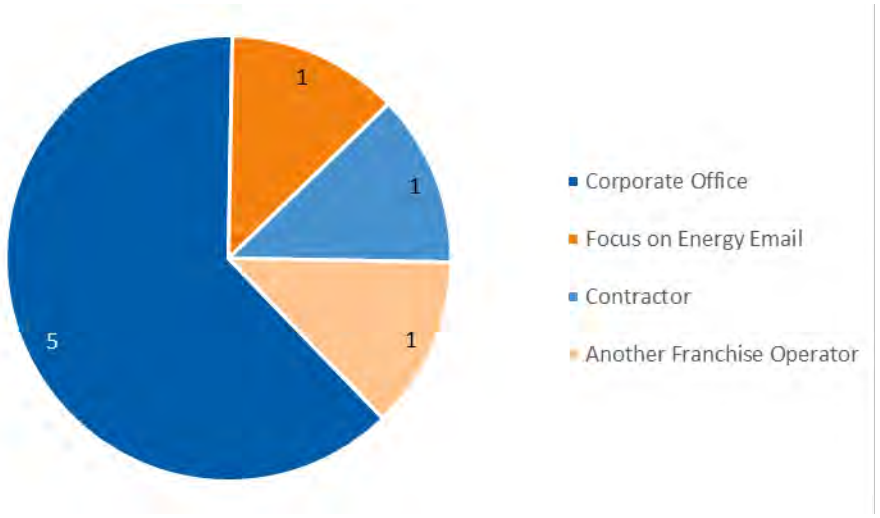
Table 224. Franchise Operator Awareness of Milestone Participation Offering

Business Type	Awareness of Offering	Awareness of Participation	Received Reward
Mixed	Yes	No	Yes
Hardware Store	No	-	-
	No	-	No
Restaurant	No	-	Yes
	No	-	Yes
Supermarket	No	-	-
	No	-	No
	Yes	Yes	No

Source: CY 2016 Franchise Operator Interviews Question B9. "Are you aware that Focus on Energy offers a Participation Milestone Incentive Program where additional rewards are available to franchise operators if the franchise chain as a whole meets certain energy saving thresholds in Wisconsin?"
Source: August 2016 SPECTRUM data

Of 23 franchise operators who took the participant survey, eight (35%) were aware of the franchise participation milestone offering. Most of these respondents (five of eight) said they heard about the milestone offering from their respective corporate headquarters (Figure 167). Eight of the survey respondents had received a milestone offering incentive payment, but only two of these eight were among the respondents who had heard about the offering.

Figure 167. Source of Awareness of the Franchise Participation Milestone Offering



Source : CY 2016 Participant Survey Question B8. "How did you become aware of this offering?" Multiple responses allowed (n=8)

Program Communication

All eight of the interviewed franchise operators said they received Focus on Energy marketing emails, and they gave mixed feedback. Three franchise operators said they read the emails, one read some emails, and four did not read the emails. As shown in Table 225, franchise operators offered a range of communication preferences and reasons for not reading the emails. One franchise operator said there is no need for him to read the emails since he works directly with contractors who are already familiar with the Program and the application process.

Table 225. Contractor Communication Preferences

Reads Emails	Interactions with Energy Advisors	Locations	Communication Preferences
Yes	Frequent, positive communication	50	Prefers email communication and benefits from communication with Energy Advisors
	Frequent, responsive communication	7	Prefers email communication but also wants to get information from Energy Advisors and measure catalogues
	None	2	Prefers email communication
Some	None	6	Prefers email communication but says it is difficult to keep up with the volume of emails
No	None	10	Works directly with contractors to implement projects and says there is no need to receive Program communications
	None	3	Prefers printed materials that are easier to share with staff or clear in-person communication and information from franchise headquarters
	Infrequent, too little time spent with respondent	1	Prefers printed materials that are easier to share with staff, suggested a three-touch approach to communication (introductory letter, in-person visit, follow-up visit) as well as an in-store energy audit to highlight where savings can be achieved
	None	1	Prefers in-person contact, first by phone then in person, and suggested an energy audit (store walk-though) as a first touch for Program communication

Source: CY 2016 Franchise Operator Interviews Question E1. "What is the most effective way that you learn about program offerings and incentives?" Question E2. "What has been the role of the Energy Advisor in providing you with information about opportunities to save energy and about the Program?" Question E4. "Are there any ways in which you would prefer to learn about the Program that are not currently available, or are there additional approaches to sharing information about energy saving opportunities and rebates that you would like to see the Program take? What are they?" (n=8)

The in-depth interviews with franchise operators revealed that larger operations are more likely to have direct contact with Energy Advisors and also to prefer email Program communication. Smaller, more resource-constrained operations are less likely to have direct communication with Energy Advisors, preferring to receive communications in printed form, and they also suggested the usefulness of an energy audit to learn about energy-saving opportunities.

Similarly, when surveyed participants were asked about the most effective way for the Program to tell customers about opportunities to save energy at their businesses, of 70 respondents, most said they preferred email communications (63%), followed by interactions with Energy Advisors (14%) and printed material delivered to their business (10%).[158] However, unlike the eight franchise operators the Evaluation Team interviewed, surveyed franchise operators did not vary by business ownership type and business size.

Customer Messaging Preferences

To help the Program Administrator enhance its Focus on Energy messaging, the survey asked participants to share insights on which messages resonate with them and for the first three words that come to mind when they think about Focus on Energy. As shown in Figure 168, the most common word phrases were "energy" and "savings," followed by "rebates," "money," and "efficient."

Figure 168. Respondent Word Association with "Focus on Energy"

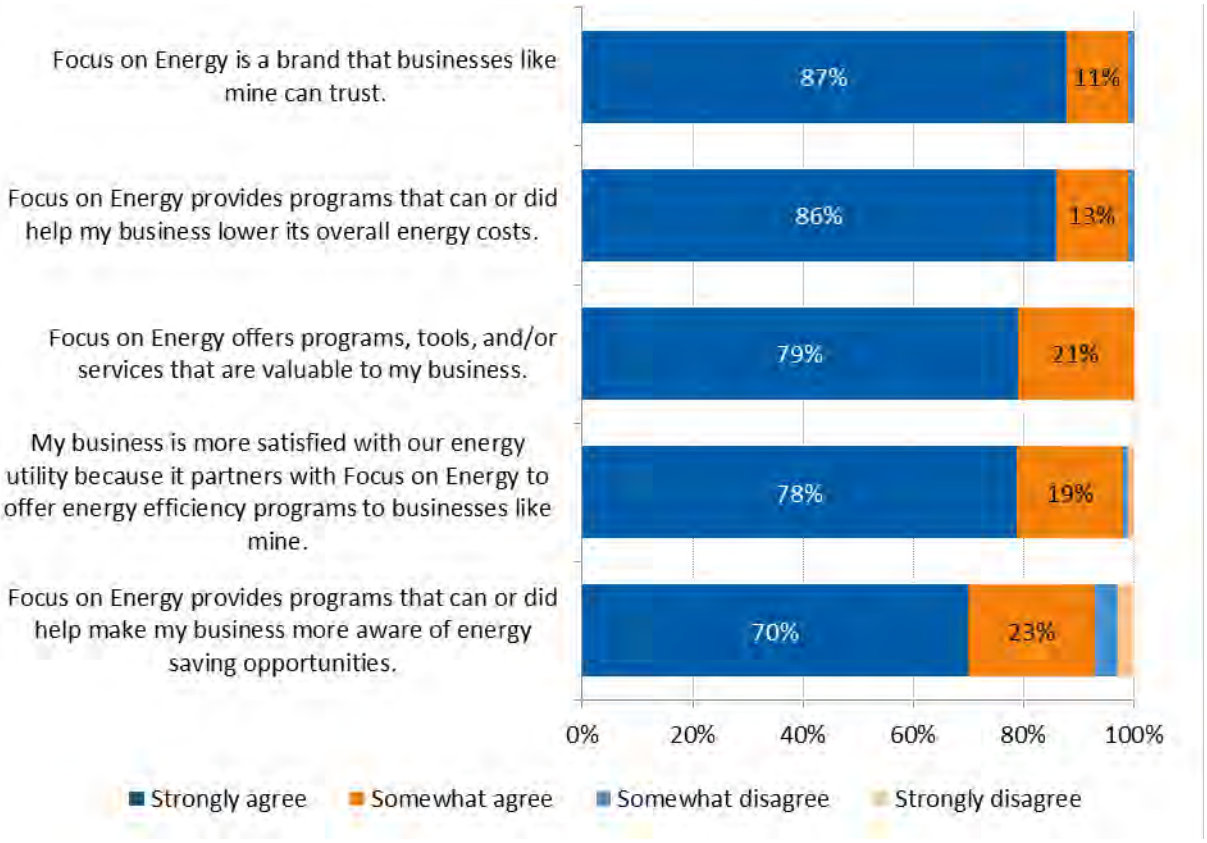


Source: CY 2016 Participant Survey Question B1. "What are the first three words that come to mind when you hear 'Focus on Energy'?" (n=70)

To gauge Focus on Energy brand affinity, the Evaluation Team included a survey question about the extent to which Program respondents agreed with several marketing statements. The vast majority of respondents agreed with all of the statements, but the two messages respondents' agreed most strongly with were *Focus on Energy is a brand that businesses like mine can trust* and *Focus on Energy provides programs that can or did help my business lower its overall energy costs*. Figure 169 shows the level of agreement with the five brand affinity statements.

[158] Source: CY 2016 Participant Survey Question E4. "What is the most effective way for Focus on Energy to communicate with you about opportunities to save energy at your business?"

Figure 169. Agreement with Focus on Energy Brand Affinity Statements



Source: CY 2016 Participant Survey Question B2. "Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with these statements." (n=68 to 70)

The Evaluation Team also included a survey question asking respondents to identify which of the statements shown in Table 226 would make them most interested in learning more about Focus on Energy. Respondents gravitated toward cost-oriented statements, with 51% saying that reducing their energy costs and saving money resonated the most.

Table 226. Participant Reaction to Marketing Statements

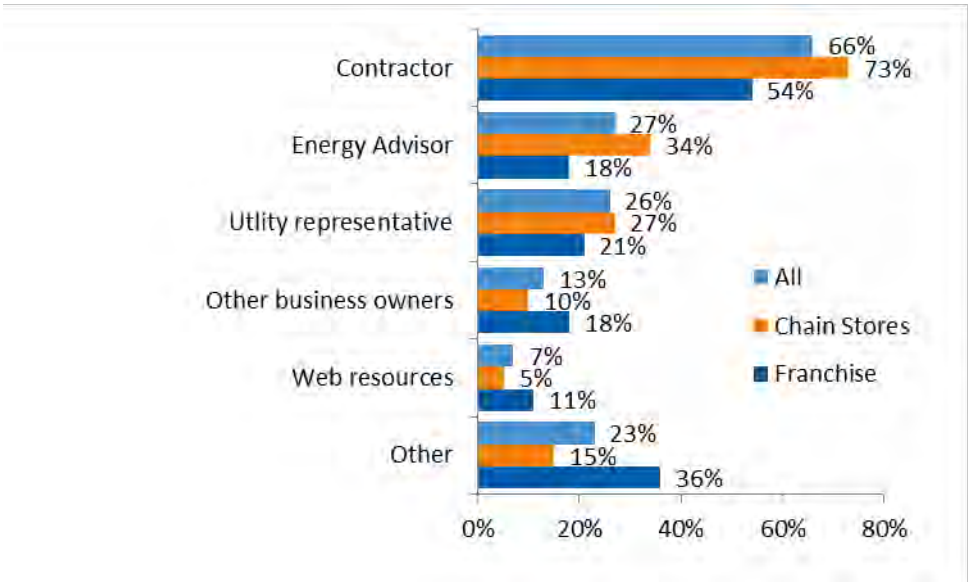
Focus on Energy helps Wisconsin businesses….	Top Statement by Percentage of Respondents
Reduce their energy costs and save money	51%
Lower their energy costs	29%
With solutions to use energy smarter and save money	16%
Grow by making smarter decisions about their energy use	4%

Source: CY 2016 Participant Survey Question B3. "Which of the following statements would make you most interested in learning more about Focus on Energy?" (n=70)

Process for Learning About Energy Savings

When seeking advice about making energy efficiency upgrades, most CY 2016 Program participants sought out contractors (66%), Energy Advisors (27%), and utility representatives (26%) as a trusted source of information (Figure 170). However, a larger percentage of franchise operators than chain store operators sought out "other sources" and "other business owners" as trusted sources of information on upgrades. "Other sources" included mostly corporate resources (6 respondents), resources at the company (2 respondents) suppliers (1 respondent), and manufacturers (1 respondent).

Figure 170. Trusted Sources for Information About Energy Efficiency Upgrades



Source: CY 2016 Participant Survey Question D4. "Who do you seek out as a trusted source of information regarding energy efficiency upgrades?"
Multiple responses allowed (n=69, Chain Stores=41, Franchises=28)

Franchise Operator Process for Learning About Energy Savings

During in-depth interviews, the Evaluation Team asked franchise operators how they primarily learned about opportunities to save energy and about the role of their contractors and corporate headquarters in informing them about energy efficiency opportunities. The eight franchise operators learned about these opportunities from a range of sources: three from corporate headquarters, two from Focus on Energy emails, two from their contractors, one from peers at other locations, one from internet research, and one from trade publications (multiple responses allowed).

When asked if they received guidance from their corporate headquarters about ways to save energy, franchise operators offered a range of responses, which sometimes differed between operators from the same franchise chain. According to the respondents, three different corporate headquarters promote LED lighting systems. One restaurant operator said the franchise's corporate headquarters

passed along special offers for energy-efficient equipment from approved contractors, and one grocery operator said the corporate office helps answer questions about energy efficiency. One franchise operator said that all franchise operators meet every two months to discuss "what works" for store upgrades "among peers," noting this as a valuable way to learn about energy efficiency opportunities. Three franchise operators said their corporate headquarters did not offer guidance on how to save energy.

Four franchise operators said they received information about energy-saving opportunities and the financial performance of their equipment (such as a return on investment calculation) from contractors. Three franchise operators said they did not receive any information on energy-savings opportunities from contractors (one franchise operator did not respond to this question).

Franchise Operator Interest in Specific Energy-Saving Opportunities

When the Evaluation Team asked if there were any energy-saving opportunities that franchise operators were interested in learning more about, four had no specific interests while four offered the following topics:

- Building shell insulation and how to get certainty about a measure's energy savings. This respondent suggested that an energy audit would be helpful to provide this information.
- General information about energy-efficient equipment and about the upfront costs and impacts on cash flow for specific measures
- Specific information about demand control ventilation and variable frequency drives
- Information about the latest energy-saving technology that is "market proven" and about technology that will outperform existing equipment and also consume less energy

Trade Ally Program Promotion

Trade Allies serve an important function as Program ambassadors and technical experts, increasing Program awareness and initiating projects. The Evaluation Team conducted an online survey with four Program Trade Allies. The small sample size made it difficult to draw conclusions; however, key themes from the surveys included the following:

- All Trade Allies reported actively promoting the Program.
- Most Trade Allies said the greatest benefit of promoting Focus on Energy programs is the financial incentive for the customer.
- Most Trade Allies enrolled in the Focus on Energy Trade Ally Network to be competitive in the marketplace, receive incentives, and be able to advertise their business.
- Program Trade Allies said they had a significant role in educating their customers about energy efficiency.
- Trade Allies expressed satisfaction with Focus on Energy and mixed satisfaction with Energy Advisors. One Trade Ally was *very satisfied* with the support received from the Energy Advisor, while two were *somewhat satisfied* and one was *not at all satisfied*.

- Trade Allies offered mixed impressions about the Program, having the strongest satisfaction with Program outreach and lowest satisfaction with marketing training.
- All four Trade Allies said the Program incentive reduction did not affect how they promoted the Program. Three Trade Allies performed work outside of Wisconsin, but none did so because other states offered higher incentives. These three Trade Allies offered differing views on how the Chain Stores and Franchises Program incentive compared to incentives in other states. One was *more satisfied*, one was *equally satisfied*, and one was *less satisfied* with incentives offered in other states.

Trade Ally Engagement

The Program Implementer conducts outreach to Program Trade Allies through a single point of contact in the Business Incentive Program outreach structure,[159] as many Trade Allies participate in both programs and duplicating communications could, according to the Program Implementer, confuse the Trade Allies. However, according to the *Marketing, Communications, & Trade Ally Plan*,[160] 31 Trade Allies were not participants of the Business Incentive Program and required outreach directly from the Chain Stores and Franchises Program. The Program Administrator said the Program makes use of a Trade Ally manager who proactively reaches out to newly registered Trade Allies. Although the Trade Ally manager works under in the Business Incentive Program, she also works directly with Trade Allies who are registered only in the Chain Stores and Franchises Program.

When asked about their preference for staying informed of Focus on Energy programs and Trade Ally services, two of the four Trade Allies said they preferred contact with their Energy Advisor, while one preferred to check the website, and one preferred to go to training offered by Focus on Energy.

The Evaluation Team asked Trade Allies to rank the Program information resources from most to least useful. On average, Trade Allies said email was the most useful information resource and training was the least useful resource.

Customer Experience

The Evaluation Team explored the customer decision-making processes, barriers to saving energy, and Program satisfaction through the survey with 70 Program participants and in-depth interviews with eight franchise operators.

---

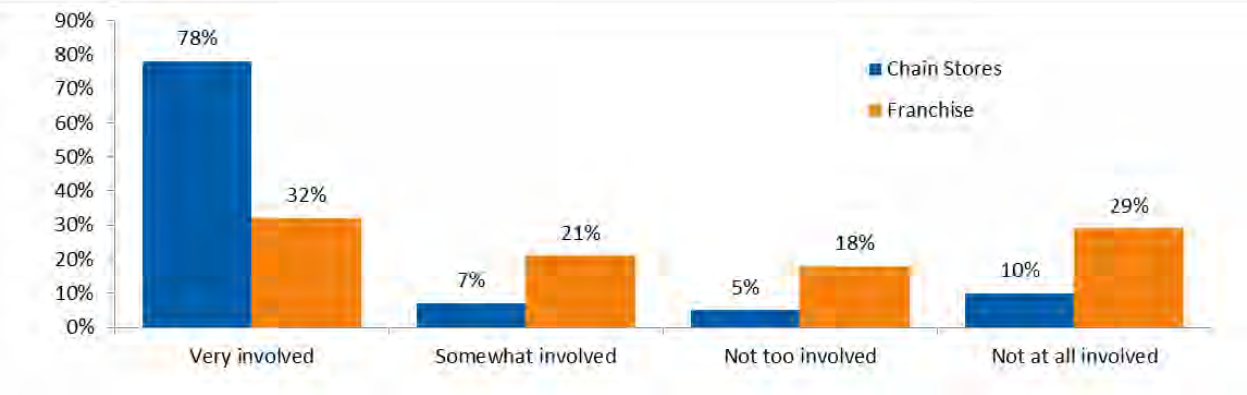
[159] Energy Advisors are the primary point of contact for Business Incentive Program Trade Allies. The Business Incentive Program Energy Advisor is responsible for communicating about both programs to Trade Allies who participate in the two programs.

[160] Focus on Energy. *Marketing, Communications, & Trade Ally Plan: Chain Stores and Franchises Program*. CY 2016. pp. 14. Approved with comments, January 11, 2016.

Customer Decision-Making Processes

Chain store respondents are also more likely to require corporate approval for upgrades, at 81% compared to only 21% of franchise respondents. Of those businesses that require corporate approval, 60% (n=35) said they received it within three weeks. The Evaluation Team also asked participants about their corporate headquarters involvement in making decisions about energy efficiency. As illustrated in Figure 171, respondents from chain stores experienced greater headquarter involvement in energy efficiency decisions than respondents from franchises.

Figure 171. Corporate Involvement in Energy Efficiency Upgrades



Source: CY 2016 Participant Survey Question C3. "As a chain store or franchise business, do you have to receive corporate approval before committing to an energy efficiency upgrade at your facility?" (n=69, Chain Stores=41, Franchises=28)

Franchise Operator Decision-Making Processes

The Evaluation Team asked the eight interviewed franchise operators to describe the dynamic between their headquarters and franchise operations in regard to the types of equipment purchased. All eight franchise operators said they had complete autonomy from corporate headquarters in making these investment decisions and that they required no approval for upgrading their facilities.

Five franchise operators said their headquarters had some influence in shaping their investment decisions:

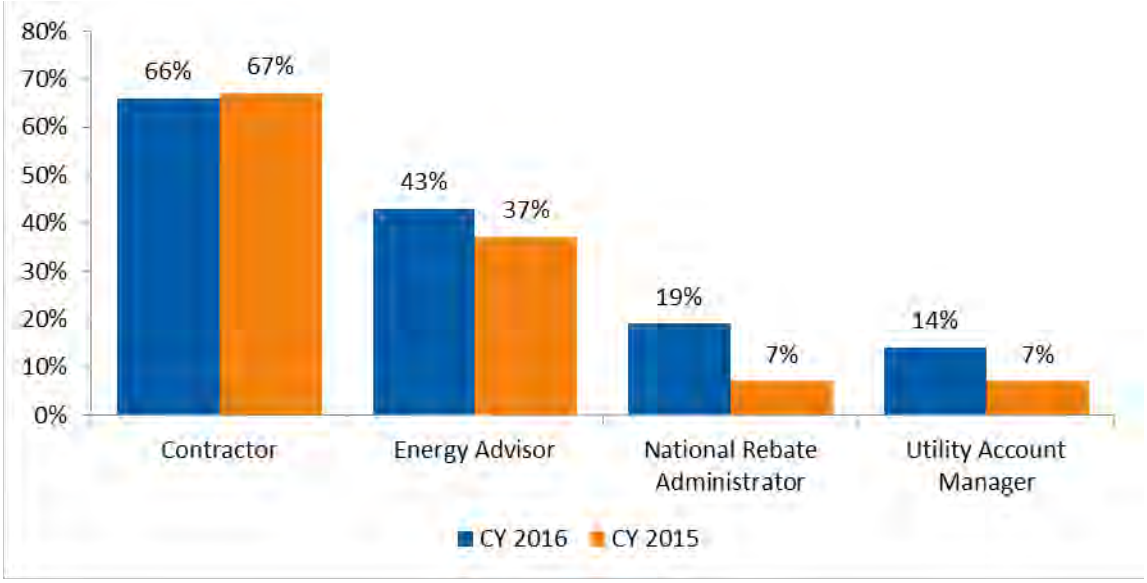
- Three grocery franchise operators said their corporate headquarters' engineering department offered information and advice about equipment upgrades, particularly when a store is remodeled. One operator noted that "[engineers] provide advice on what kind of LEDs to use or how to reduce loss from refrigeration doors. Overall they are very helpful." Another franchise operator headquarters was particularly involved when an entire store was being remodeled.
- Two restaurant franchise operators said their headquarters maintained a list of approved vendors who can recommend specific equipment that met company specifications. One of these operators also said corporate headquarters worked with vendors to ensure they offer "the best

stuff" and "get energy-efficient equipment out" and that headquarters made sure operators were aware of special vendor offerings for energy-efficient equipment.

Customer Decision Drivers

As in CY 2015, the CY 2016 contractors, Energy Advisors, National Rebate Administrators, and Utility Account Managers all encouraged customers to initiate a Program project (Figure 172). Between CY 2015 and CY 2016, the increase in the percentage of projects being initiated by National Rebate Administrators is statistically significant.[161] However, the percentage share of overall Program savings associated with the National Rebate Administrators has declined from 19% in CY 2014 to 11% in CY 2016.

Figure 172. Supporting Stakeholders in Project Initiation



Source: CY 2016 Participant Survey Question A2 and CY 2015 Participant Survey Question A4. "Who was involved in helping you initiate your energy efficiency project?" (Multiple responses allowed; CY 2016 n=65; CY 2015 n=46)

The Evaluation Team surveyed Program participants about internal decision-making processes regarding energy efficiency upgrades. As illustrated in Figure 173, similar to previous evaluations, most CY 2016 participants said the most important factor in making decisions about energy efficiency upgrades was saving money and reducing energy consumption (64%); this percentage increase from CY 2015 (46%) is statistically significant.[162] There was also a statistically significant,[163] but much smaller, fraction of

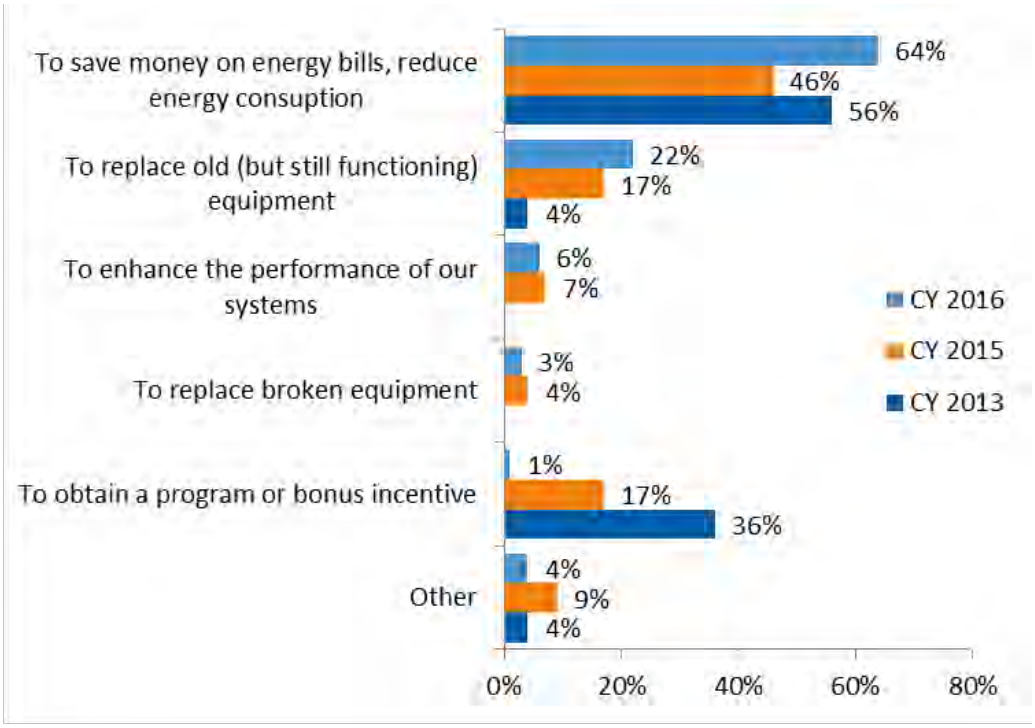
[161] $p < 0.05$ using a binomial t-test

[162] $p < 0.05$ using a binomial t-test

[163] $p < 0.05$ using a binomial t-test

CY 2016 respondents (1%) who said the most important factor for making decisions about energy efficiency was to obtain an incentive (compared to 17% in CY 2015 and 36% in CY 2013).

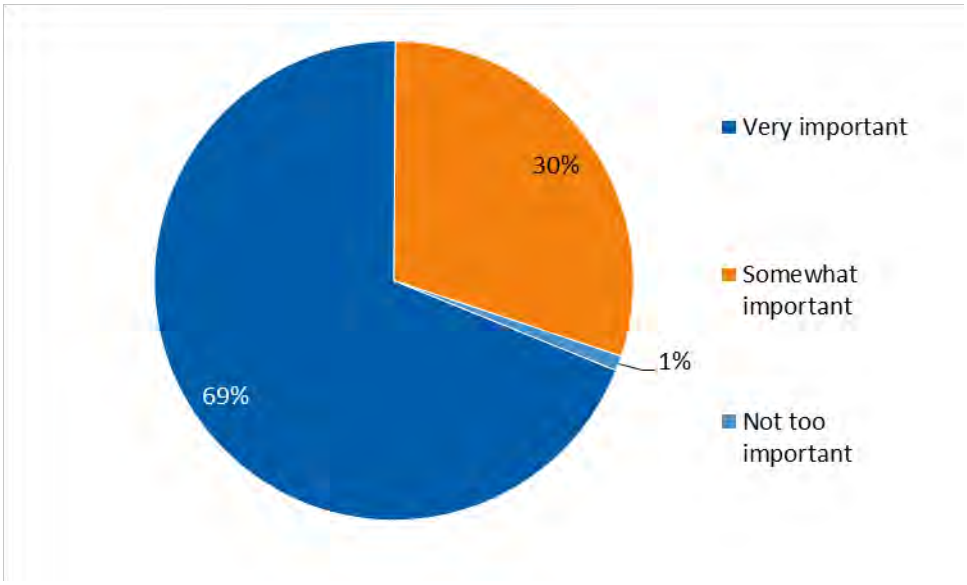
Figure 173. Most Important Factor for Investing in Energy Efficiency Upgrades



Source: CY 2016 Participant Survey Question C1; CY 2015 Participant Survey Question C1; and CY 2013 Participant Survey Question D2. "What factor was most important to your company's decision to make the energy-efficient upgrades for which you received an incentive?"
(CY 2016 n=69; CY 2015 n=46; CY 2013 n=50)

The Evaluation Team also asked customers how important energy efficiency is when making capital upgrades or improvements. As illustrated in Figure 174, the majority of customers rated this as a *very important* consideration when making facility upgrades.

Figure 174. Importance of Energy Efficiency in Capital Upgrades



Source: CY 2016 Participant Survey Question C5. "How important is energy efficiency when making capital upgrades or improvements?" (n=70)

Franchise Operator Decision Drivers

During in-depth interviews, the Evaluation Team asked the eight franchise operators to describe the primary reasons for investing in energy-efficient equipment and the most important drivers for selecting specific energy-efficient equipment. As illustrated in Table 227, they said they were primarily motivated by reducing costs and energy consumption, and they selected equipment based on a variety of financial criteria, including payback period, return on investment, and impact on cash flow. Two franchise operators said the most important drivers for selecting equipment were related to performance, both in terms of equipment performance and after-installation service.

Two other franchise operators said the primary reason for investing in energy-efficient equipment is to replace existing equipment that had failed, with one saying he only buys "equipment when the old equipment has failed" and never buys "new equipment only because it is energy efficient, because the costs don't offset the benefits."

Highlighting the importance of cash flow impacts in selecting specific equipment, one franchise operator stated that "the upfront cost of the equipment is difficult" and that it is "difficult to recover the initial investment." This respondent said that a "low interest loan for energy-efficient equipment" would help him "revamp the store." Another operator noted that Focus on Energy helped to reduce the equipment payback period, but that the investments only started "making economic sense a few years ago," when overall equipment cost had dropped.

Table 227. Franchise Operator Decision-Making Criteria

Business Type	Equipment Installed	Primary Reason for Making Energy-Efficient Investments	Most Important Drivers for Selecting Equipment
Mixed	LEDs	Saving energy	"Largest return on investment… will target low-hanging fruit first"
Hardware store	LEDs	Cutting monthly expenses	"Time and labor to switch, cost of equipment, and potential savings"
	LEDs	Reducing operating cost	"Lowest impact on cash flow is most important"
Restaurant	Exterior LEDs	Saving money	"Payback period, everything will be very low priority"
	Fryers	Replacing failed equipment	"Quality of service after purchase is the most important"
Supermarket	LEDs, refrigeration equipment, ECMs	Saving money	"Payback period is the most critical and aesthetics is important"
	LEDs	Being economically and energy efficient	"Return on investment is the most important aspect"
	LEDs, refrigeration equipment, ECMs	Replacing failed equipment	"How the equipment presents merchandise is the primary driver"

Source: CY 2016 Franchise Operator Interviews Question B5. "What are the primary reasons for investing in energy-efficient equipment at your stores/restaurants?" and Question C2. "This year you installed/upgraded [insert measure(s) from data]. Can you please describe why you chose to focus on upgrading this particular equipment?" (n=8)

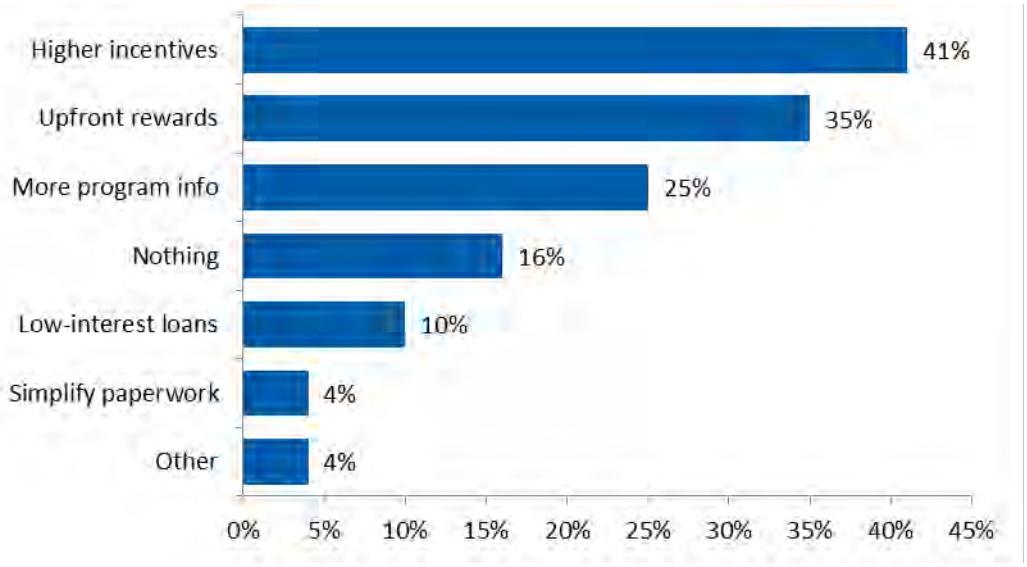
Challenges to Saving Energy

Participants cited financial constraints as the biggest challenge to making energy efficiency upgrades at their facilities. These included high initial project costs (72%), long equipment payback periods (7%), and budget limitations (4%). Other challenges included replacing equipment without affecting business operations (3%), getting corporate approval (3%), and having knowledge of equipment (3%).[164]

When asked what could be done to help customers overcome challenges with making energy efficiency upgrades, most respondents cited higher incentives (41%) and upfront rewards/direct discounts (35%). Respondents also said that Program information (25%), low-interest loans (10%), and a simplified paperwork process (4%) would be helpful (Figure 175).

[164] The Evaluation Team examined whether the challenges to saving energy varied by industry. Since the majority of participants were either retail/wholesalers (73%) or in food service (21%), and since food service participants were almost exclusively franchises (see the *Participant Demographics* section), this comparison confounded the differences between chain stores and franchises.

Figure 175. Ideas to Address Customer Challenges to Making Efficiency Upgrades



Source: CY 2016 Participant Survey Question D3. "What could be done to help your company overcome challenges with making energy efficiency improvements?" (n=68)

The Evaluation Team asked customers to elaborate on what types of information would be helpful to overcoming challenges to making upgrades. Six respondents suggested that the Program provide more information on the incentives offered, two said to offer more general Program information, and two said to provide information specific to their company.

Franchise Operator Challenges to Saving Energy

The Evaluation Team asked interviewed franchise operators about the biggest challenges they faced and biggest opportunities for saving energy at their facilities. The Team also asked franchise operators about their experience making upgrades in CY 2016 and about their future plans to install energy-efficient equipment.

Five of eight franchise operators said their biggest challenge to saving energy was cost-related. For example, one operator said, "the energy efficiency of the equipment is not so great that you get a return right away, so you have to look for additional savings the equipment can offer, such as lower amounts of oil needed to run fryers." The other three franchise operators said their biggest challenges concerned not having access to information about energy-saving opportunities, not having financial project projections (such as payback periods or return on investment) for company stakeholders, and difficulties related to staff behavior. The respondents gave more information about the challenges:

- One operator (with one location) said the store's challenge was "not knowing what we don't know. We're a one-store operation, we don't know what other people are doing and what's possible, and our most trusted source of information is from other stores, and information from contractors is rare."

- One operator (with 50 locations) said his biggest challenge was "convincing the Chief Financial Officer that investments are sound and have payback." He elaborated that it "would be nice to have return on investment worksheets" and "more exact numbers on what the return on investment was." He noted that "LED [lighting] is the most straightforward to calculate, but for all other equipment it is more difficult."
- One operator (with 10 locations) said that "staff members do not follow company energy policies and getting them to be energy aware is a challenge."

Trade Ally Perception of Customer Challenges

The Evaluation Team asked the four Trade Allies what they perceived as customers' biggest challenges to moving forward with energy efficiency upgrades:[165]

- Upgrades did not meet the company's payback or return on investment criteria (three respondents)
- There is a disruption to business activities when making upgrades (one respondent)
- The cost of upgrades (one respondent)
- The difficulty of calculating savings (one respondent)
- A lack of familiarity with new technologies (one respondent)
- The difficulty in obtaining corporate approval (one respondent)

Perceived Energy-Saving Opportunities

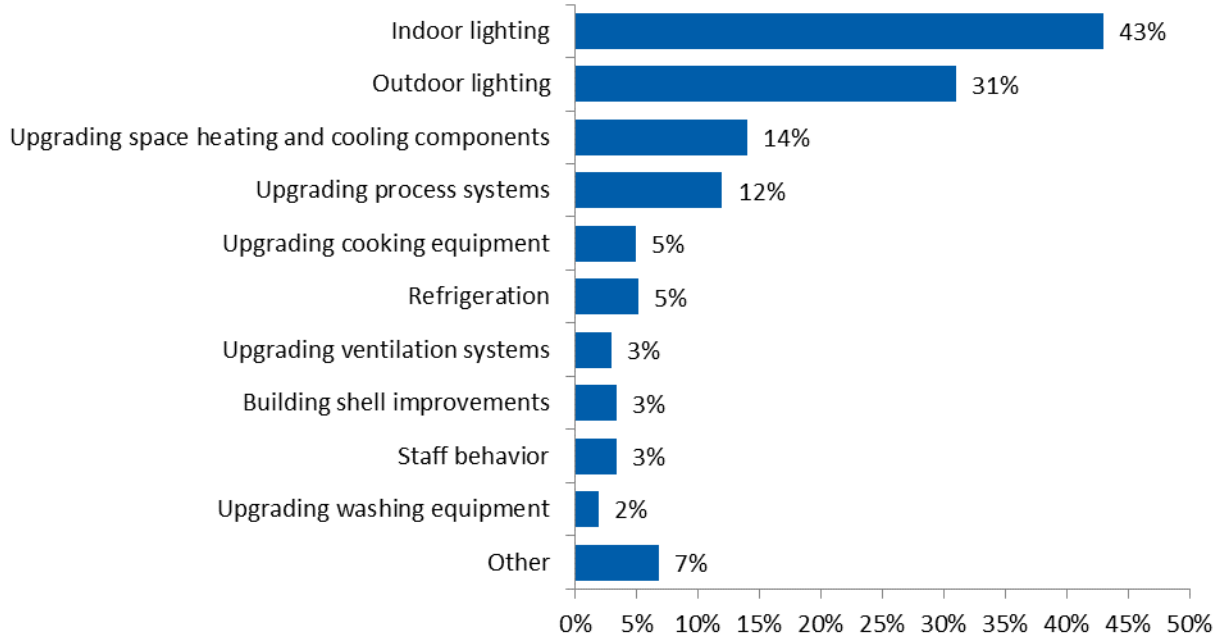
When asked which energy efficiency upgrades could result in the most significant savings for their business, the franchise operators primarily cited indoor (43%) and outdoor lighting upgrades (31%) (Figure 176).

When asked what energy efficiency upgrades could result in significant energy savings, franchise operators and chain store operators offered similar responses, with the exception that 14% of franchise respondents said that upgrading cooking equipment could result in significant savings, compared to 0% of chain store respondents (most food service operators were franchise respondents).

The Evaluation Team asked survey respondents why they chose a particular upgrade as representing a source of significant potential energy savings, and most (67%) said their selection was informed by their understanding of where their business currently consumes the most energy. Other respondents indicated that specific end uses represented significant savings based on their knowledge of alternative equipment technologies (24%) and that existing, inefficient equipment needed to be replaced (9%).

[165] Multiple responses allowed.

Figure 176. Perceived Energy-saving Opportunities



Source: CY 2016 Participant Survey Question E1. "In your opinion, what kind of energy-efficient upgrades could result in significant energy savings at your business in the future?" (n=58)

In the in-depth interviews, the Evaluation Team also asked the eight franchise operators about the biggest opportunities to save energy at their locations. Six franchise operators offered a range of opportunities, including HVAC, cooking, lighting, and refrigeration equipment. Their reasons for focusing on specific equipment were also diverse, including already having researched information on equipment that required replacement, assuming that more efficient technologies were available to replace old equipment, "feeling wasted energy" from current equipment, and believing that lighting equipment was the "most straightforward" technology for which to assess energy savings.

Franchise Operators' CY 2016 Experience With Equipment Upgrades

The Evaluation Team asked franchise operators about their experience making equipment upgrades in CY 2016, specifically why they chose to focus on specific equipment upgrades in CY 2016, whether they experienced challenges with their upgrades, and what Focus on Energy could do to facilitate upgrades in the future. As indicated in Table 228, their reasons for choosing specific equipment to upgrade in CY 2016 included the need to replace aging or failed equipment, having corporate support, the ease of evaluating energy savings from lighting equipment, and learning about the energy savings of LED lights from a variety of sources.

Table 228. Reasons for Choosing Equipment Upgrades in CY 2016

Equipment Upgraded	Reason for Making Upgrade
Exterior LEDs	Corporate support to make upgrade ("corporation wants operators to make more money without raising prices"), quick payback
Fryers (cooking equipment)	Replace fryers that "caught on fire"
LEDs, refrigeration, ECM	"Walk-in" contractor provided proposal and "energy and financial analysis," it was "time for a lighting upgrade"
LEDs	LEDs offer the "most transparent way to calculate the effectiveness of the investment"
LEDs	"Most clear-cut way to evaluate return on investment and payback period," "not quite convinced about HVAC savings"
LEDs	"Contractor recommended upgrade years ago," heard of benefits at a "hardware trade show," "heard about benefits through network"
LEDs	Lighting upgrades provide the "best return on investment"
LEDs, refrigeration, ECM	"Store remodel," "old equipment needed to be replaced"

Source: CY 2016 Franchise Operator Interviews Question C2. "This year you installed/upgraded [insert measure(s) from data]. Can you please describe why you chose to focus on upgrading this particular equipment?" (n=8)

None of the franchise operators faced any challenges in making their equipment upgrades in CY 2016. They had the following suggestions for how Focus on Energy could assist with future upgrades:

- Offer energy audits, or energy surveys, so participants could learn about the savings from non-lighting equipment (mentioned by two franchise operators)
- Get more information about the return on investment for non-lighting energy upgrades[166]
- Offer helpful tips or checklists on day-to-day store operation and maintenance (such as weather stripping)

The Evaluation Team also asked the eight franchise operators if they had any plans to upgrade additional equipment in the next two years. Four said they planned to make additional lighting upgrades, and three said they planned to upgrade to efficient equipment when existing equipment failed. One franchise operator planned to determine what equipment to replace during an upcoming store remodel project.

Customer Satisfaction

In CY 2016, 70% of respondents reported that their incentive check arrived within six weeks, and most were satisfied with the time it took for the check to arrive (62% were *very satisfied* and 24% were *somewhat satisfied*). In addition, of the 57 respondents, most expressed satisfaction with the application process, with 37% saying it was *very easy* and 47% saying it was *easy* to complete (14% said

[166] This franchise operator said that "lighting is the most obvious," but he or she also said he had little information on the savings offered by other types of equipment.

the application was *somewhat challenging* to complete, and 2% said it was *very challenging* to complete). All four Trade Allies said they offered to help customers fill out the application (one assisted customers *all the time*, two assisted customers *sometimes*, and one *seldom* assisted customers). Two Trade Allies said they *sometimes* had problems with the application process, and two said they *seldom* had problems.

When asked what Focus on Energy could have done to improve their Program experience, 73% of customer respondents said nothing could improve their experience. Nine percent suggested more or better communication, 4% suggested more face time with their Energy Advisor, 4% suggested simplifying the application process, and 4% suggested increasing the incentive amount. In regard to better communication, customers specified the following:

- More timely communication about the arrival of incentives
- More information about the savings for all locations
- More communication with the corporate headquarters
- More email updates

Annual Results from Ongoing Customer Satisfaction Survey

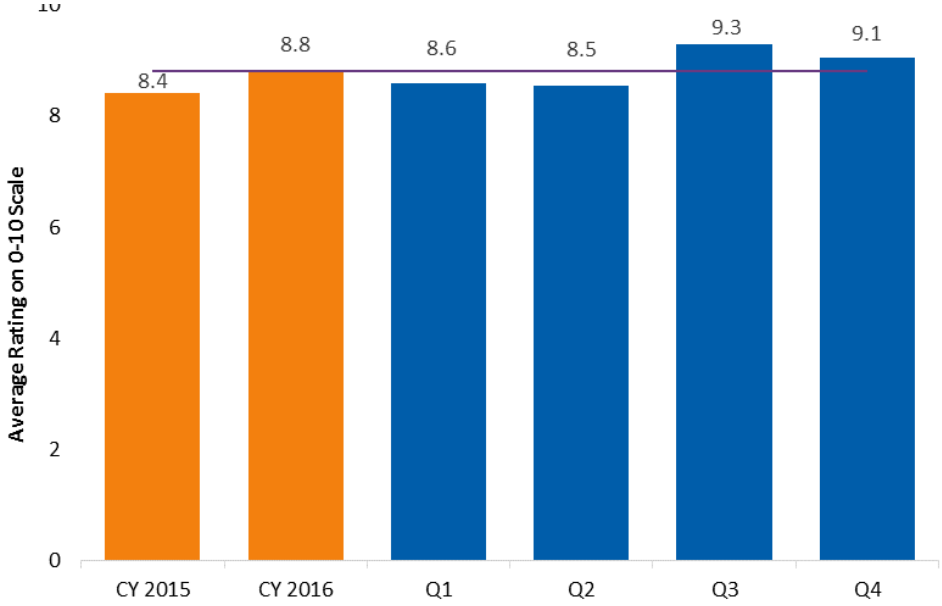
Throughout CY 2016, the Program Administrator and Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Chain Stores and Franchises Program. [167] Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 the lowest.

Figure 177 shows that the average overall satisfaction rating with the Program was 8.8 among CY 2016 participants, which is higher but not significantly different from the average rating of 8.4 in CY 2015, nor is it significantly different from the portfolio baseline of 8.8 (indicated by the purple line). [168]

[167] The Evaluation Team found that some surveys did not include identifying information to allow it to match survey responses to program participation dates. Survey responses without participation dates were included in the year-end total but not the quarterly breakdown.

[168] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015-2018 quadrennium).

Figure 177. CY 2016 Overall Satisfaction with the Chain Stores and Franchises Program



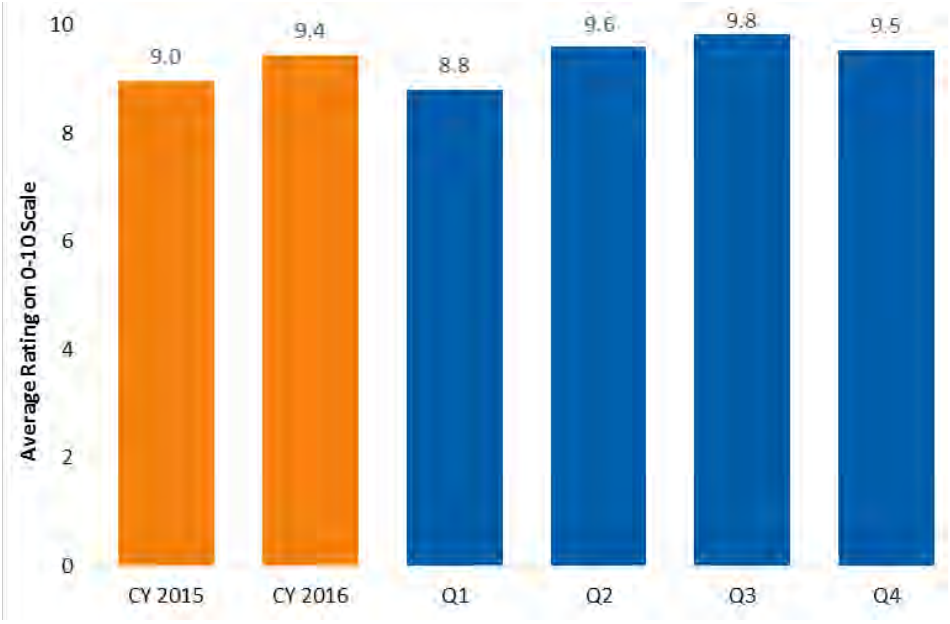
Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question. "Overall, how satisfied are you with the program?" (CY 2015 n=55, CY 2016 n=50, Q1 n=10, Q2 n=13, Q3 n=7, Q4 n=19). The portfolio baseline (8.8) is indicated by a purple line.

As shown in Figure 178, respondents gave an average rating of 9.4 for their satisfaction with the upgrades they received through the Program, representing a statistically significant improvement from the average rating in CY 2015 (9.0). [169]

Respondents gave an average rating of 8.8 for their satisfaction with the contractor (Figure 179), which was not significantly different from the average rating in CY 2015 (8.9).

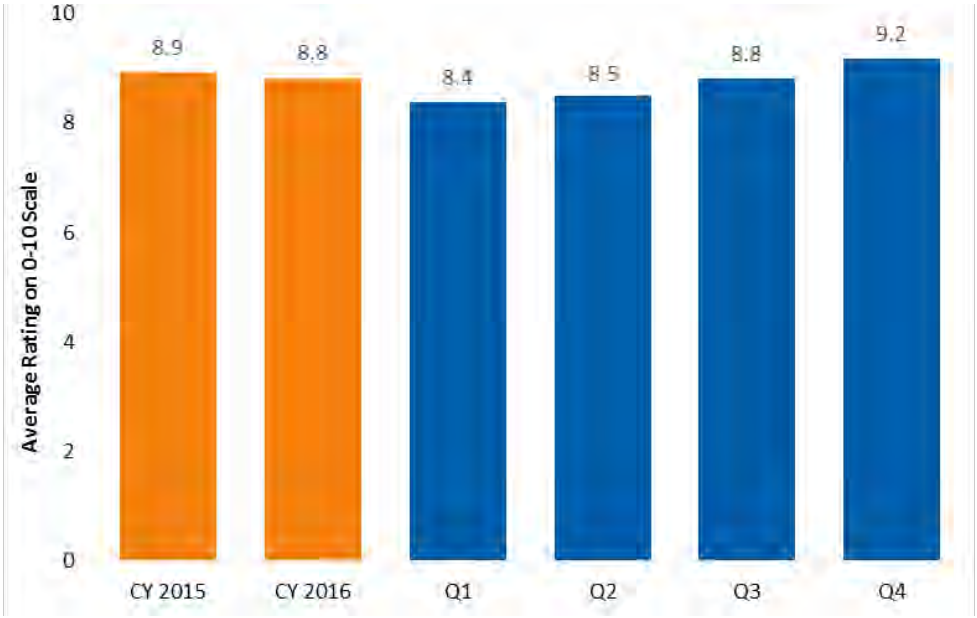
[169] $p < 0.10$ or better for CY 2016, Q1, Q2, and Q3 compared to CY 2015 using binomial t-tests.

Figure 178. CY 2016 Satisfaction with Chain Stores and Franchises Program Upgrades



Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"How satisfied are you with the energy-efficient upgrades you received?"
(CY 2015 n=54, CY 2016 n=47, Q1 n=10, Q2 n=13, Q3 n=6, Q4 n=17)

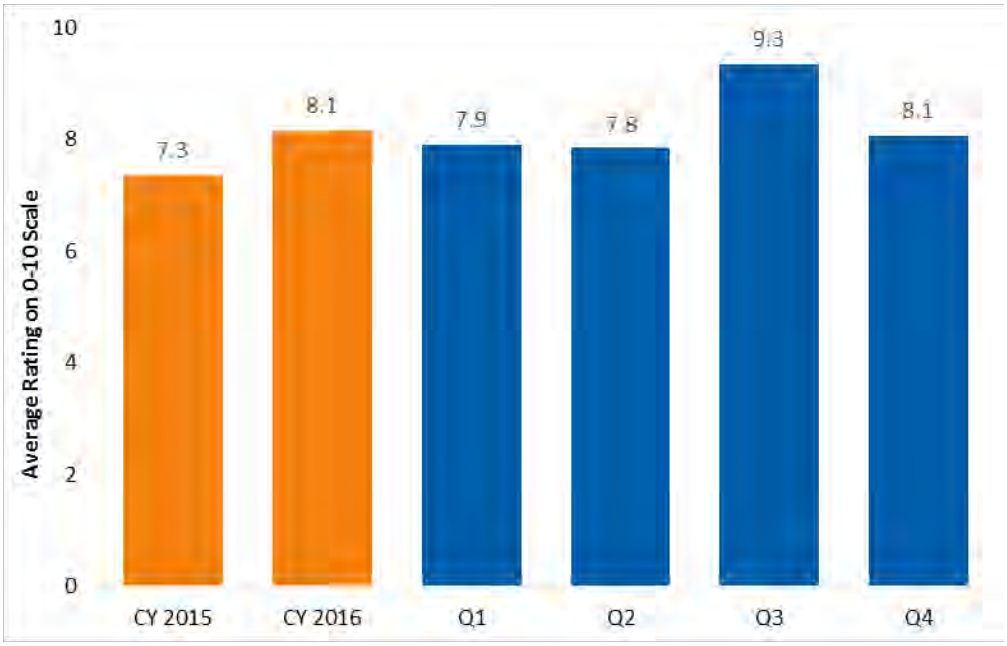
Figure 179. CY 2016 Satisfaction with Contractors for the Chain Stores and Franchises Program



Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"How satisfied are you with the contractor who provided the service?"
(CY 2015 n=43, CY 2016 n=44, Q1 n=8, Q2 n=12, Q3 n=5, Q4 n=18)

Respondents gave an average rating of 8.1 for their satisfaction with the incentive amount (Figure 180). Despite incentive levels decreasing in CY 2016, the rating is a statistically significant improvement from the average rating of 7.3 in CY 2015.[170]

Figure 180. CY 2016 Satisfaction with Incentive for the Chain Stores and Franchises Program



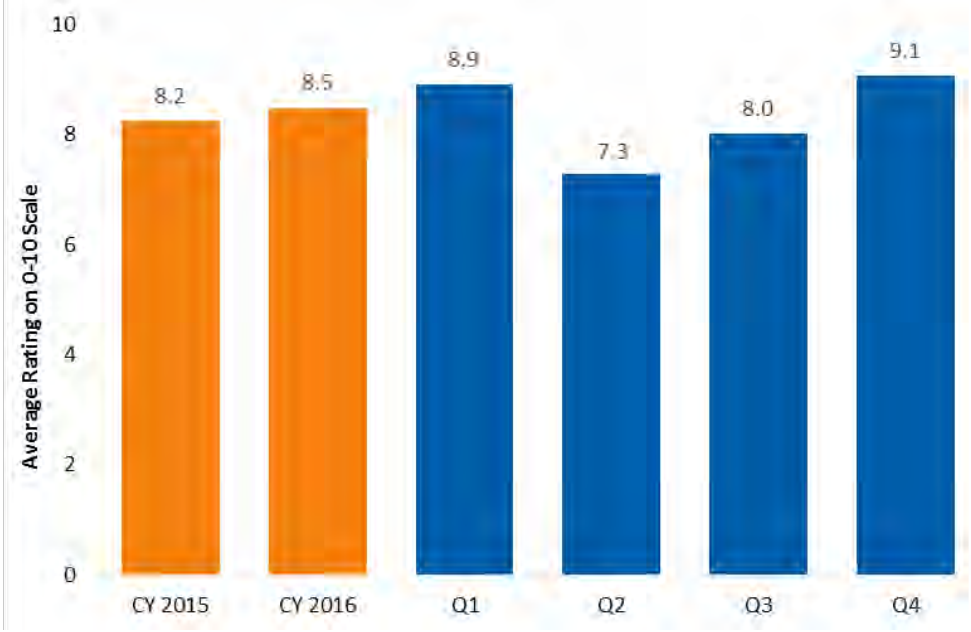
Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"How satisfied are you with the amount of incentive you received?"
(CY 2015 n=55, CY 2016 n=49, Q1 n=10, Q2 n=13, Q3 n=6, Q4 n=19)

Figure 181 shows that respondents' rating for the likelihood that they will initiate another energy efficiency project in the next 12 months averaged 8.5.[171] The difference compared to CY 2015 is not statistically significant.

[170] $p < 0.10$ for CY 2016 and Q3 compared to CY 2015 using binomial t-tests.

[171] Customers who responded that they "already have" done another energy efficiency project were counted in mean ratings as a rating of 10 (most likely).

Figure 181. CY 2016 Likelihood of Initiating Another Energy-Efficiency Improvement



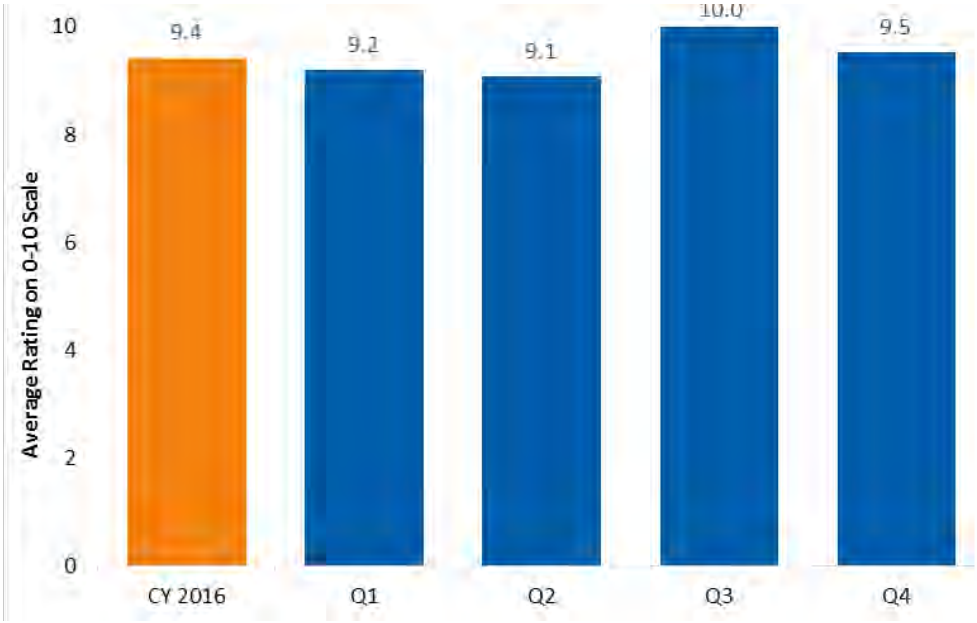
Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"How likely are you to initiate another energy-efficiency improvement in the next 12 months?"
(CY 2015 n=51, CY 2016 n=48, Q1 n=10, Q2 n=13, Q3 n=6, Q4 n=19)

Figure 182 shows that respondents gave a rating of 9.4 for the likelihood they would recommend the Chain Stores and Franchises Program to other businesses.[172] Using these survey data, the Evaluation Team calculated a net promoter score (NPS), which is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Chain Stores and Franchises Program NPS is +80, based on 88% of participants who identified as promoters and 8% who identified as detractors.

The ongoing participant satisfaction survey included a question asking respondents for any comments or suggestions for improving the Program. Of the 51 participants who responded to the survey, 17 (33%) provided open-ended feedback, which the Evaluation Team coded into a total of 24 topics or "mentions." Of these mentions, 13 were positive or complimentary comments (54%), and 11 were suggestions for improvement (46%). Compared to CY 2015, survey respondents in CY 2016 gave about twice as many positive comments and half as many suggestions for improvement.

[172] Customers who responded that they "already have" recommended the Program are counted in mean ratings as a rating of 10 (most likely).

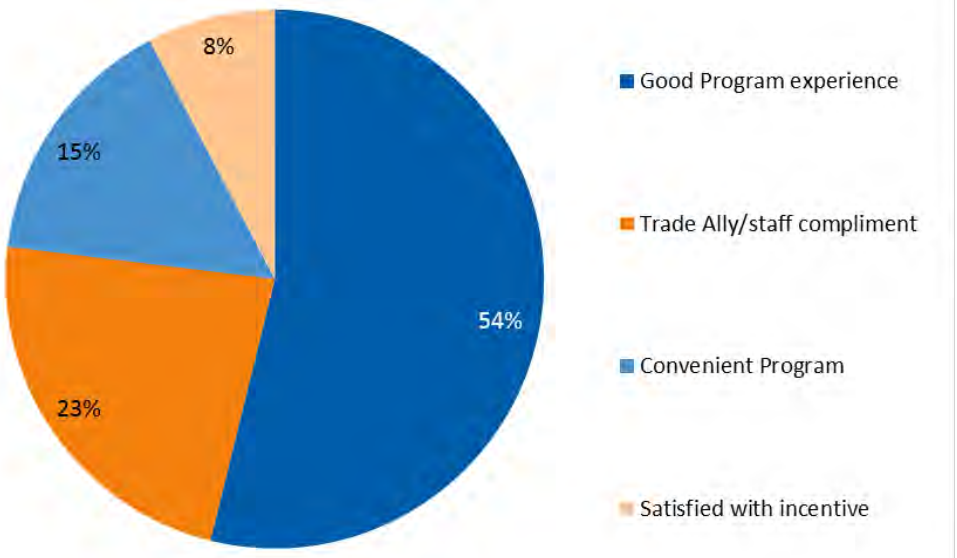
Figure 182. CY 2016 Likelihood of Recommending the Chain Stores and Franchises Program



Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"How likely is it that you would recommend this program to others?"
(CY 2016 n=50, Q1 n=10, Q2 n=13, Q3 n=7, Q4 n=19)

In the CY 2015 survey, all but one of the positive comments reflected a generally positive Program experience (86%; 6 of 7 mentions). Figure 183 shows that in CY 2016 comments that reflected a generally positive experience were still the most common (54%).

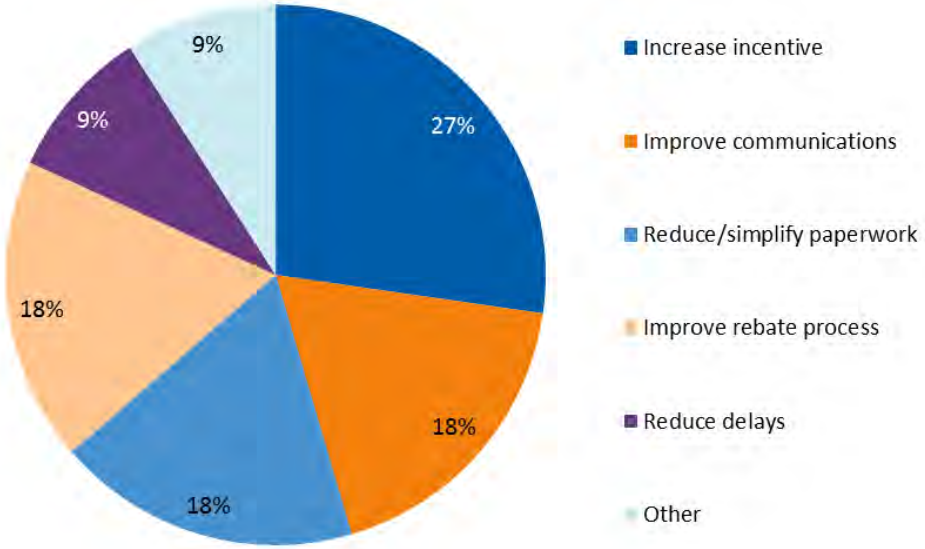
Figure 183. CY 2016 Positive Comments about the Chain Stores and Franchises Program



Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"Please tell us more about your experience and any suggestions." (Total positive mentions: n=13)

Respondents' suggestions for improvement are shown in Figure 184. No category of suggestions dominated, with the most common suggestion to increase incentives (27%).

Figure 184. CY 2016 Suggestions for Improving the Chain Stores and Franchises Program



Source: Chain Stores and Franchises Program Participant Satisfaction Survey Question.
"Please tell us more about your experience and any suggestions."
(Total suggestions for improvement mentions: n=11)

National Rebate Administrator Experience

The Evaluation Team interviewed three National Rebate Administrators who supported their corporate clients by identifying and processing energy efficiency incentive opportunities nationwide. The Team asked these National Rebate Administrators how the Chain Stores and Franchises Program compared to other programs they were involved with nationally and about the most and least competitive program elements.

National Rebate Administrator Profile

One National Rebate Administrator specifically focused on lighting measures for commercial, industrial, and retail businesses, while the other two did not focus on a specific measure or customer segment. All three said they take a comprehensive, multifactor approach to identifying Program opportunities for their clients. Their key criteria for identifying suitable energy efficiency incentive opportunities are these:

- Incentive levels (all three respondents)
- Utility energy rates (two respondents)
- Pre-approval process timelines and ease (two respondent)

- Client preferences for specific equipment upgrades (one respondent)
- Client energy consumption patterns (one respondent)

Comparison of Chain Stores and Franchises Program to Other Programs

The Evaluation Team asked the three National Rebate Administrators how the Chain Stores and Franchises Program offerings compared to similar offerings in other states. The respondents' only negative feedback about the Program was its comparatively low incentive levels. All three said incentive levels were higher elsewhere. However, one National Rebate Administrator said that the Program's lower rebate values were offset by Wisconsin's lower energy costs.

As shown in Table 229, the National Rebate Administrators offered praise for the Program in terms of project approval timelines and eligibility requirements, customer focus, and extensive measure offerings.

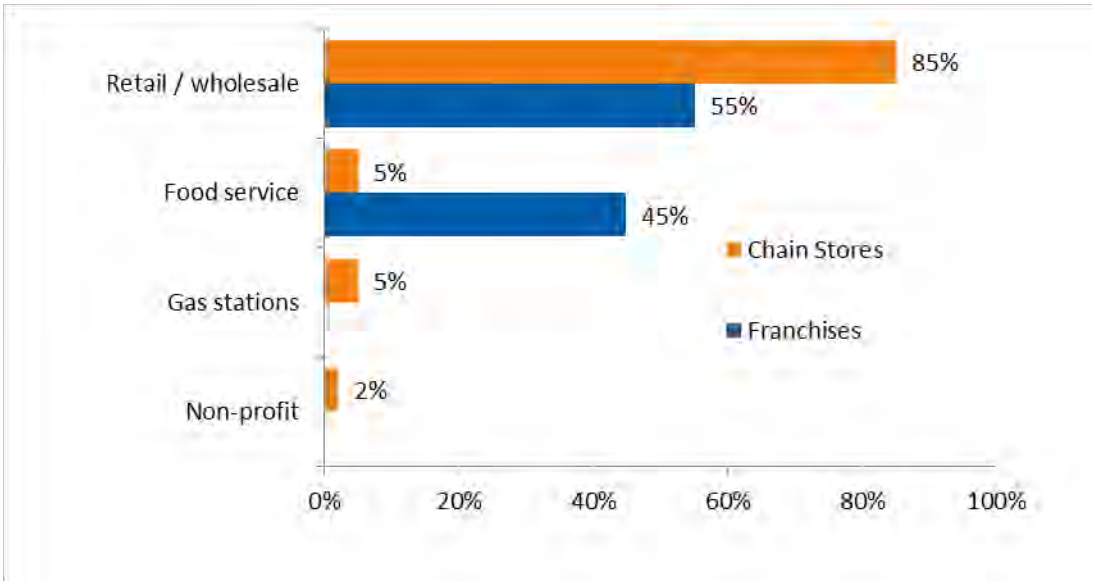
Table 229. Chain Stores and Franchises Program Strengths According to National Rebate Administrator

Project Approval Timeline and Eligibility Requirements	Customer Focus
• "Program doesn't require pre-approval" • "Strong pre-approval times mean that customers can move forward with projects sooner and are able to realize energy savings sooner" • "Paperwork process is very strong, especially for pre-approval: this helps with emergency replacements" • "Post-install HVAC incentives are good because many of the replacements are for emergency issues" • "Eligibility requirements are very competitive"	• "Franchise-specific focus" helps working with "our franchise clients" • "Focuses on multiple types of users" and "looks at clients holistically" • "Puts in a lot of effort to evaluate a project on its energy-saving merits rather than being overly prescriptive about what qualifies"
Other Strengths	**Extensive Measure Offerings**
• "Can cover whole state with one or two contacts" • "Incentives for high-bay lights, and incentives for strip fixtures"	• Measure offerings "cover everything" • "Great measure mix" • "Wide ranging portfolio"

Participant Demographics

CY 2016 participants provided information regarding their business type, business segment, number of stores, number of employees, and the ownership status of their facilities. Fifty-nine percent of respondents were chain stores operators and 41% were franchise operators. Most franchise and chain store operators said they were retail or wholesale businesses. Only 5% of chain store respondents were in the food service business compared to 45% of franchise respondents (Figure 185).

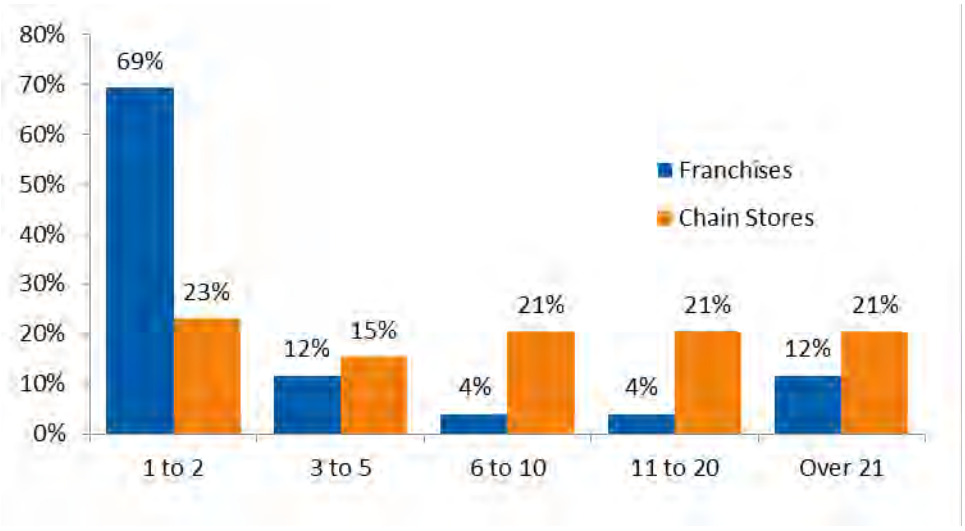
Figure 185. Participant Business Segment



Source: CY 2016 Participant Survey Question L1. "What industry is your company in?" (n=69, Chain Stores=41, Franchises=28)

Franchise operators also tended to manage fewer business locations. As Figure 186 shows, the majority of franchise operations consisted of one or two locations, while the number of chain store locations was more evenly distributed.

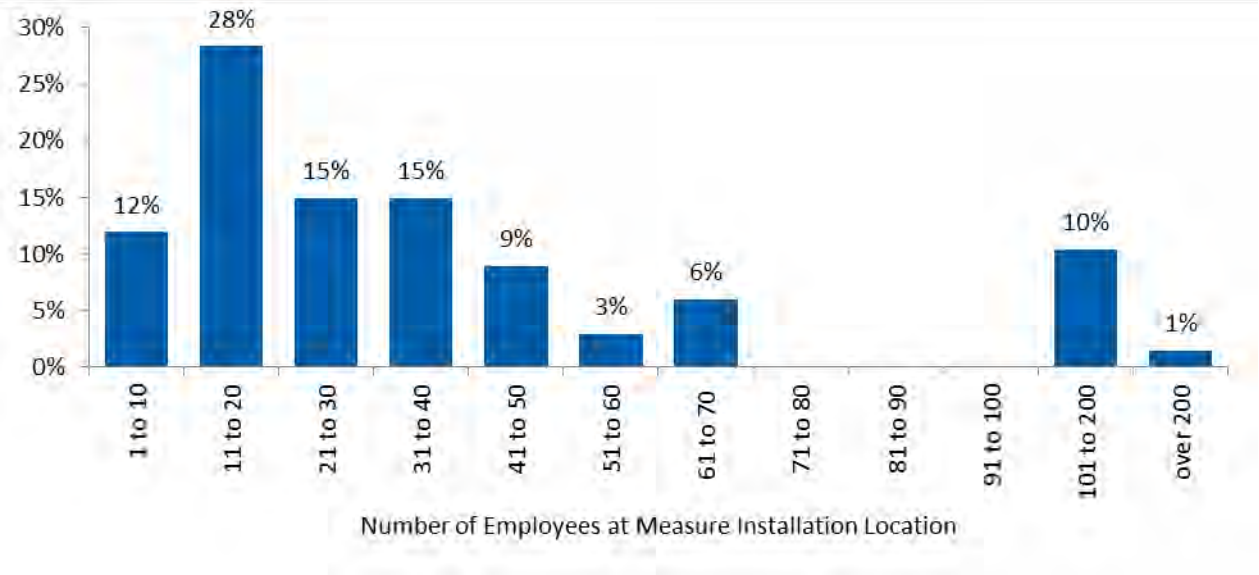
Figure 186. Number of Franchise and Chain Store Locations



Source: CY 2016 Participant Survey Question L2. "How many locations does your business operate in Wisconsin?" (n=65, Chain Stores=39, Franchises=26)

Fifty-seven percent of participants said they owned their facilities, while 26% leased their facilities and 17% both owned and leased locations.[173] As shown in Figure 187, the largest percentage of participant businesses had between 11 and 20 employees at the location where the participants' project was implemented, with an average of 44 employees.

Figure 187. Number of Employees at Business Location Where Project was Implemented



Source: CY 2016 Participant Survey Question L5. "How many people are employed at the location where the project took place?" (n=67)

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 230 lists the CY 2015 and CY 2016 incentive costs for the Chain Stores and Franchises Program.

Table 230. Chain Stores and Franchises Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$2,799,870	$3,027,391

[173] In CY 2016, 73% of Small Business Program survey respondents said they owned their facilities, and 86% of Business Incentive Program participants said they owned their facilities.

The Evaluation Team found the CY 2016 Program was cost-effective (2.80). Table 231 lists the evaluated costs and benefits.

Table 231. Chain Stores and Franchises Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$309,868	$307,206
Delivery Costs	$1,265,321	$1,254,449
Incremental Measure Costs	$16,131,275	$16,474,953
Total Non-Incentive Costs	**$17,706,464**	**$18,036,607**
Benefits		
Electric Benefits	$40,515,614	$29,356,615
Gas Benefits	$2,057,220	$5,305,481
Emissions Benefits	$6,989,714	$6,041,743
Total TRC Benefits	**$49,562,548**	**$40,703,839**
Net TRC Benefits	**$31,856,084**	**$22,667,232**
TRC B/C Ratio	**2.80**	**2.26**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. National Rebate Administrators provided extremely positive feedback about the Program. The National Rebate Administrators gave positive feedback regarding components of the Program design and operation, as well as its measure mix, demonstrating that providing specific resources for chain stores and franchises had been beneficial from a corporate perspective. National Rebate Administrators also noted that incentives were lower in Wisconsin than in other states.

Outcome 2. The franchise participation milestone offering is not operating as intended. In-depth interviews with franchise operators and the participant survey revealed that franchise operators were frequently not aware of the Program's franchise participation milestone offering, even if they had received the incentive.

Recommendation 2. For the milestone offering to succeed in encouraging Program participation from businesses within the same franchise organization, it is critical that franchise operators hear about and understand the offering. Consider expanding, if resources allow, the Program mechanism for communicating about the offering through contractors and regular mail while continuing and possibly expanding this approach through corporate headquarters, Energy Advisors, and marketing emails.

Outcome 3. Many franchise operators had less time to read marketing materials than chain store operators. There was no single most effective way to communicate to all Program participants. Most franchise operators ran one or two locations, and they functioned similar to other small businesses,

whereas more chain store locations were operated by single point of contact. The diversity of franchises operations also required a variety of Program communication methods. The in-depth interviews with franchise operators also revealed that those from smaller operations had less time to read marketing emails and interacted less frequently with Energy Advisors. Participant surveys revealed that smaller operations were less likely to have heard about the Program from an Energy Advisor and more likely to have heard from a contractor, and that franchise operators heard about the Program through word of mouth and corporate headquarters.

Recommendation 3. To enable communication about a range of specific topics to franchise organizations (such as the franchise participation milestone offering or specific retrofit opportunities), ensure that marketing efforts include methods to reach franchises that operate only a few stores, possibly by expanding marketing efforts to include direct mailing of printed material, conveying information through contractors, and taking advantage of corporate resources. If Program resources allow, consider encouraging Energy Advisors to maintain greater contact with smaller operations.

Outcome 4. Although franchise operators were limited by corporate decision making, franchise headquarters had a significant positive influence regarding efficiency at their locations. The participant surveys and in-depth interviews with franchise operators revealed that franchise corporate offices had less decision-making power concerning energy efficiency upgrades than chain store corporate offices. However, franchise operators said that corporate headquarters had significant influence in regards to energy efficiency and represented a trusted source of information. The Program Implementer is currently engaged in building partnerships with the various corporate headquarters, an approach that may prove effective in driving messages to franchise operators.

Recommendation 4. Continue to build partnerships with corporate headquarters to drive Program messaging to franchise operators.

Outcome 5. Participants learned about energy efficiency from a variety of sources and viewed energy-savings opportunities from their own end-use consumption patterns. Participants appeared to have more limited knowledge about energy-savings opportunities beyond lighting retrofits. Participant surveys and in-depth interviews with franchise operators revealed that they view potential energy savings from their existing end-use consumption, that is, either by assuming that end uses with the highest perceived level of consumption created the biggest savings opportunity or by conducting research only when specific equipment needed to be replaced.

Recommendation 5. Consider designing Program marketing messages around specific customer energy consumption patterns (such as the Program Implementer's work to highlight the energy-saving opportunities at restaurants, or by creating cooking equipment messaging for restaurants or refrigeration equipment messaging for supermarkets, then targeting these messages to specific business segments via tailored emails, targeted direct mailings, or corporate partnerships).

Outcome 6. Measures which were not supported by current approved workpapers drove the deviation of evaluated savings from expected (*ex ante*) values.

The Wisconsin TRM is made up of workpapers which have been reviewed and accepted by stakeholders. There are also a number of accepted workpapers which are not included in the TRM but are still used to support SPECTRUM savings values. Finally, a number of measures in SPECTRUM are not supported by the current TRM or current accepted workpapers, but rather are based on old, outdated workpapers or other substandard documentation. These active measures with insufficient documentation are a major source of deviation from expected savings values, since the Evaluation Team must rely upon other algorithms, input parameters, and sources.

Recommendation 6: Increase the measure management process rigor to mitigate the effects of old or insufficient documentation on current program savings. Consider employing sunset dates on all measures to restrict how long a measure savings value can persist in the SPECTRUM database. Consider, also, creating an "opt-in" process where only those measures with current, approved methodology are listed for use in the current program year database.

Design Assistance Program

Through the Design Assistance Program, Focus on Energy provides incentives to participating customers and their design teams to design and build new energy-efficient buildings or to complete substantial renovations of existing buildings. The Program was launched in January 2013, and targets projects that are 5,000 square feet or greater. The Program Implementer, The Weidt Group, with support from the Program Administrator, CB&I, conducts direct outreach to design professionals such as architects, engineers, and design contractors.

The program performed moderately well relative to its goals; this was partially because the level of freeridership in CY 2016 was lower than in previous years. Apart from several minor adjustments to as-built equipment efficiencies or setpoints, there were no major trends or systematic issues that merited adjustments to the evaluated savings.

Table 232 lists the actual Program spending, savings, participation, and cost-effectiveness.

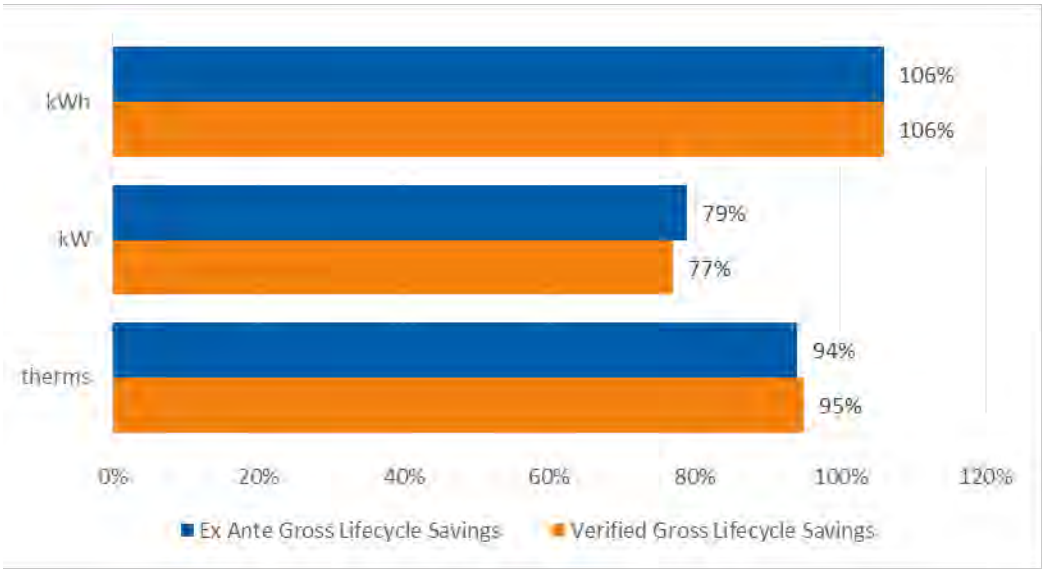
Table 232. Design Assistance Program Summary[1]

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$4,012,333	$3,236,510
Participation	Number of Participants	77	54
Verified Gross Lifecycle Savings	kWh	640,629,077	640,975,264
	kW	4,572	4,766
	therms	32,410,595	24,698,071
Verified Gross Lifecycle Realization Rate	MMBtu	100%	100%
Annual Net-to-Gross Ratio	MMBtu	93%	68%
Net Annual Savings	kWh	29,789,252	21,793,159
	kW	4,252	3,241
	therms	1,507,093	850,469
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	4.47	2.89

[1]Values are inclusive of both offerings: Design Assistance and Design Assistance – Residential.

Figure 188 shows the percentage of gross lifecycle savings goals achieved by the Design Assistance Program in CY 2016. The Program exceeded CY 2016 goals for *ex ante* and verified electric energy savings, but fell short of CY 2016 goals for *ex ante* and verified peak demand and natural gas energy savings.

Figure 188. Design Assistance Program Achievement of CY 2016 Gross Lifecycle Savings Goals[1, 2]



[1] The 100% *ex ante* gross lifecycle savings reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

[2]Values are inclusive of both offerings: Design Assistance and Design Assistance – Residential.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for the Program in CY 2016. The Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance. Table 233 lists the specific data collection activities and sample sizes used in the evaluations.

Table 233. Design Assistance Program Data Collection Activities and Sample Sizes[1]

Activity	CY 2016 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant and Design Team Interviews[2]	10
Online Building Owner Brand Affinity Survey	8
Engineering Desk Review	40
Verification Site Visits	10

[1]Values are inclusive of both offerings: Design Assistance and Design Assistance – Residential.

[2] Data from the interviews informed Program Implementer contractual obligations surrounding satisfaction KPIs. The Evaluation Team completed nine joint building owner and design team interviews and one design-team-only interview.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and the Program Implementer in July 2016 to learn about the current state of the Design Assistance Program and to assess its objectives,

performance, and implementation challenges and solutions. Interview topics included Program design and implementation, goals, marketing and outreach, building owner and design team engagement, data tracking, and Program barriers.

Tracking Database Review

The Evaluation Team reviewed a census of the Design Assistance Program records in the Focus on Energy database, SPECTRUM, which included the following tasks:

- Conducting a thorough review of the data to ensure the SPECTRUM totals matched the totals that the Program Administrator reported
- Reassigning savings from any database adjustment measures to the corresponding program measures (if applicable)
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Participant Building Owners and Design Team Interviews

The Evaluation Team completed nine joint telephone interviews with building owners and representatives of the project design team, and one additional telephone interview with design representatives only (the building owner was unavailable for the interview) to assess their experience with the Program and gather data to inform NTG calculations. The Evaluation Team selected from a sample of 150 projects for which the Program processed and distributed incentive checks as of November 2016 (according to SPECTRUM records). Of the 10 interviews, nine were for nonresidential building projects and one was for a residential multifamily building project.

Online Building Owner Brand Affinity Survey

To assess customer marketing preferences and Focus on Energy brand affinity, the Evaluation Team fielded a brief supplemental online survey with the building owners who had been interviewed. This survey was fielded separately so that the Evaluation Team could focus the telephone interviews on high-priority topics applicable to both building owners and design teams. Of the 10 building owners the Evaluation Team requested to participate in the survey, eight completed the survey, including the one building owner who declined to participate in the telephone interview.

Engineering Desk Review

The Evaluation Team conducted 40 detailed reviews of project documentation, primarily the Project Savings Verification reports and the energy model output reports, and when available, the energy models themselves. For each project, the verification report created by the Program Implementer described the energy savings strategies that were implemented in the project design. The Evaluation Team investigated the energy model and/or model output report to ensure that the identified strategies were accurately reflected in the model. The Team also compared the energy consumption between the model output reports from the baseline and proposed design to ensure that the reported savings were calculated correctly.

Verification Site Visits

The Evaluation Team conducted ten site visits to verify that reported energy-saving strategies are incorporated in the building design and operating in a manner consistent with the claimed savings estimates. An Evaluation Team member visited seven nonresidential building projects and three multifamily residential building projects. While on the site at each building, the Team member observed light fixture counts, wattages, and control types, and verified that the installed lighting was consistent with the lighting plans and lighting power densities included in the project documentation. The Team member also observed all HVAC and domestic water heating equipment, and collected nameplate data and verified that it was consistent with the efficiency and performance data from the project documentation.

As in the engineering desk review process, the Team then investigated the models to ensure that the identified strategies and the conditions observed on the site were represented appropriately in the models. The Evaluation Team obtained the actual model files when available and explored them firsthand to verify that the input parameters accurately reflected the building design. When discrepancies were identified between the models and the conditions observed in the field, the Team updated the models as necessary and reran them to obtain new results. If no discrepancies were identified, the Team still reran the models to verify that the reported results could be reproduced. In cases where the Team could not obtain the actual model files, a thorough review of the model output reports was conducted, as was done in the engineering desk reviews.

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Program:

- Tracking database review
- Participant interviews
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data to determine reported installations, then applied the results from participant interviews (n=10), engineering desk reviews (n=40), and verification site visits (n=10) to calculate verified gross savings.

As a part of the tracking database review, the Evaluation Team evaluated the census of the CY 2016 Design Assistance Program data contained in SPECTRUM. The Team reviewed data for appropriate and consistent application of unit-level savings values and EUL values that align with the applicable TRMs (October 2015 and February 2016), and found no major discrepancies or data issues as part of this process.

The Evaluation Team identified several projects where minor savings adjustments were made as part of the impact analysis. The largest adjustment made to a sampled project was the result of an as-installed

boiler which was more efficient than originally modeled; the change from a modeled 89% efficient boiler to an as-built 95% efficient boiler yielded a measure-specific realization rate of 125%. Several other minor adjustments included adjusting modeled lighting power densities, modeled thermostat set-points, modeled chiller efficiencies, and modeled pump power. In general, nearly all evaluated projects were found to have verified savings very close to that of claimed savings.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating properly following installation by the Program Implementer. In CY 2016, the Evaluation Team conducted participant interviews to verify the installed measures and estimate the ISR at the measure level and found the ISR to be 100%. Since each measure for this program is comprised of multiple energy conservation measures and strategies, this ISR was supported by the on-site verifications which confirmed the interview findings.

Verified Gross Savings Results

Table 234 lists the annual and lifecycle realization rates for the CY 2016 Program. Overall, the Program achieved an annual evaluated realization rate of 100%, weighted by total (MMBtu) energy savings.[174]

Table 234. CY 2016 Design Assistance Program Annual and Lifecycle Realization Rates[1]

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
100%	97%	101%	100%	100%	97%	101%	100%

[1] Values are inclusive of both offerings: Design Assistance and Design Assistance – Residential.

Table 235 lists the *ex ante* and verified annual gross savings for the CY 2016 Program. Design measures consist of two types of measures that represent the initial and final phases of each project: initial "Design and Modeling Assistance," and final "Project Savings Verification." Each project is initiated with the "Design and Modeling Assistance" measure, in which potential energy-saving design strategies are evaluated and a bundle of strategies is selected to be included in the project's design. After the building design is completed, the implementation of the energy-saving strategies is verified and all savings are booked in association with the subsequent "Project Savings Verification" measure. "Design and Modeling Assistance" measures are effectively excluded from the impact evaluation since they do not have associated energy savings. The category of "Other" measures is reserved for Group 1 measures, which are Renewable Energy measures. Ground-source heat pump systems are categorized as renewable energy systems, and therefore any energy savings directly attributed to this HVAC system type are broken out into this separate category.

[174] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 235. CY 2016 Design Assistance Program Annual Gross Savings Summary

Measure Category	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Design	24,773,106	3,957	960,441	24,680,824	3,832	970,324
Other	2,161,840	0	0	2,153,787	0	0
Design – Residential	5,167,482	764	643,583	5,148,233	740	650,206
Other – Residential	48,792	0	0	48,610	0	0
Total Annual	**32,151,220**	**4,721**	**1,604,024**	**32,031,454**	**4,572**	**1,620,530**

Table 236 lists the *ex ante* and verified gross lifecycle savings by measure category for the CY 2016 Program.

Table 236. CY 2016 Design Assistance Program Lifecycle Gross Savings Summary

Measure Category	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Design	495,462,120	3,957	19,208,820	493,616,480	3,832	19,406,483
Other	43,236,800	0	0	43,075,739	0	0
Design – Residential	103,349,640	764	12,871,660	102,964,653	740	13,004,112
Other – Residential	975,840	0	0	972,205	0	0
Total Lifecycle	**643,024,400**	**4,721**	**32,080,480**	**640,629,077**	**4,572**	**32,410,595**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Design Assistance Program, and calculated a NTG percentage of 93% for the CY 2016 Program.

Freeridership

The Evaluation Team used the self-report survey method to determine the Program freeridership level for CY 2016. The Team estimated an average self-reported freeridership of 12%, weighted by evaluated savings, for the CY 2016 Program.

As in CY 2015, the Evaluation Team considered both the modeling assistance and incentives offered through the Program when assessing the Program's net savings for CY 2016. The Evaluation Team estimated two intention-based freeridership scores: one addressing the modeling assistance and one addressing the incentives. In addition, the Evaluated Team included an influence-based freeridership score that was combined with the average of the modeling assistance and incentive intention-based freeridership scores.

The influence component was added to the freeridership methodology after discussions with Program stakeholders following the CY 2014 evaluation. It was determined that the Program contains elements that were not specifically addressed through the CY 2014 freeridership questions, and that an additional

freeridership score was needed to fully account for all Program factors. The net savings analysis approach used in CY 2016 is the same as the revised approach first used in CY 2015.

An aspect contributing to the change in freeridership from CY 2015 to CY 2016 is that small analysis sample sizes with large variations in evaluated Program savings between participants creates the opportunity for large swings in weighted freeridership estimates. In CY 2016, the largest saver represents 46% of the analysis sample Program savings, but was estimated as a 0% freerider. In CY 2015, a respondent who was estimated as a 37.5% freerider also represented 46% of the total analysis sample gross savings. If the participants who represent 46% of the analysis sample savings are removed from both the CY 2015 and CY 2016 analyses, the weighted freeridership estimates are 27% (CY 2015) and 21% (CY 2016). Table 237 shows the Program-level, savings-weighted freeridership estimates for the CY 2015 and CY 2016 Program years.

Table 237. CY 2014, CY 2015, and CY 2016 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	8	32%
CY 2016	9	12%

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Design Assistance Program. One building owner installed Design Assistance Program qualifying measures at five nonparticipating projects during the Program year, and reported that their participation in the Design Assistance Program was *very important* in their decisions. The Evaluation Team applied the average evaluated savings of two of the building owners' Program projects. These projects were representative of the total amount of spillover measures that the participant said they had installed as a result of their Program participation, presented in Table 238.

Table 238. Design Assistance Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
Energy Recovery Ventilators	5	23,116
High-Efficiency Boilers	5	
Solar Hot Water Heaters	5	
Solar PV Systems	5	

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 5% spillover estimate, rounded to the nearest whole percentage, for the Design Assistance Program respondents (Table 239).

Table 239. Design Assistance Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	23,116
Program Savings	445,247
Spillover Estimate	**5%**

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG estimate of 93% for the Program. Table 240 shows total savings net of freeridership, participant spillover, and total annual gross and net savings in MMBtu, as well as the overall Program NTG.

Table 240. CY 2016 Design Assistance Program Annual Net Savings and NTG Ratio

Net of Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
238,783	13,567	271,344	252,350	93%

Table 241 shows the annual Program net demand and energy impacts (kWh, kW, and therms) by measure category. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 241. CY 2016 Design Assistance Program Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Design	22,953,166	3,564	902,401
Other	2,003,022	0	0
Design – Residential	4,787,856	688	604,691
Other – Residential	45,208	0	0
Total Annual	**29,789,252**	**4,252**	**1,507,093**

Table 242 lists the lifecycle Program net demand and energy impacts (kWh, kW, and therms) by measure category.

Table 242. CY 2016 Design Assistance Program Lifecycle Net Savings

Measure Category	Lifecycle Net		
	kWh	kW	therms
Design	459,063,326	3,564	18,048,029
Other	40,060,437	0	0
Design – Residential	95,757,128	688	12,093,824
Other – Residential	904,151	0	0
Total Lifecycle	**595,785,042**	**4,252**	**30,141,854**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and a brief building owner survey as part of the process evaluation activities. The process evaluation focused on these key topics for the Program:

- Program design, delivery, and goals
- Marketing and outreach
- Customer messaging preferences
- Customer and design team experience, including decision-making influences and Program benefits, barriers, and satisfaction

Program Design, Delivery, and Goals

The Design Assistance Program uses a custom incentive design that relies on savings per kWh or therm and offers two incentives—one for customers and one for design teams—to influence them to design and construct high-efficiency nonresidential and residential (multifamily) buildings. Table 243 shows the CY 2016 incentives.

Table 243. Design Assistance Program Incentive Structure in CY 2016

Incentive	Reward
Design Team Incentive	$0.012/kWh if the Program Implementer completes whole-building energy modeling $0.015/kWh if the customer completes whole-building energy modeling
Customer/Building Owner Incentive	$0.09/kWh and $0.55/therm

Focus on Energy requires that Program projects include whole-building energy modeling to inform and influence design teams and customers about the energy-related decisions they could make. Customers and their design teams can opt to complete building modeling and receive an incentive of $0.015/kWh or have the Program Implementer complete building modeling for an incentive of $0.012/kWh.

Using the results of the modeling, the Program Implementer offers several energy-efficient building design options, or bundles, with a range of forecasted savings and designs to implement. Customers select the bundle that best suit their building and available budget. The Program Implementer then provides the customer with a document that summarizes the selected strategies and details the key

design parameters that need to be confirmed before the project can receive credit for the energy-saving strategies. Customers then proceed with project construction and are awarded incentives based on verified (post-construction) building performance.

The Program Implementer works directly with building owners and project design teams and is responsible for Program marketing and outreach, project verification, and incentive processing. The Program Implementer also performs whole-building energy modeling for participants that opt not to perform modeling themselves.

The Program Administrator is primarily responsible for Program management, including processing applications, approving incentives, and tracking data, and conducts some Program marketing and outreach.

Design teams also play a substantial role by helping to identify new opportunities and customers, providing energy model inputs, and working with building owners to implement building design recommendations.

Program Changes

Focus on Energy made no substantial changes to Program design or delivery in CY 2016. Minor changes involved revising the Program Implementer's net energy optimizer (NEO) energy modeling tool, which helps customers view the impacts of various efficiency upgrades, and revising the Enrollment Wizard online application. The Program Implementer explained that, although the underlying NEO tool remained unchanged, it upgraded the front-end user interface in CY 2016 to be more interactive and user friendly. It also revised the Enrollment Wizard to gather more information about the customer and project earlier in the process. The Program Administrator and Program Implementer said they made these changes to reduce the time from project initiation to review and selection of energy bundles. In reviewing SPECTRUM data, Cadmus confirmed a decrease in the average number of days between project initiation and application creation for the 40 projects initiated in CY 2016 compared to CY 2013, CY 2014, and CY 2015.[175]

To assess responses to the online application, during the joint interviews, the Evaluation Team asked building owners and design team to describe their experience with the Enrollment Wizard. Similar to findings from CY 2015, most respondents were unable to remember their exact experience. The four design team respondents who could recall using the Enrollment Wizard said it was straightforward and enrollment was easy to complete.

[175] Cadmus reviewed projects in SPECTRUM that received design team or customer incentives in CY 2016 and compared the average number of days between project initiation and application creation date (which occurs after participants select an energy bundle and are ready to move forward with a project) by project initiation year.

Program Goals

In CY 2016, the Design Assistance Program had these savings goals:

- Demand reduction of 5,449 kW (nonresidential) and 504 kW (residential)
- Lifecycle electric savings of 514,962,363 kWh (nonresidential) and 90,762,665 kWh (residential)
- Lifecycle natural gas savings of 22,001,081 therms (nonresidential) and 12,152,357 (residential)

The CY 2016 Program achieved 106% of its nonresidential electric savings goal, but only 77% of its verified demand reduction goal and 95% of its verified therms goal across both program offerings.

The Program has typically exceeded its electric savings goals but has fallen short of therms savings goals because nonresidential lighting projects are such a large share of the Program. In addition, the Program has long lead times, generally over a year, and cannot react to changes in goals in a timely fashion. The Program Administrator maintains fuel-specific targets for the Program, but adjusts the balance between the two based on Program performance and projections.

In CY 2016, the Program Implementer had six KPIs that are intended to improve customer satisfaction, achieve savings milestones, and increase participation. Table 244 presents these KPIs and their results.

Table 244. Design Assistance Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Customer Satisfaction	Achieve customer satisfaction rating of 4.5 out of 5, based on satisfaction data gathered through Evaluation Team's building owner interviews.[1]	Reached goal (achieved average satisfaction rating of 9 out of 10)	Reported through the Evaluation Team's building owner interviews
Savings Achievement	Achieve 25% of the annual savings goal by end of Q2; achieve 80% of the annual savings goal by end of Q3.	Did not reach goal; achieved Q2 savings goal (50%); did not reach Q3 savings goals (69%)	Confirmed by final CY 2016 SPECTRUM data

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Participation	Enroll 15 new design firms in Program for CY 2016.	Reached goal; enrolled 20 new design firms	Reported by Program Administrator
	Increase social media presence with three to four postings each month.	Did not reach goal; issued approximately six social media posts during CY 2016	Reported by Program Implementer
	Speak at a minimum of two utility events during CY 2016 for Design Assistance education.	Did not reach goal; Program Implementer did not attend utility events during CY 2016	Reported by Program Administrator
	Attend at least 30 industry events for networking and Program promotion.	Reached goal; Program Implementer attended 28 industry events; Program Administrator attended additional three events	Reported by Program Administrator

[1] The Program Administrator initially included a 5-point scale as part of the Program Implementer's contractual obligations for KPIs in CY 2016. The Evaluation Team shifted to a 10-point rating scale for the CY 2016 evaluation to standardize ratings across programs; therefore, customer satisfaction was calculated using the 10-point scale.

The Program achieved its customer satisfaction KPI and two of its KPIs regarding increased participation. The Program reached its goal of achieving 25% of annual savings by Q2 but did not achieve its 80% Q3 savings goal. The Program Administrator and Program Implementer explained that most construction projects are seasonal, so project completion rates were typically relatively flat for the first three quarters, with most projects wrapping up in the final quarter of the year.

The Program Implementer increased participation by successfully enrolling 20 new design firms and attending 28 industry events. The Program Administrator also attended three additional events on the Program Implementer's behalf. The Program Administrator said neither it nor the Program Implementer were invited to speak about the Program at any utility events, and therefore the Program Implementer did not attend any events during CY 2016. In addition, the Program Implementer explained that since the Program did not experience difficulty enrolling participants in CY 2016, and neither it nor the Program Administrator believed social media posts had a substantial impact on increasing Program participation, they did not prioritize this KPI in CY 2016.

Data Management and Reporting

For the Design Assistance Program, like other Focus on Energy programs, the Program Implementer uses SPECTRUM to capture customer data. Program data is also captured in the NEO tool, the comprehensive energy modeling software that helps customers view the impacts of various energy-savings strategies. The Program Implementer uploads the customers completed applications from the Enrollment Wizard and bundle requirements from the NEO tool to SPECTRUM.

The Program Administrator reviews and approves these documents, then the Program Implementer sends an incentive agreement to the customer. The customer signs and returns the agreement. The

Program Implementer then uploads the agreement to SPECTRUM and distributes the incentive to the design team. Customers' receive their incentive once their project is complete and the Program Implementer has verified savings by reviewing building documentation (shop drawings, specifications, and as-built drawings) to verify that they align with the strategies and specifications described in the bundle requirements document.

Other than some reliability and speed issues with SPECTRUM, the Program Implementer and the Program Administrator said they had no difficulty managing data and tracking processes in CY 2016.

Marketing and Outreach

The Program Administrator and Program Implementer focus primarily on building relationships through face-to-face interaction with building owners and their design teams to increase awareness and engagement with the Program. They limit additional outreach to social media, email to their existing contacts, and bill inserts. They said the Program targets specific trade groups and professional groups, such as the Wisconsin branch of the AIA, Wisconsin Healthcare Engineering Association, Wisconsin Economic Development Corporation, and ASHRAE. The Program Implementer also maintains engagement through lunch-and-learn sessions with design teams to provide introductions to and updates on the Program.

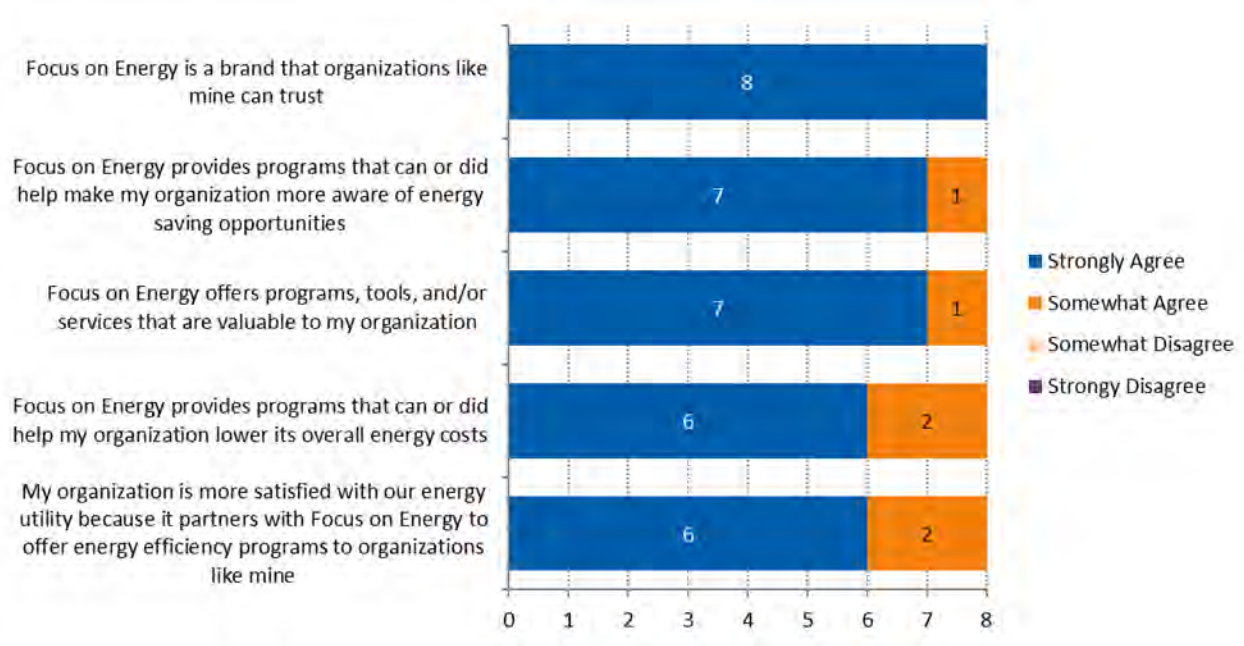
Program Awareness

The Evaluation Team asked participant interview respondents how they first learned of the incentives available through the Design Assistance Program. Some building owners and design teams could not recall how and where they first learned about the Program because they already had a relationship, having participated in other Focus on Energy programs. The five building owners who could recall said they had learned primarily through Focus on Energy representatives or their design teams. Six design teams said they had also learned through Focus on Energy or through their colleagues or local utilities.

Customer Messaging Preferences

To gauge Focus on Energy brand affinity and messaging preferences, the Evaluation Team fielded a brief online survey with building owners who, with the exception of one survey respondent, had agreed to participate in the telephone interviews. First, the Evaluation Team asked building owners to what extent they agreed with five marketing statements. The majority agreed with all statements and most strongly with the statement that Focus on Energy is a trustworthy brand. Figure 189 shows building owners' agreement with the brand affinity statements.

Figure 189. Building Owner Agreement with Focus on Energy Claims

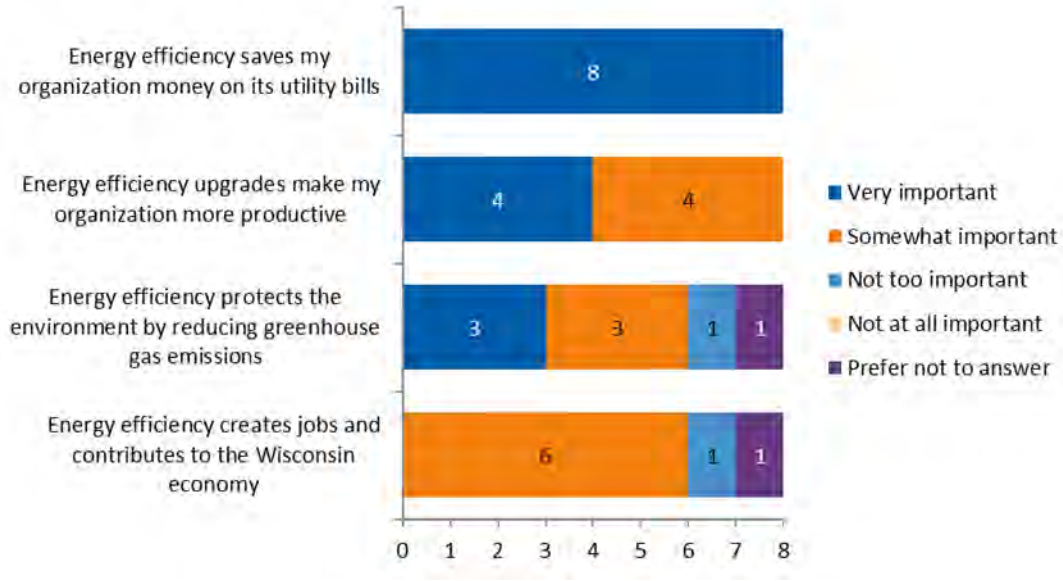


Source: CY 2016 Building Owner Survey Question A2. "Please tell me whether you *strongly agree*, *somewhat agree*, *somewhat disagree*, or *strongly disagree* with these statements." (n=8)

The Evaluation Team also asked building owners to identify which of four statements would make them most interested in learning more about Focus on Energy. The eight respondents were nearly evenly split among three of the four statements. These statements were that Focus on Energy helps Wisconsin businesses "[to] reduce their energy costs and save money" (n=3); "with solutions to use energy smarter and save money" (n=3); and "[to] grow by making smarter decisions about their energy use" (n=2). No building owners chose the statement "…lower their energy costs."

The Evaluation Team then asked respondents to rate the importance of four statements about the importance of energy efficiency in their decision to design and build energy-efficient buildings. As shown in Figure 190, respondents said saving their organization money on its utility bills is the most important statement in their decision to design and construct energy-efficient buildings, with each of the eight respondents indicating that this statement is *very important* in their decision making.

Figure 190. Importance of Energy Efficiency Statements



Source: CY 2016 Building Owner Survey Question A4. "Please indicate how important these statements are to you when deciding whether to design and build energy-efficient buildings." (n=8)

Customer and Design Team Experience

The Evaluation Team interviewed a sample of participating building owners and design teams about their experiences with the Program; motivations for participation; benefits and barriers to designing and building efficient buildings and to participating in the Program; and satisfaction.

Decision-Making Process and Influences

During the interviews, the Evaluation Team asked building owners to identify the most important factors in their decision to build energy-efficient buildings and participate in the Program. Building owners cited a variety of important factors such as saving energy and money, sustainability, and increasing comfort for occupants of their buildings.

During the interviews, the Evaluation Team also asked building owners to rate the importance of maximizing the building's energy efficiency on a scale of 1 to 5, where 1 indicated *not at all important* and 5 indicated *very important*. Building owners rated maximizing energy efficiency as relatively important; five out of nine rated energy efficiency as *very important*, one gave a rating of 4, and three gave a rating of 3. Although maximizing energy efficiency was a priority, building owners clarified they had to balance spending on energy efficiency with other, sometimes more important, priorities. For example, one respondent who designed and constructed a hospital through the Program said patient-related considerations had to be a higher priority than energy efficiency.

The Evaluation Team asked design teams whether the Program was reaching customers early enough to effectively influence design decisions. Most respondents said the Program had been involved at the appropriate time to make an impact. Two design team respondents said that because they were already

familiar with the Program, and promote it to their clients, they are experienced enough to bring in Focus on Energy at the appropriate time. Another respondent said Focus on Energy representatives periodically reached out to see if his team has any appropriate projects, which helped him keep the Program in mind.

Program Benefits

Building owners and design teams identified a number of benefits of participating in the Program. In addition to financial incentives and reduced energy costs, building owners and design teams said these were two Program benefits:

- **Assistance with identifying and prioritizing energy-saving strategies**. Building owners and design teams said that balancing energy efficiency with other priorities was one of their main challenges to designing and building energy-efficient buildings. Two building owners and six design team representatives said an important benefit was the Program's help with these:
  - Identifying energy-saving opportunities
  - Evaluating these options through the Program energy modeling
  - Prioritizing the energy-saving opportunities that had the greatest impact for their project
  - One design team respondent explained that during building design and construction, it could be difficult for design teams to sustain the importance of energy efficiency. For example, some efficiency features were value-engineered out of the project or simply forgotten under other priorities. She said that establishing a clear plan for energy efficiency designs and priorities—and being accountable to the Program to procure an incentive for her client—kept the design team and decision-makers focused on energy efficiency throughout the process.
- **Third-party validation and increased confidence.** Two building owners and three design team respondents said that validation of the energy-saving opportunities by Focus on Energy, a trusted third party, helped to increase the owner's confidence in the building design and energy efficiency strategies. One building owner noted that modeling "gives us a level of confidence that we're choosing the right systems. We're achieving, at least through the model, what our goals are for the building." A design team respondent said, "It helps us do our job better, because the owner has a comfort in the fact that the energy aspects of their facility have been looked at, that they've made informed decisions." Another design team respondent said the Program "brought a lot of value to our clients. It has helped us do a better job… It's a way we can bring more value to our clients."

Barriers to Participation

The Evaluation Team asked building owners and design teams about any challenges to participating in the Program. Respondents said that coordinating a variety of project stakeholders was one of the main challenges. Two building owners and two design teams said it was difficult to coordinate with design team members (including engineers and architects), building owner decision makers, and Focus on Energy representatives (including the Program Administrator and Program Implementer), and to do so

within their design schedule. As one design team respondent said, "The biggest challenge is getting the whole design team together for the meetings that we have. Always a challenge, busy schedules, tough getting everyone together."

Two design team respondents also pointed out that coordinating with the Program Implementer and attending meetings with project stakeholders could be very time consuming. A design team respondent said it was like "herding cats getting people to the table to have discussions." Nevertheless, he appreciated how the Program has reduced the time commitment for design teams and building owners by moving projects forward more quickly: "We've seen [Focus on Energy] improve the system. For [this project] we had one meeting, whereas for other [past projects] we've had a couple meetings. The Program is done now in real time. They modify bundles in real time and come up with a bundle recommendation a few days later."

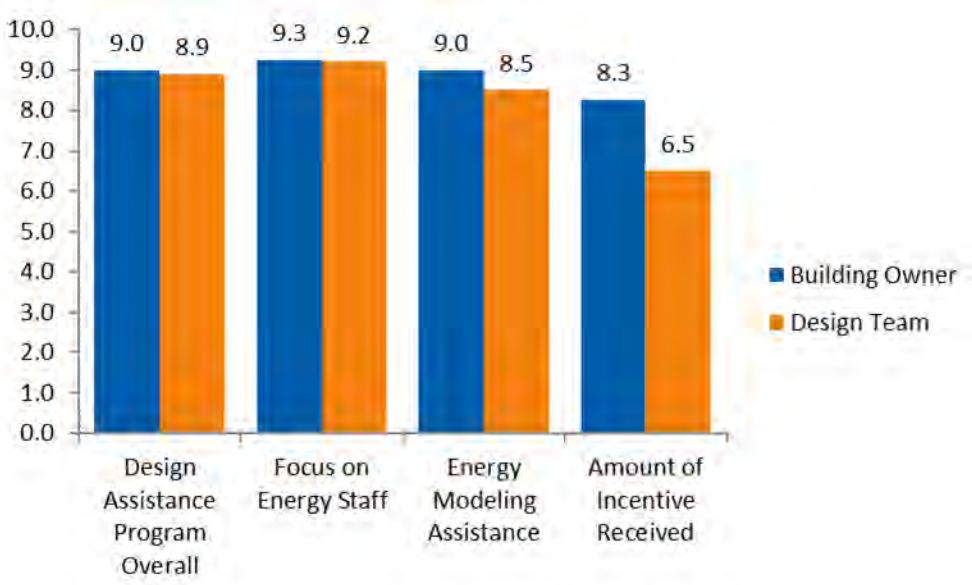
Customer and Design Team Satisfaction

The Evaluation Team asked building owners and design teams to rate their satisfaction with the Program and its components. Respondents answered questions about satisfaction and their likelihood to recommend the Program on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood to recommend and 0 the lowest.

Figure 191 shows average overall Program and Program component satisfaction. Building owners were highly satisfied with the Program overall—on average, they rated their satisfaction as 9.0. Design teams also indicated high satisfaction with the Program—on average, they rated their satisfaction as 8.9. Design teams indicated lower satisfaction than building owners for all Program components.[176]

[176] Because of small sample sizes, the Evaluation Team did not test for statistical differences between design team and building owner responses. These results should be viewed as directional only and should not be extrapolated to the participant population.

Figure 191. Building Owner and Design Team Satisfaction Ratings



Source: CY 2016 Building Owner and Design Team Interview Questions G1, G2, G3, G4. "On a scale from 0 to 10, where 0 is *not at all satisfied* and 10 is *extremely satisfied*, how satisfied are you with….?" (Building Owner n=7-9; Design Team n=10)

Focus on Energy Support

Building owners and design teams gave the highest satisfaction ratings for the Focus on Energy Program staff who assisted them with their projects. They described these staff members as knowledgeable, helpful, and responsive. They appreciated that they kept the team informed of project progress and were timely in processing project components.

Energy Modeling Assistance

All but one design team relied on the Program Implementer to perform the Program-required energy modeling. Building owners and design teams appreciated the energy modeling assistance provided through the Program. Most said they were *very satisfied* with the modeling assistance and provided positive feedback about how the modeling results, report, and subsequent discussions with the Program Implementer and Program Administrator helped them effectively identify and prioritize energy-saving strategies.

Along with generally positive reception to the modeling, design team respondents suggested some improvements:

- One design team respondent thought the modeling results and report were too technical and "data heavy," particularly for design teams led by architects (rather than engineers). He wanted the modeling report to have more visuals and graphics to help design teams identify and prioritize areas on which to focus design. He said, "Sometimes we really have to dig through all the data to find that." (It should be noted that this design team respondent's project began in

CY 2015, prior to the CY 2016 changes of making the NEO modeling tool interface more user friendly.) Conversely, in a different interview, one building owner found the modeling results simple, user-friendly, and "understandable for an elementary type person such as myself."

- One design team respondent wanted the model to produce additional technical details. He said the modeling software and parameters were too generic and wanted them to be more customizable.
- One design team respondent wanted the modeling results to provide more information about cost and return on investment.

Incentive Amount Received

Design teams provided a notably lower satisfaction rating than building owners with the incentive amount received. The Program's custom incentive design relies on savings per kWh or therm. Design teams receive an incentive of $0.012/kWh if the Program Implementer completes energy modeling or $0.015/kWh if the design team completes the modeling. The building owner receives a larger incentive of $0.09/kWh and $0.55/therm. Of all completed projects in CY 2016, design teams received an average of approximately $3,900 in incentives, while building owners received an average of approximately $43,000.

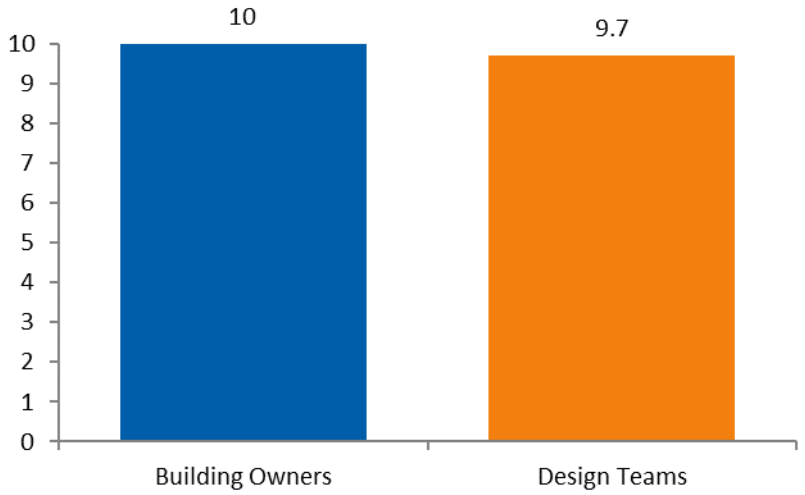
Several design team representatives said they appreciated helping building owners get an incentive, but they did not believe the design team incentive was sufficient to cover the time and costs associated with their participation in the Program. As one design team representative said, "There's a very small incentive for our participation… that [incentive] did not cover the total cost of us participating in all the meetings and phone calls. But, the benefit probably outweighs [the cost] since the results were very good for the client. It helped us help them."

Overall, building owners were satisfied with the incentive. As one building owner pointed out, "you always want more money." However, most building owners thought the incentive they received was sufficient.

Likelihood to Recommend

As Figure 192 shows, building owners and design teams indicated a very high likelihood of recommending the Program to others. In fact, almost all said they had already recommended the Program to others, and several design teams are actively promoting the Program to their colleagues and clients.

Figure 192. Building Owner and Design Team Likelihood to Recommend Program

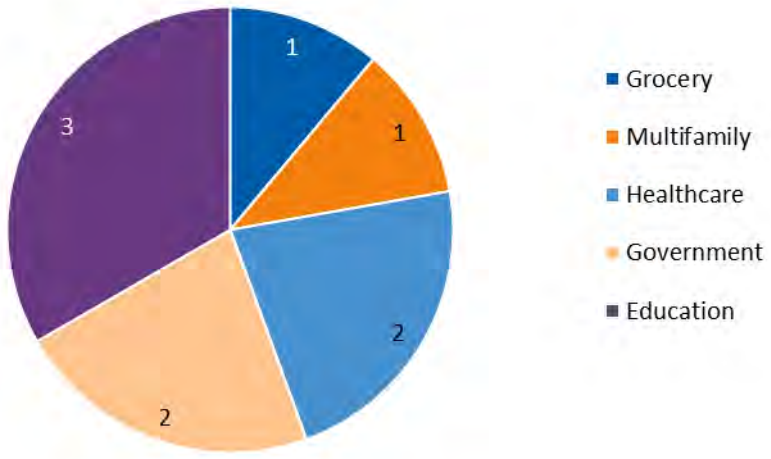


Source: CY 2016 Building Owner and Design Team Interview Question G5. "On a scale from 0 to 10 where 0 is *not at all likely* and 10 is *extremely likely*, how likely is it that you would recommend this Program to others?" (Building Owner n=9; Design Team n=10)

Participant Demographics

The Evaluation Team interviewed a diverse group of building owners. Figure 193 shows the building owner sectors represented in the CY 2016 interviews. Of nine building owners, three represented education, two represented government, and two represented healthcare.

Figure 193. Building Owner Industries Represented in the CY 2016 Interviews



Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 245 lists the CY 2015 and CY 2016 incentive costs for the Design Assistance Program.

Table 245. Design Assistance Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$4,874,177	$3,181,680

The Evaluation Team found the CY 2016 Program was cost-effective (4.47). Table 246 lists the evaluated costs and benefits.

Table 246. Design Assistance Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$604,527	$514,394
Delivery Costs	$2,275,910	$2,100,485
Incremental Measure Costs	$11,987,515	$13,218,037
Total Non-Incentive Costs	**$14,867,952**	**$15,832,916**
Benefits		
Electric Benefits	$36,576,085	$27,677,925
Gas Benefits	$21,541,900	$12,224,875
Emissions Benefits	$8,393,755	$5,828,143
Total TRC Benefits	**$66,511,741**	**$45,730,943**
Net TRC Benefits	**$51,643,789**	**$29,898,026**
TRC B/C Ratio	**4.47**	**2.89**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. Efforts to streamline the application and bundle selection processes, and reduce turnaround time have been partially effective in addressing participant needs.

The Program Administrator and Program Implementer said that in CY 2016, they made changes to the NEO modeling tool and the Enrollment Wizard online application for these reasons:

- Enhance usability
- Reduce the turnaround time from project initiation to review and selection of energy bundles
- Ensure that results are provided early enough in the design process in line with customer needs to effectively impact decision making

Most building owners and design teams provided positive feedback about how the modeling results, report, and subsequent discussion with Focus on Energy helped them effectively identify and prioritize energy-saving strategies. Several building owners and design teams said they appreciated that Program staff kept the team informed of project progress and were timely in processing project components. Although building owners and design teams said coordinating the variety of relevant parties was difficult, several were ultimately able to do so and received the modeling results in line with their design timelines. One design team respondent, who had worked on multiple projects through the Program, noted that the Program's recent improvements had reduced the number of meetings needed with the project team, provided real-time bundle selection, and delivered results more quickly.

Although these findings suggest that improvements have had a positive impact, it can be difficult to measure participant response to Program changes because building owners and design teams typically begin working with the Program a year or more before project completion. Although for CY 2016, the Evaluation Team prioritized interviews with the teams that had started working with the Program in CY 2015 or early CY 2016, any projects completed in CY 2015 would probably not have been affected by the updates to the Enrollment Wizard or NEO modeling tool. Furthermore, many interview respondents could not recall the Enrollment Wizard online application because so much time had elapsed between project initiation and completion.

Recommendation 1: Consider gathering feedback from Program participants more frequently to gauge their reaction to Program touchpoints and any changes. For example, the Program Implementer could embed a pop-up survey in the Enrollment Wizard to gather immediate feedback after participants complete their online application. The Evaluation Team could gather feedback about the energy modeling assistance from participants by interviewing building owners and/or design teams soon after completing this component (but prior to project completion).

Outcome 2. Financial incentives may not be a substantial driver of design team participation. Rather, design teams are motivated to participate by a desire to add value for the clients.

Design teams identified a number of benefits from and motivations for participating in the Program, including these:

- Helping their clients procure an incentive for investing in energy efficiency
- Validating assumptions about energy efficiency strategies and building design
- Enhancing building owner confidence in their building design and satisfaction with design teams

Design teams were less satisfied with the amount of the incentive they received—rating this as a 6.5 out of 10—than were building owners, who rated this as an 8.3 out of 10. However, this did not appear to have much of an impact on design teams' overall satisfaction with the Program or the likelihood they would recommend the Program to others. Although most design team respondents thought that the incentive was insufficient to cover their time and costs associated with participation, they were still receptive to obtaining an incentive and a few said they appreciated receiving any compensation.

Recommendation 2: When targeting new design teams for Program enrollment, ensure that Program messaging clearly explains the key design team motivators of supporting building owners, validating design assumptions, and enhancing building owner confidence. For example, on the Program website or through social media, consider featuring testimonials and feedback from design teams or presenting project case studies. Since the Program Implementer relies primarily on face-to-face interactions with design teams, continue to emphasize these Program benefits during such discussions.

Large Energy Users Program

Through the Large Energy Users Program, Focus on Energy provides custom and prescriptive incentives to customers who had a utility bill of at least $60,000 in at least one month in the last year, and an average monthly demand which exceeds 1,000 kW or 100,000 therms. An Energy Advisor is assigned to help each participating customer identify savings opportunities in its facility (the facilities are in the commercial, industrial, municipal, and institutional sectors). The Program Administrator is CB&I and the Program Implementer is Leidos Engineering LLC.

Focus on Energy launched the Strategic Energy Management Pilot Program in CY 2015 to provide support for 30 Large Energy Customers to implement management systems and energy saving initiatives in their facilities. In CY 2015 and continuing through CY 2016, the Strategic Energy Management Pilot Program had independent funding and energy savings goals and was fully operational under the Large Energy Users Program.

In the Strategic Energy Management Pilot Program, Energy Advisors work with Large Energy Customers to promote an energy management information system in their facilities, demonstrate its value, and develop a workforce of individuals in Wisconsin with experience in leading strategic energy management (SEM) initiatives. The Pilot Program is targeted to customers that are eligible for the Large Energy Users Program. The impacts from this pilot were not included in this year's evaluation, but the CY 2016 savings will be evaluated as part of the CY 2017 evaluation.

The Program performed moderately well relative to its goals, surpassing natural gas energy goals but falling short of electric demand and energy savings goals. Realization rates were relatively high (between 92% and 107% across various parameters), and there were no major trends or systematic issues that merited adjustments to the evaluated savings, apart from typical custom measure adjustments based on post-installation performance data.

Table 247 lists the Large Energy Users Program actual spending, savings, participation, and cost-effectiveness, excluding SEM projects.

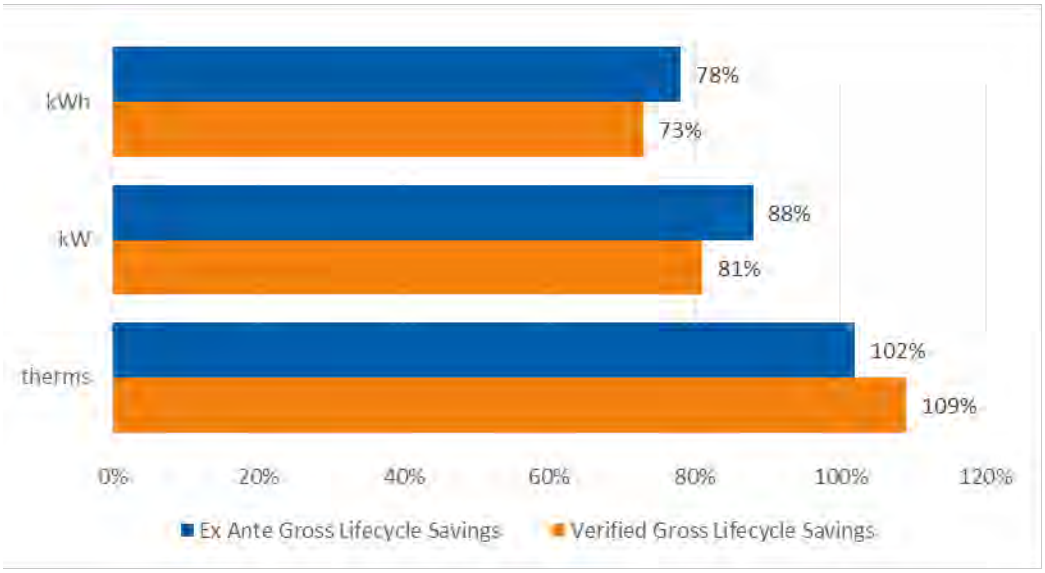
Table 247. CY 2016 and CY 2015 Large Energy Users Program Summary[1]

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$10,423,365	$13,920,708
Participation	Number of Participants	368	422
Verified Gross Lifecycle Savings	kWh	1,768,582,191	2,526,960,091
	kW	15,041	21,122
	therms	201,477,193	206,852,066
Verified Gross Lifecycle Realization Rate	MMBtu	104%	94%
Net Annual Savings	kWh	107,223,854	131,174,772
	kW	12,333	17,320
	therms	11,394,993	12,069,402
Annual Net-to-Gross Ratio	MMBtu	82%	82%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	4.54	5.14

[1]Excludes Strategic Energy Management (SEM) offering, which will be evaluated in CY 2017.

Figure 194 shows the percentage of gross lifecycle savings goals achieved by the Large Energy Users Program in CY 2016. The Program did not meet CY 2016 goals for *ex ante* and verified gross savings with the exception of the natural gas energy savings goals. The Evaluation Team did not verify *ex ante* savings for the Strategic Energy Management Pilot Program in CY 2016.

Figure 194. Large Energy Users Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1, 2]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

[2] Includes Strategic Energy Management (SEM) offering.

Evaluation, Measurement, and Verification Approach

In CY 2016, the Evaluation Team conducted impact and process evaluations of the Large Energy Users Program and a process evaluation for the Strategic Energy Management Pilot Program. The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing the performance of the Program and the Pilot Program. Table 248 lists the specific data collection activities and sample sizes used in the evaluations.

Table 248. Large Energy Users Program and Strategic Energy Management Pilot Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)	Large Energy Users Program	Strategic Energy Management Pilot Program
Program Actor Interviews	4	✓	✓
Tracking Database Review	Census	✓	✓
Participant Surveys	70	✓	-
Participant Interviews	12	-	✓
Ongoing Participant Satisfaction Surveys[1]	171	✓	-
Participating Trade Ally Surveys	10	✓	-
Engineering Desk Reviews	41	✓	Deferred to CY 2017
Verification Site Visits	41	✓	Deferred to CY 2017

[1] The Evaluation Team used survey data to assess the Program Implementer's performance in meeting contractual obligations related to satisfaction KPIs.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator and the Program Implementer in August 2016 to learn about the status of the Large Energy Users Program and assess its performance, objectives, and implementation challenges and solutions. Interview topics included questions about the Program goals and KPIs; Program design, implementation, and operations; marketing and outreach; interactions with Trade Allies; and data tracking.

In September 2016, the Evaluation Team interviewed the Program Administrator and the Program Implementer again, this time to learn about the state of the Strategic Energy Management Pilot Program and to assess its performance, objectives, and any implementation challenges and solutions.

Tracking Database Review

The Evaluation Team conducted a census review of the Large Energy Users Program records in the Focus on Energy database, SPECTRUM, which included the following tasks:

- Thoroughly reviewing data to ensure the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning savings from a number of database adjustment measures to the corresponding program measures
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Large Energy Users Program Participant Surveys

The Evaluation Team surveyed a random sample of 70 customers who participated in the Large Energy Users Program to assess their experience with the Program and to gather data for calculating NTG. At the time of the survey, the Program had a population of 364 unique participants (determined by unique phone numbers). This population size and the number of completed surveys achieved 90% confidence with ±10% precision at the Program level. Participants also received a verification battery which was used to calculate a program-level ISR.

Strategic Energy Management Pilot Program Participant Interviews

The Evaluation Team completed telephone interviews with 12 Strategic Energy Management Pilot Program participants to assess their experience, gather information on the benefits and challenges of the initiatives undertaken, and learn the status for completing all Pilot Program elements (this is detailed in the *Strategic Energy Management Pilot Program Design* section).

Ongoing Participant Satisfaction Surveys

The PSC requested that the Evaluation Team conduct ongoing participant satisfaction surveys beginning in CY 2015 for the 2015–2018 quadrennial. The goal of these surveys is to provide a quick and easy feedback opportunity to recent Program participants, ensure timely feedback close to their participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow up to interested participants.

The Program Administrator deploys online surveys through SPECTRUM to all CY 2016 participants with an e-mail address within two weeks of completing participation in the Program. The Evaluation Team gathers online survey results via SPECTRUM and sends, receives, and scans mail survey responses, combining these with the online results for quarterly and annual reporting.

In CY 2016, 171 participants responded to the Large Energy Users Program ongoing participant satisfaction survey.

Participating Trade Ally Survey

The Evaluation Team conducted an online survey of participating Trade Allies. The Team sourced the population frame from the SPECTRUM database and included a sample of registered contractors associated with the Large Energy Users Program in CY 2016. Because of the overlap between the nonresidential Focus on Energy programs, some Trade Allies also may have worked on projects with participants in other programs. To avoid response confusion, the Evaluation Team structured the first half of the online survey to ask general questions pertaining to Focus on Energy and the second half for questions specific to the Large Energy Users Program. Of 116 registered Large Energy Users Program Trade Allies, the Evaluation Team e-mailed a sample of 70 and received 10 responses, for a response rate of 14%.

Engineering Desk Reviews

The Evaluation Team conducted a detailed review of available project documentation for 41 measures, including assessing the savings calculations and methodology applied by the Program Implementer. The Team relied on the applicable (October 2015 or February 2016) TRMs, associated workpapers, and other relevant secondary sources as needed. Secondary sources included the TRMs from nearby jurisdictions or earlier versions of the Wisconsin TRM, local weather data from CY 2016 or historic weather data, energy codes and standards, published research, and energy efficiency program evaluations of applicable measures (based on geography, sector, measure application, and date of issue). For nearly all prescriptive and hybrid measures in Wisconsin, the Evaluation Team used the October 2015 TRM as the primary source to determine methodology and data.

Verification Site Visits

The Evaluation Team conducted 41 site visits to verify that reported measures are installed and operating in a manner consistent with the claimed savings estimates. The Team compared efficiency and performance data from project documents against manufacturer specifications, nameplate data collected from site visits, and other relevant sources. The Evaluation Team also referenced TRM parameters and algorithms to confirm alignment or justified deviation.

In some cases, the Evaluation Team performed data logging or used existing monitoring capabilities at a participant site for a period of weeks or months to collect additional data for the engineering calculation models. The Team used key parameters from the IPMVP Option A (in part) or Option B (in total) as inputs in the analysis.[177] The Team also included other important inputs in the calculations collected from various sources, such as historic weather data, operating and occupancy schedules, system or component set-points, and control schemes.

[177] National Renewable Energy Laboratory. *"International Performance Measurement and Verification Protocol. Concepts and Options for Determining Energy and Water Savings. Volume I."* March 2002. Available online: http://www.nrel.gov/docs/fy02osti/31505.pdf

After downloading or transmitting the data, the Evaluation Team cleaned and processed the data. Depending on the data, this process may have entailed flagging suspect or out-of-tolerance readings, interpolating between measurements, or aggregating data into bins for smoother trend fits. In most cases, the Evaluation Team conducted data analysis using standard or proprietary Excel spreadsheet tools.

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Program:

- Tracking database review
- Participant surveys
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data for the Large Energy Users Program and the Strategic Energy Management Pilot Program. The Team then applied the results from participant surveys (n=70), engineering desk reviews (n=41), and verification site visits (n=41) to the Large Energy Users data to calculate verified gross savings for that Program. The Team reviewed but did not analyze Strategic Energy Management Pilot Program savings.

As a part of the tracking database review, the Team evaluated the census of the CY 2016 Large Energy Users Program and Strategic Energy Management Pilot Program data contained in SPECTRUM. The Evaluation Team reviewed data for appropriate and consistent application of unit-level savings values and EUL value alignment with the applicable TRM. Cadmus found that the overall accounting of demand and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices.

If measures were not explicitly captured in the TRM, the Team referenced other secondary sources (deemed savings reports, workpapers, other relevant TRMs, and published studies). The Evaluation Team found no major discrepancies or data issues for the Program or Pilot Program as part of this review, although one minor deviation was detected for MMID #2499 (“Process, Not Otherwise Specified”) and #2463 (“Lighting, Not Otherwise Specified”). These measures used technology-specific EUL values in their claimed savings calculations, rather than the deemed values of 15 years and 12 years, respectively. This deviation has been flagged for further discussion among stakeholders as part of the program-wide EUL review taking place in 2017.

No impact analysis was performed for the Strategic Energy Management Pilot Program during the CY 2016 evaluation cycle, as the Pilot Program is designed to be a multiple-year effort. The Evaluation Team will verify *ex ante* savings and provide impact evaluation findings for the Pilot Program in future years.

The Evaluation Team made some minor adjustments to the Large Energy Users Program *ex ante* calculations and savings values as part of the engineering desk review process. The Team used deemed values for prescriptive projects in general, although there were no TRM entries or workpapers available for MMID #2571 ("T8 lighting") or MMID #3270 ("steam trap repair"). In addition, the Team identified one measure management issue related to a prescriptive LED fixture measure (MMID #3107) which had a lower claimed savings value than calculated in accordance with the TRM. For all sampled steam trap measures (MMID #3270), the verified savings for CY 2016 were higher than the savings to be applied in 2017 per a new TRM update. A measure that matched actual savings achievement was unavailable to this Program. The Strategic Evaluation Plan provides some guidance as to how to deal with this type of circumstance, noting that findings related to prescriptive measures with deemed savings will generally be applied on a prospective basis. Therefore, to stay consistent with the plan and the precedent from previous evaluations, the Team did not make any adjustments to the deemed values and used the *ex ante* SPECTRUM deemed savings values to calculate the final verified savings.

The Evaluation Team also made some adjustments to the *ex ante* calculations and savings values as part of the verification site visit process. This included one hybrid measure (MMID #2648) with a significant difference between reported and verified hours of use, as well as a discrepancy between the reported and verified quantities. No further adjustments were necessary for prescriptive measure projects during the on-site reviews.

The majority of program measures sampled for site visits (28 of 41; 68%) were custom. Of these, nine projects had realization rates of 100% and included boiler, process, HVAC, and lighting measures. One project was verified as having no change from the existing condition and therefore achieved a realization rate of 0%; this site had not installed an HVAC unit at the time of inspection and not implemented control schedules as planned. The realization rate for the remaining 19 projects ranged from 66% to 220%, mostly because of small changes in operating setpoints or as-installed equipment efficiency. The Evaluation Team generally used the same methodology which was the basis of the claimed savings calculations for these adjustments, but with modified input parameters.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned. In CY 2016, the Evaluation Team conducted participant surveys to verify the installed measures and estimate a program-level ISR.

The Evaluation Team applied a combined, weighted ISR of 99.8% from these surveys to all engineering desk reviews without a completed site visit. The Team applied a site-specific ISR to all measures where verification site visits were performed.

CY 2016 Verified Gross Savings Results

Table 249 lists the annual and lifecycle realization rates for the CY 2016 Program. Overall, the Program achieved a first-year evaluated realization rate of 102%, weighted by total energy savings (MMBtu).[178] These results represent weighted average realization rates for the entire Program.

Table 249. CY 2016 Large Energy Users Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
97%	92%	104%	102%	94%	92%	107%	103%

Table 250 lists the *ex ante* and verified annual gross savings for the CY 2016 Program. The Program Implementer includes a bonus measures category in the tracking database for accounting purposes to capture funds paid out to various participants and Trade Allies. No demand reduction or energy savings are associated with these measures, so the Team omitted bonus measures from the following tables.

Table 250. CY 2016 Large Energy Users Program Annual Gross Savings Summary

Measure Category	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	1,835,115	210	0	1,773,400	193	0
Air Sealing	35,886	9	46,995	34,679	8	48,879
Boiler	413,292	69	820,359	399,393	64	853,252
Chiller	2,297,170	445	0	2,219,917	410	0
Compressor	2,177,669	313	0	2,104,434	289	0
Computer Management	1,142,800	0	0	1,104,368	0	0
Controls	3,477,255	336	437,366	3,360,316	310	454,903
Delamping	813,591	158	0	786,230	146	0
Dishwasher, Commercial	54,966	0	48	53,117	0	50
Door	0	0	11,055	0	0	11,498
Dryer	653,682	128	0	631,698	118	0
Energy Recovery	-1,056,297	-19	2,639,692	-1,020,774	-17	2,745,534
Filtration	529,423	143	266,282	511,619	132	276,959
Fluorescent, Compact (CFL)	5,643	1	0	5,453	1	0
Fluorescent, Linear	2,354,890	468	0	2,275,695	432	0
Fryer	983	0	1,980	950	0	2,059
Furnace	1,946	0	74,597	1,881	0	77,588
High Intensity Discharge (HID)	4,656	0	0	4,499	0	0
Infrared Heater	0	0	5,500	0	0	5,721
Insulation	30,248	22	390,389	29,231	20	406,042

[178] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Measure Category	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Light Emitting Diode (LED)	26,785,755	4,054	0	25,884,956	3,740	0
Motor	4,609	1	0	4,454	1	0
Other	51,152,537	5,727	6,466,425	49,432,289	5,283	6,725,705
Oven	15,096	3	4,880	14,588	3	5,076
Process Heat	48,866	6	0	47,223	6	0
Reconfigure Equipment	1,043,943	171	0	1,008,835	158	0
Refrigerator / Freezer - Commercial	18,855	2	0	18,221	2	0
Rooftop Unit / Split System A/C	1,157,926	199	64,897	1,118,985	184	67,499
Scheduling	345,373	0	176,816	333,758	0	183,906
Specialty Pulp & Paper	367,857	73	0	355,486	67	0
Steam Trap	0	0	1,948,781	0	0	2,026,920
Supporting Equipment	13,644	2	0	13,185	1	0
Tune-up / Repair / Commissioning	5,212,150	642	0	5,036,867	592	0
Variable Speed Drive	33,756,421	3,130	3,434	32,621,200	2,887	3,572
Water Heater	-1,250	0	1,125	-1,208	0	1,170
Pump	616,587	12	0	595,851	11	0
Total Annual	**135,311,286**	**16,305**	**13,360,620**	**130,760,798**	**15,041**	**13,896,333**

Table 251 lists the *ex ante* and verified gross lifecycle savings by measure category for the CY 2016 Program.

Table 251. CY 2016 Large Energy Users Program Lifecycle Gross Savings Summary

Measure Category	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	29,718,062	210	0	27,805,740	193	0
Air Sealing	538,290	9	566,255	503,652	8	608,023
Boiler	6,205,080	69	14,527,912	5,805,791	64	15,599,506
Chiller	45,711,236	445	0	42,769,773	410	0
Compressor	32,665,045	313	0	30,563,089	289	0
Computer Management	2,285,600	0	0	2,138,524	0	0
Controls	32,225,622	336	7,104,663	30,151,942	310	7,628,709
Delamping	8,135,910	158	0	7,612,374	146	0
Dishwasher, Commercial	549,656	0	480	514,286	0	515
Door	0	0	221,200	0	0	237,516
Dryer	9,805,224	128	0	9,174,270	118	0
Energy Recovery	-15,845,266	-19	39,595,403	-14,825,642	-17	42,515,999

Measure Category	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Filtration	5,390,315	143	2,728,880	5,043,455	132	2,930,165
Fluorescent, Compact (CFL)	17,152	1	0	16,048	1	0
Fluorescent, Linear	33,335,456	468	0	31,190,359	432	0
Fryer	11,796	0	23,760	11,037	0	25,513
Furnace	35,020	0	1,121,495	32,767	0	1,204,218
High Intensity Discharge (HID)	65,984	0	0	61,738	0	0
Infrared Heater	0	0	82,500	0	0	88,585
Insulation	756,225	22	7,139,437	707,563	20	7,666,049
Light Emitting Diode (LED)	446,146,728	4,054	0	417,437,723	3,740	0
Motor	73,744	1	0	68,999	1	0
Other	675,734,087	5,727	99,081,608	632,251,412	5,283	106,389,966
Oven	181,146	3	58,564	169,489	3	62,884
Process Heat	732,995	6	0	685,828	6	0
Reconfigure Equipment	20,878,869	171	0	19,535,339	158	0
Refrigerator / Freezer - Commercial	226,260	2	0	211,700	2	0
Rooftop Unit / Split System A/C	17,368,863	199	973,462	16,251,198	184	1,045,266
Scheduling	5,180,595	0	2,652,240	4,847,230	0	2,847,872
Specialty Pulp & Paper	5,517,859	73	0	5,162,791	67	0
Steam Trap	0	0	11,692,915	0	0	12,555,396
Supporting Equipment	204,660	2	0	191,490	1	0
Tune-up / Repair / Commissioning	10,784,235	642	0	10,090,282	592	0
Variable Speed Drive	506,346,267	3,130	51,510	473,763,494	2,887	55,309
Water Heater	-16,250	0	14,625	-15,204	0	15,704
Pump	9,248,805	12	0	8,653,656	11	0
Total Lifecycle	**1,890,215,269**	**16,305**	**187,636,908**	**1,768,582,191**	**15,041**	**201,477,193**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Large Energy Users Program. The Team calculated a NTG ratio of 82% for the CY 2016 Program.

Freeridership

The Evaluation Team used the self-report survey method to determine freeridership in the CY 2016 Large Energy User Program, estimating an average freeridership of 19% when weighted by evaluated savings.

To determine Program freeridership in CY 2015, the Team planned to use a combination of the standard market practice approach for certain measure categories and the self-report approach for all measure categories; however, the CY 2015 data were not sufficient in any of the measure categories for a standard market practice analysis. Therefore, the Evaluation Team applied the self-reported freeridership of 18% to all measure categories. In CY 2016, the data were not sufficient to conduct standard market practice analysis, so the Evaluation Team again relied solely on the self-reported freeridership of 19%, applied to all Program measure categories.

The three CY 2016 respondents with the greatest savings accounted for 48% of the total analysis sample of gross savings and had an average weighted freeridership rate of 22%. In CY 2015, the three respondents with the greatest savings accounted for 37% of the total analysis sample gross savings and had an average weighted freeridership rate of 17%. Table 252 lists the CY 2015 and CY 2016 self-reported freeridership estimates, weighted by participant gross evaluated energy savings.

Table 252. CY 2015 and CY 2016 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	73	18%
CY 2016	70	19%

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Large Energy User Program and who said their participation in the Program was *very important* in that purchasing decision. The Team applied evaluated and deemed savings values to the spillover measures—LED lighting, digital direct controls, and tune-up repair and commissioning—that customers said they had installed as a result of their Program participation, presented in Table 253.

Table 253. Large Energy Users Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	316	1,100.19
Digital Direct Controls	7	265.11
Tune-Up Repair and Commissioning	1	1,577.25

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, rounded to the nearest whole percentage, for Program survey respondents (Table 254).

Table 254. Large Energy Users Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	2,942.55
Program Savings	225,255.41
Spillover Estimate	**1%**

CY 2016 Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Participant\ Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall Program NTG estimate of 82%. Table 255 shows total net-of-freeridership savings, participant spillover savings, and total net savings in MMBtu, as well as the overall Program NTG.[179]

Table 255. CY 2016 Large Energy Users Program Annual Net Savings and Net-to-Gross

Net-of-Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
1,486,989	18,358	1,835,789	1,505,347	82%

Table 256 shows the annual net demand and energy impacts (kWh, kW, and therms) by measure category for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 256. CY 2016 Large Energy Users Program Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Aeration	1,454,188	158	0
Air Sealing	28,437	7	40,081
Boiler	327,502	52	699,667

[179] Although nonparticipant spillover was measured through Trade Ally interviews in CY 2016, these savings will be reviewed by the EWG and a determination of if and how these savings should be applied will occur at the end of the CY 2015–CY 2018 quadrennial, consistent with broader sampling practices design to draw full-quad conclusions.

Measure Category	Annual Net Savings		
	kWh	kW	therms
Chiller	1,820,332	337	0
Compressor	1,725,636	237	0
Computer Management	905,582	0	0
Controls	2,755,459	254	373,021
Delamping	644,709	120	0
Dishwasher, Commercial	43,556	0	41
Door	0	0	9,429
Dryer	517,993	97	0
Energy Recovery	-837,035	-14	2,251,338
Filtration	419,527	108	227,106
Fluorescent, Compact	4,472	1	0
Fluorescent, Linear	1,866,070	354	0
Fryer	779	0	1,689
Furnace	1,542	0	63,622
High Intensity Discharge	3,690	0	0
Infrared Heater	0	0	4,691
Insulation	23,969	16	332,954
Light Emitting Diode	21,225,664	3,067	0
Motor	3,652	0	0
Other	40,534,477	4,332	5,515,078
Oven	11,962	3	4,162
Process Heat	38,723	5	0
Reconfigure Equipment	827,245	129	0
Refrigerator/Freezer - Commercial	14,941	2	0
Rooftop Unit/Split System Air Conditioner	917,568	151	55,349
Scheduling	273,682	0	150,803
Specialty Pulp and Paper	291,499	55	0
Steam Trap	0	0	1,662,074
Supporting Equipment	10,812	1	0
Tune-Up/Repair/Commissioning	4,130,231	486	0
Variable Speed Drive	26,749,384	2,367	2,929
Water Heater	-991	0	959
Pump	488,598	9	0
Total Annual Savings	**107,223,854**	**12,333**	**11,394,993**

Table 257 lists the lifecycle net demand and energy impacts (kWh, kW, and therms) by measure category for the Program.

Table 257. CY 2016 Large Energy Users Program Lifecycle Net Savings

Measure Category	Lifecycle Net Savings		
	kWh	kW	therms
Aeration	22,800,707	158	0
Air Sealing	412,994	7	498,578
Boiler	4,760,748	52	12,791,595
Chiller	35,071,214	337	0
Compressor	25,061,733	237	0
Computer Management	1,753,590	0	0
Controls	24,724,592	254	6,255,542
Delamping	6,242,147	120	0
Dishwasher, Commercial	421,715	0	423
Door	0	0	194,763
Dryer	7,522,901	97	0
Energy Recovery	-12,157,027	-14	34,863,120
Filtration	4,135,633	108	2,402,735
Fluorescent, Compact	13,159	1	0
Fluorescent, Linear	25,576,095	354	0
Fryer	9,050	0	20,920
Furnace	26,869	0	987,458
High Intensity Discharge	50,625	0	0
Infrared Heater	0	0	72,640
Insulation	580,202	16	6,286,160
Light Emitting Diode	342,298,933	3,067	0
Motor	56,579	0	0
Other	518,446,158	4,332	87,239,772
Oven	138,981	3	51,565
Process Heat	562,379	5	0
Reconfigure Equipment	16,018,978	129	0
Refrigerator/Freezer - Commercial	173,594	2	0
Rooftop Unit/Split System Air Conditioner	13,325,982	151	857,118
Scheduling	3,974,729	0	2,335,255
Specialty Pulp and Paper	4,233,489	55	0
Steam Trap	0	0	10,295,425
Supporting Equipment	157,022	1	0
Tune-Up/Repair/Commissioning	8,274,032	486	0
Variable Speed Drive	388,486,065	2,367	45,354
Water Heater	-12,468	0	12,877
Pump	7,095,998	9	0
Total Lifecycle	**1,450,237,396**	**12,333**	**165,211,299**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities for the Large Energy Users Program and focused on these key topics:

- Customer satisfaction with Program components
- Barriers and opportunities for participation
- Trade Ally engagement with the Program, their satisfaction, and value propositions
- The impact of Program incentive changes on Program participation and Trade Ally businesses

Program Design, Delivery, and Goals

The Evaluation Team interviewed key Program Administrator and Program Implementer staff to get an overview of the Program and Pilot Program designs, delivery processes, and any changes or challenges in implementation.

Large Energy Users Program Design

Customers whose monthly demand is greater than or equal to 1,000 kW of electricity or 100,000 therms of natural gas, or whose combined utility bill was at least $60,000 in any month of the preceding year, are eligible for prescriptive and custom incentives through the Large Energy Users Program. Focus on Energy provides incentives for measures that reduce customers' energy use and demand. Custom incentives are available for more complex and site-specific projects. (Appendix C contains information about the Program incentive structure.)

An Energy Advisor from either Leidos or Clean Tech Partners, a subcontractor to Leidos, is assigned to each participating facility. Energy Advisors coordinate with key account managers (KAMs) to help customers identify and quantify opportunities to save energy, apply for incentives, manage energy use fundamentals, and access other available resources. During the project, the customer must work with an Energy Advisor to estimate savings, determine eligibility requirements for measures and take the steps to complete Program participation. The KAM may lead project meetings and use the Energy Advisor as a resource. To be eligible for a custom project incentive, customers must receive pre-approval from Focus on Energy prior to beginning the project or purchasing equipment.

According to the Program Administrator, the delivery model is working well. In particular, the Energy Advisors are highly experienced and have extremely low turnover, allowing them to build trust with customers. The Program Administrator is proud of the Energy Advisors' ability to recommend good projects that meet customers' needs and deliver the expected monetary and energy savings.

Strategic Energy Management Pilot Program Design

Focus on Energy designed the Strategic Energy Management Pilot Program to enroll select customers who wanted to commit to sustainable energy efficiency. The Program Administrator said the Pilot Program was designed to accept up to 30 large energy use customers. Building on the Wisconsin Healthcare Energy Leaders interest in a SEM offering in 2014, the PSC established separate funding and

goals for the Strategic Energy Management Pilot Program to be offered under the Large Energy Users Program during CY 2015 and CY 2016.

In CY 2016, all Pilot Program participants (29 total) were either current or past Large Energy Users Program participants and were familiar with the role of Energy Advisors. SEM Advisors act in a similar capacity as the Energy Advisors for the Large Energy Users Program but specialize in SEM concepts and delivery. Participants conduct Program elements, or milestones, in a sequential order in which each step builds on the previous step, with a full active engagement period of 16 to 22 months. The duration of this process with each participant depends on the participant's budget, schedule facility size, and other factors, in particular whether a participant decides to pursue achievement of full ISO 50001 certification or ISO-ready status as defined by the Department of Energy.

The following list provides a brief overview of Pilot Program delivery throughout participation, along with the incentives for achieving the base Program milestones (adding to $70,000):

- **Kick-Off Meeting:** At this meeting, key project members determine how they will interact with one another and with the participating facility's senior management and produce a roles and responsibilities matrix.
- **Gap Analysis:** During the kick-off meeting, the project team commonly conducts a gap analysis to determine the maturity of the facility's current SEM efforts and document any areas for improvement. The roles and responsibilities matrix is also an output of the gap analysis: $3,500 incentive.
- **Energy Review:** The project team quantifies the primary energy sources and designates significant energy uses: $3,500 incentive.
- **Energy Intensity Model:** The project team creates a valid model to review the baseline and track energy performance. The model identifies energy intensity through a linear regression that, for example, equates the number of kWh used per unit produced in a facility, a value then used to compare energy consumption to the number of units produced in a facility: $7,000 incentive.
- **Energy Team Meetings:** At these meeting, the team generates support for the efforts of the Energy Champion (the Energy Team Meeting facilitator) and identifies savings activities. Energy team meetings occur monthly during which the team discusses improvements and projects: $3,500 incentive for meetings, $3,500 incentive for coordinating with the Strategic Energy Management Advisor.
- **Opportunity Implementation:** The project team creates a process for routinely pursuing energy-savings opportunities.
- **Energy Management Information System Assessment and Implementation:** For this step, the project team assesses the hardware and software necessary to collect, analyze, and use energy data. For the EMIS assessment, the project team reviews facility operations and installs meters to accurately quantify energy use, establishing a baseline: $14,000 incentive for implementation of savings activities.

- **Operational Control:** The project team establishes boundaries for expected energy use and assesses any deviations from those boundaries. This allows for calibrating the range of accuracy around the energy intensity model described above. The project team also describes what can and cannot be controlled: $7,000 for the EMIS assessment, $7,000 for operational controls.
- **Administrative Infrastructure:** The project team implements the requirements and procedures to ensure a sustainable facility. Top management gets involved to encourage a continuous and sustainable program: $3,500 incentive for administrative infrastructure, $3,500 for SEM leader meetings.
- **Performance Goals:** Focus on Energy provides a $14,000 incentive when the project team achieves the project performance goals.

In CY 2016, the Strategic Energy Management Pilot Program supported 29 participants, required facility senior management to commit to Pilot Program initiatives, and provided training opportunities for participating staff.

Large Energy Users Program Management and Delivery Structure

Trade Allies, KAMs, and Energy Advisors are primarily responsible for developing leads and helping participants navigate the Program. KAMs already have close relationships with customers and act as a conduit for the Program.

Energy Advisors (employed by Leidos, the Program Implementer) are professionals with the industry-specific expertise to support the Program and customers. They are assigned to specific customers to develop and review energy efficiency project proposals and submit incentive applications for project funding support or studies. Energy Advisors work closely with KAMs, Trade Allies, and customers to identify potential projects and coordinate Program offerings that best meet the customers' needs.

Trade Allies have a key Program role in introducing project ideas, working through project implementation and savings calculations, and completing the project from initiation to closure.

Strategic Energy Management Pilot Program Management and Delivery Structure

The Program Implementer for the Strategic Energy Management Pilot Program employs SEM Advisors who are technical experts in implementing energy management information systems in large manufacturing facilities. The Program Implementer also subcontracts with Energy Performance Services, a company that helps customers gather baseline data and identify significant energy uses and opportunities for energy efficiency improvements throughout the facility. Energy Performance Services also completes a facility's final report. Leidos works with the KAMs and other representatives from the utilities.

Large Energy Users Program Changes

During CY 2016, Focus on Energy made major changes to the Large Energy Users Program incentive levels and offering. As shown in Table 258, Focus on Energy decreased the base incentives for kW, kWh, and therms, eliminated all new construction and compressed air incentives, changed base incentive

rates for prescriptive projects, and implemented more stringent incentive caps and eligibility requirements.

Table 258. CY 2015 to CY 2016 Program Incentive Changes

Incentive Rates	CY 2015	CY 2016
Custom incentive per kW demand	$125.00	$100.00
Custom incentive per kWh (non-lighting)	$0.04	$0.03
Custom incentive per kWh (lighting)	$0.04	$0.02
Custom incentive per therm	$0.80	$0.40
Maximum payback eligibility	10 years maximum, 1.5 years minimum	5 years maximum, 1.5 years minimum
Maximum incentive as percentage of project cost	50%	30%
Single project cap	$200,000	$150,000
Customer annual cap	$400,000	$300,000
New construction	Prescriptive or custom incentives allowed	Discontinued some custom incentives
Prescriptive incentive measures suspended in CY 2016 and custom incentive measures disallowed in CY 2016	Compressed air leak survey and repair Compressed air heat recovery HVAC chillers	
Measures changed from prescriptive in CY 2015 to custom in CY 2016	Repulper rotor Pressure screen Radiant tube Radiant heater bands Compressed air load shift	

The Evaluation Team asked the Program Administrator and Program Implementer why there was such a shift in incentive levels from CY 2015. The Program Administrator said incentives were changed across nonresidential programs primarily because of the significant shortfall in available incentive budgets compared with forecasted customer participation levels in CY 2016, especially for the Large Energy Users Program. These changes were also in part because the CY 2015 Portfolio had different measure applications for each nonresidential Program, which Focus on Energy combined in CY 2016 to simplify their use by all users; accordingly, the Program Administrator made a concerted effort to specify consistent incentives and eligibility rules across all nonresidential programs in CY 2016, to the extent achievable, while providing the level of control needed to meet the specific goals and constraints of each program.

According to the Program Administrator, to take advantage of the significantly more cost-effective return on investment for therms savings compared to kWh savings at the CY 2016 incentive rates (in terms of incentive dollars per MMBtu savings), it prioritized projects with potential therms savings over those with electric savings in CY 2016.

The Program Administrator also said that decreasing the Program-level caps in CY 2016, such as changing from a 10-year to a five-year payback cap, reduced the number of large project applications and may have impacted the Program more than the incentive rate changes. This observation was reflected in SPECTRUM data, which showed an average actual lifecycle savings of 859,689 kWh per project in CY 2016, compared to an average of 1,239,865 kWh in CY 2015.

Large Energy Users Program Goals

Some of the Large Energy Users Program energy savings and demand reduction goals are reported to the PSC, and the Program Administrator sets internal Program KPIs. In CY 2016, the Program exceeded natural gas energy goals, but did not reach demand reduction or electric energy savings targets, which may have been influenced by decreased incentive levels from CY 2015. For CY 2016, the Large Energy Users Program had the following performance targets:

- Gross annual savings goal: 15,000 kW
- Electric gross lifecycle savings goal: 2,114,803,201 kWh
- Natural gas gross lifecycle savings goal: 168,374,136 therms

Table 259 shows the KPIs and CY 2016 results reported by the Program Implementer and verified by the Evaluation Team through SPECTRUM where possible. The Program Implementer did not reach all of the KPI goals.

Table 259. Large Energy Users Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Pre-Approval Processing Time	Program Implementer shall average 10 business days for pre-approval of custom incentives and shall use all reasonable efforts to limit rush pre-approval requests submitted to Program Administrator to no more than three requests per calendar month. The processing time period begins on the date the completed application is entered by Program Implementer into SPECTRUM.	Reached goal (8 days)	SPECTRUM, averaging the days between 2016-paid projects' "Submit for Preapproval Date" and the "Pre Approved Date."
UW-Milwaukee Industrial Assessment Center (IAC) Leads	Program Implementer shall enter a minimum of two projects per quarter into SPECTRUM from leads established through the IAC.	No study reports were received from IAC, so there were no leads to pursue.	Program Implementer interview
Days Incentive Outstanding	The Program Implementer shall average 45 days of outstanding incentives annually for standard incentive applications.	Reached goal (44 days)	SPECTRUM
Customer Satisfaction	Achieve 90% or higher satisfaction from participating customers, based on Program	Average 8.8 on 0-10 scale	Evaluation Team's ongoing

KPI	Goal	CY 2016 Result	CY 2016 Result Source
	Implementer survey approved by Program Administrator, or Program Administrator survey.		satisfaction survey
Claim-Only Savings	Contact at least three past customers per month who had a project assessment incentive or performance-based assessment study incentive; who received a biogas feasibility study grant; or who expected additional future energy savings associated with a completed project.	Reached goal (tracked and contacted all qualifying customers on monthly basis)	Program Implementer interview
Project, Savings, and Budget Forecasts	Provide an updated forecast of CY 2016 annual energy efficiency savings and incentive budget expenditures, and a similar forecast for CY 2017, at least every three weeks.	Reached goal (biweekly)	Program Implementer interview
Emerging Technologies	Transfer a minimum of six technologies from the Emerging Technologies Program to the Large Energy Users Program over the CY 2015 to CY 2018 contract term.	Reached goal (nine technologies)	SPECTRUM

Strategic Energy Management Pilot Program Goals

The Strategic Energy Management Pilot Program objectives, KPIs, and process goals were created for CY 2015 and CY 2016 combined. The Pilot Program has energy savings and demand reduction goals that are reported to the PSC, as well as internal KPIs set by the Program Administrator. In CY 2016, the Pilot Program did not reach its *ex ante* savings goals for demand, electric energy or natural gas energy savings (the Evaluation Team will verify *ex ante* savings during the CY 2017 evaluation).

Both the Program Implementer and Program Administrator reported in September 2016 that the Pilot Program was not forecasted to achieve its original CY 2016 savings goals. The Program Implementer reported that the Pilot Program takes time to ramp up and does not achieve results as quickly and easily as the Large Energy Users Program, which offers measures that replace equipment with savings that can be claimed immediately. For CY 2016, the Pilot Program had the following performance targets:

- Gross annual savings goal: 3,484 kW
- Electric gross lifecycle savings goal: 310,171,806 kWh
- Natural gas gross lifecycle savings goal: 15,875,310 therms

Table 260 shows the KPIs and CY 2016 results reported by the Program Implementer, which the Evaluation Team verified through SPECTRUM where possible. The Program Implementer did not achieve all of the KPI goals because of the many Pilot Program changes. However, although participation remained high, the Program Administrator and Program Implementer noted that participants were not achieving full implementation of Pilot Program elements with the speed initially expected. The Program

Administrator planned for 12 months of participation, and actual participation to complete the full Strategic Energy Management Pilot Program ranged from 16 months to 22 months.

Table 260. Strategic Energy Management Pilot Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Participation and Progress	18 participating facilities fully implement the elements of the Strategic Energy Management Pilot Program	Two participating facilities have fully implemented all Program elements	Program Implementer interview
Reduction in Energy Use	At least 12 participating facilities achieve 3% reduction in overall energy use	To be determined: Amount of savings available one year after a facility participates in the Program.	n/a
Education and Awareness	Offer professional development training to 60 participants	Provided professional development training to 45 participating facility staff by reimbursing travel to training or sponsoring in-state trainings that covered ISO and CEM skills.	Program Implementer interview
	Offer U.S. Department of Energy (DOE) In-Plant training to 120 participants	DOE In-Plant training is no longer offered.	Program Implementer interview
	Offer DOE Systems training to 300 participants	Trained 74 participating facility staff as a part of ongoing efforts, although not specifically through the DOE.	Program Implementer interview
	Develop five case studies highlighting the success of Strategic Energy Management Pilot Program projects	Due to longer than anticipated participation duration, no case studies were drafted or distributed.	Program Implementer interview
Satisfaction	Survey each participant to gauge satisfaction with the Strategic Energy Management Pilot Program and lessons learned	The Evaluation Team surveyed participant satisfaction levels in the CY 2016 evaluation.	Strategic Energy Management Pilot Program Participant interviews

Large Energy Users Program Data Management and Reporting

The Large Energy Users Program Administrator and Program Implementer manage Program data and generate reports through SPECTRUM. These activities include:

- Tracking SPECTRUM applications, customer records, reports, and opportunities (under development)
- Updating various tracking spreadsheets for functions SPECTRUM does not serve, such as:
  - Project forecasting and a custom project tracking
  - Customer cap checklist
  - Prescriptive application list and missing information notifications
  - Market category details

Both the Program Administrator and Program Implementer discussed the updates and use of a dashboard tool that was initially introduced in CY 2015. This dashboard was set up as an internal process improvement to help Energy Advisors track the status of their own projects with both customers and leads for potential projects. In CY 2016, all Energy Advisors had their own dashboard and homepage. Improvements to the dashboard in CY 2016 included these:

- The added ability to change who receives the incentive (the customer or the Trade Ally) during the application process
- A new field denoting the specific business segment of the customer, not just the sector in which they operate
- Implementation of data entry and quality assurance practices

Strategic Energy Management Data Management and Reporting

At the time of the interviews, Pilot Program data were not being uploaded into SPECTRUM. The Program Implementer uses a spreadsheet to track data and said that none of the energy performance modeling is uploaded to SPECTRUM. The Program Implementer wants to more carefully plan how to set up SPECTRUM for the Pilot Program. The Program Implementer is following Pilot Program data quality assurance procedures.

Marketing and Outreach

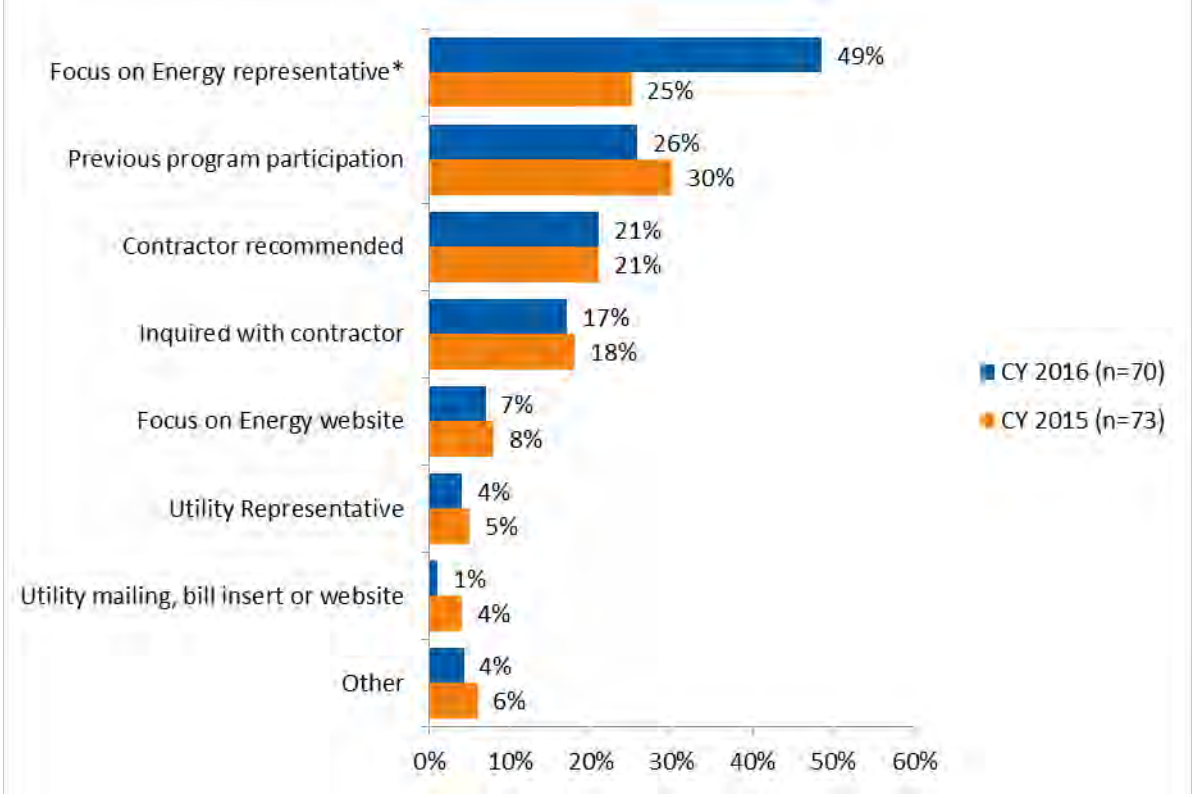
Large Energy Users Program Marketing and Outreach

For the Large Energy Users Program, the Program Implementer uses a direct, customer-centered approach to market to the relatively small number of customers (approximately 750 as defined by the customer tax identification numbers). Because most projects are highly technical, Program marketing campaigns deliver services, technical support, and information to the targeted markets, in addition to providing incentives. The Program Implementer have professional energy engineering expertise and a strong understanding of technologies that contribute to customer satisfaction and Program goals. The Program is marketed through the Focus on Energy website, Energy Advisors, Trade Allies, the customers'

previous participation, and customers' contractors. Marketing is effective and customers participate year after year. The Program Implementer has developed long-term relationships and achieved long-term commitment from customers for large, time-consuming projects.

In CY 2016, nearly twice as many surveyed participants (49%) said their source of Program awareness was the Focus on Energy representative compared with CY 2015 (25% of respondents). As shown in Figure 195, other leading sources of Program awareness in CY 2016 were prior participation (26%), recommendations from a contractor (21%), and inquiries with contractors (17%).

Figure 195. Customer Reported Source of Awareness of the Large Energy Users Program



Source: CY 2015 and CY 2016 Participant Survey Question: "How did your organization learn about the incentives available for this project?" Multiple responses allowed.

* Indicates CY 2016 results are significantly different from the CY 2015 results at the 90% level (p≤0.10).

Customer Messaging Preferences

The Evaluation Team asked surveyed participants what three words first came to mind when they thought about Focus on Energy. As shown in Figure 196, the most common words were "energy," "savings," and "rebates."

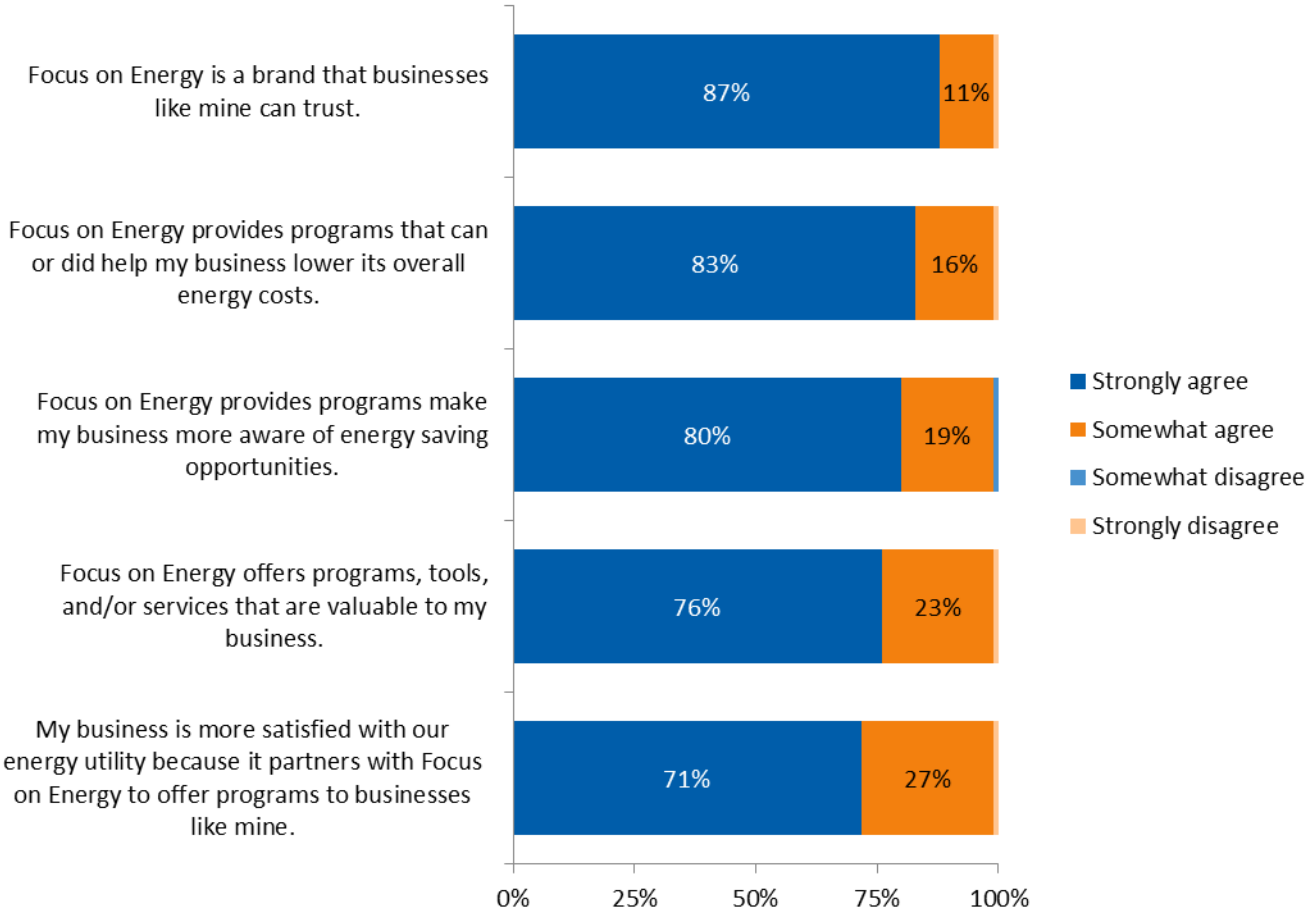
Figure 196. Respondent Word Association with "Focus on Energy"



Source: CY 2016 Participant Survey Question B1: "What are the first three words that come to mind when you hear 'Focus on Energy'?" (n=70)

To gauge Focus on Energy brand affinity, the Team asked customers their agreement with several statements about Focus on Energy. The vast majority of respondents (n=70) agreed with all of the statements, most strongly with the statements that Focus on Energy is a trustworthy brand and that Focus on Energy helps lower business costs. Figure 197 lists respondents' agreement with the five brand affinity statements.

Figure 197. Customer Agreement with Focus on Energy Statements



Source: CY 2016 Participant Survey Question B2. "I'm going to read you a list of statements about Focus on Energy and your business' energy utility. Please tell me whether you agree or disagree with these statements." (n=70)

Trade Ally Program Promotion

The Program Implementer relies on Trade Allies to market the Large Energy Users Program to end users. All 10 surveyed Trade Allies said they promote Focus on Energy programs *frequently* or *all the time* to potential customers. When asked what benefits they receive from promoting Focus on Energy programs, seven Trade Allies spoke about the financial incentives the Program provides for their customers, and two said they receive a competitive advantage from their Program participation. One Trade Ally said the greatest benefit of promoting the Program is doing something good for the environment.

The Program Implementer conducts outreach to Trade Allies. Both the Program Implementer and the Program Administrator said the number of registered Trade Allies has remained consistent since CY 2015. When asked about their preferences for staying informed about Focus on Energy programs and

Trade Ally services, the Trade Allies' responses were split—three preferred to be contacted from the Energy Advisor, three preferred e-mail, three preferred to check the website, and one preferred to obtain information through Focus on Energy training.

Strategic Energy Management Pilot Program Marketing and Outreach

The Program Implementer said participant recruitment was a very delicate process because the Strategic Energy Management Pilot Program is labor intensive and not intended for all eligible participants. Many of the participants were selected by invitation only (instead of open enrollment). According to the Program Implementer, a good candidate matched many of the Program criteria, such as having a clear history of continuous energy improvements, a set of standards or certifications it is seeking to achieve, and corporate mandates for sustainability. The Program Implementer said it did not want to hand pick all participants and was pleased with the wide range of participating facilities and their competence in implementing energy management systems.

Customer Experience

The Evaluation Team investigated customers' overall satisfaction with the Large Energy Users Program and the Strategic Energy Management Pilot Program, experience with specific components, decision-making process, and barriers to participation.

Annual Results from Large Energy Users Program Ongoing Participant Satisfaction Surveys

Throughout CY 2016, the Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Large Energy Users Program.[180] Respondents answered satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicates the highest satisfaction or likelihood and 0 the lowest.

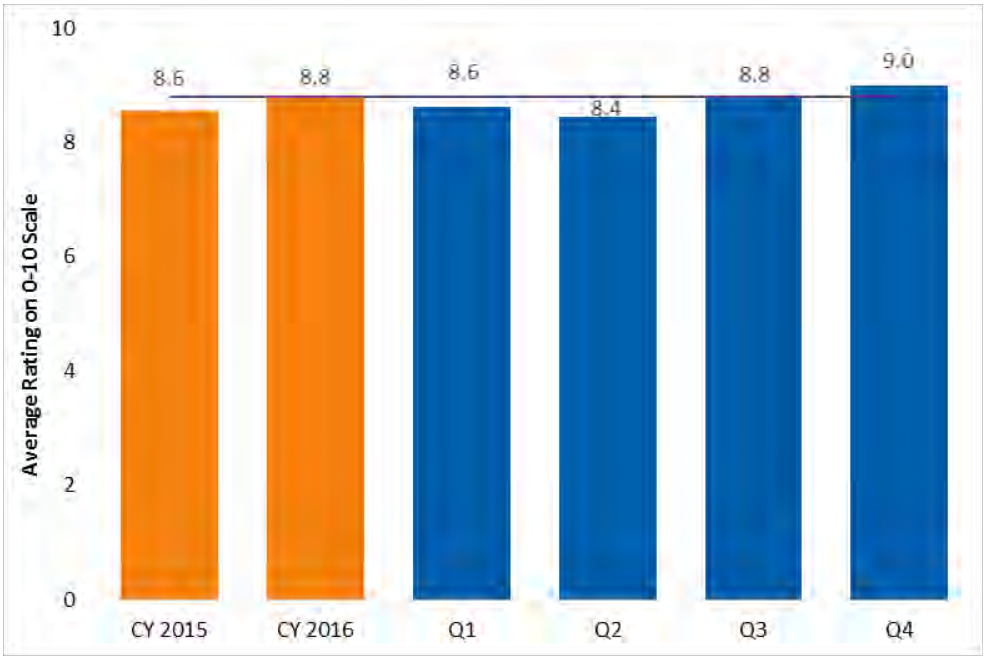
Figure 198 shows that CY 2016 respondents gave the Program an average overall satisfaction rating of 8.8, which was not statistically different from the portfolio baseline of 8.8 (indicated by the purple line).[181] This rating was significantly higher during Q4 of CY 2016 than during CY 2015, but was not higher than CY 2015 for any other CY 2016 quarters or for CY 2016 overall.[182]

[180] Some surveys did not include identifying information to allow the Evaluation Team to match survey responses to program participation dates. The Team included survey responses without participation dates in the year-end total but not the quarterly breakdown.

[181] The portfolio baseline of 8.8 is a participation-weighted average of CY 2015 program satisfaction ratings across the portfolio. The Program Implementer used this baseline value to establish a KPI to meet or exceed the baseline value over the last three years of the 2015–2018 quadrennium.

[182] $p < 0.05$ using binomial t-test.

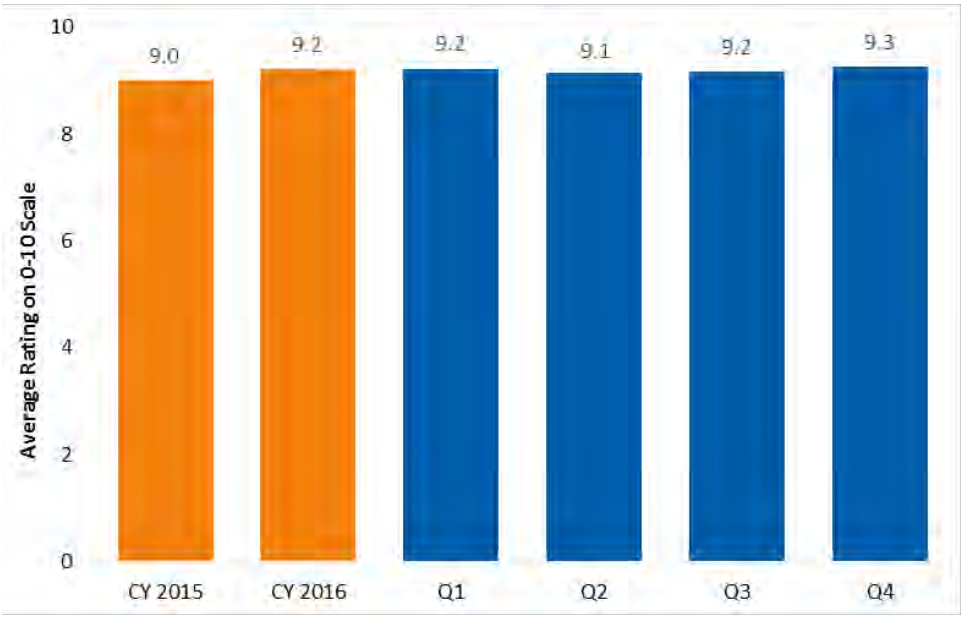
Figure 198. CY 2015 and CY 2016 Overall Program Satisfaction



Source: CY 2015 and CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "Overall, how satisfied are you with the Program?" (CY 2015 n=129, CY 2016 n=170, Q1 n=18, Q2 n=29, Q3 n=19, Q4 n=85). The portfolio baseline (8.8) is indicated by a purple line.

As shown in Figure 199, respondents rated their satisfaction with the upgrades they received through the Program as an average of 9.2. This result is not statistically different from the CY 2015 rating (9.0).

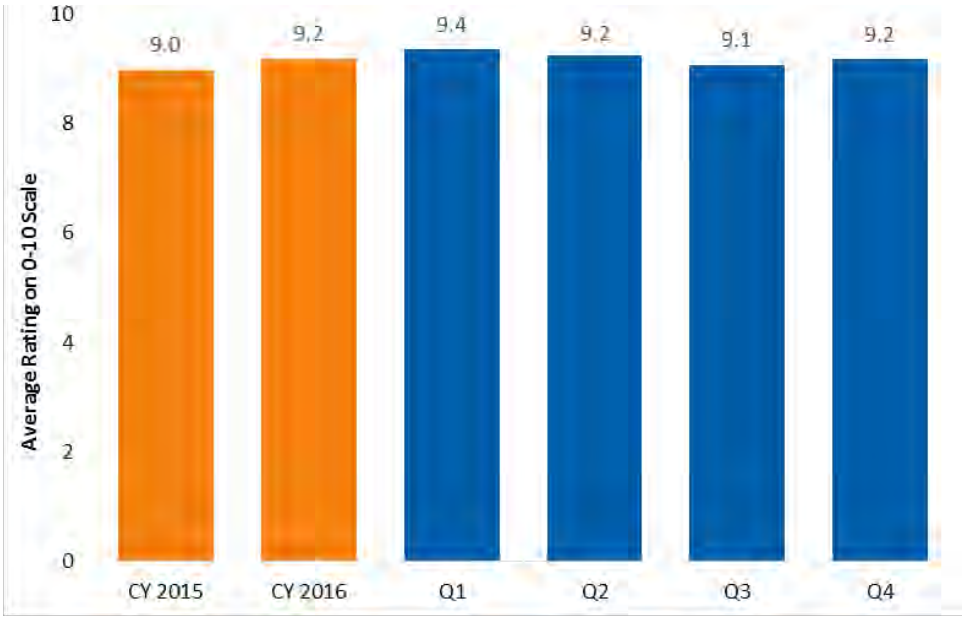
Figure 199. CY 2016 Satisfaction with Program Upgrades



Source: CY 2015 and CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient upgrades you received?" (CY 2015 n=128, CY 2016 n=167, Q1 n=18, Q2 n=28, Q3 n=19, Q4 n=84)

Participants gave the Focus staff who assisted them similarly high satisfaction ratings, averaging 9.2 for CY 2016 (Figure 200). This result is not statistically different from the rating of 9.0 in CY 2015.

Figure 200. CY 2016 Satisfaction with Focus on Energy Staff

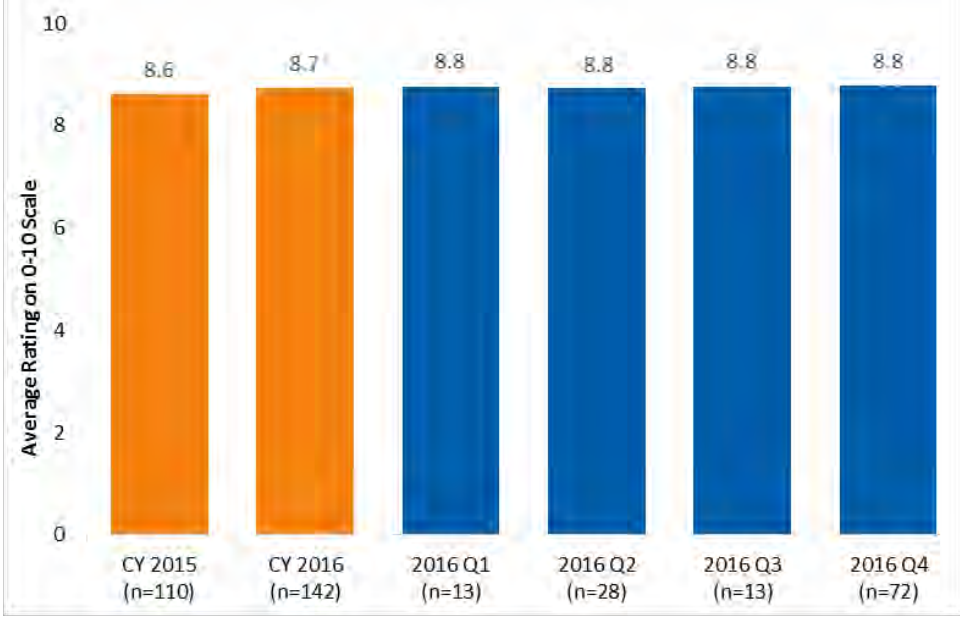


Source: CY 2015 and CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the Energy Advisor or Focus on Energy staff who assisted you?" (CY 2015 n=117, CY 2016 n=149, Q1 n=17, Q2 n=21, Q3 n=14, Q4 n=79)

Respondents gave an average rating of 8.7 for their satisfaction with the contractor who provided Program services (Figure 201).[183] This is not statistically different from the average CY 2015 rating (8.6), and ratings were very stable throughout the year.

[183] Quarterly results in Figure 201 appear higher than the CY 2016 total due to rounding and online surveys missing participation months. Including an additional decimal, the average ratings by quarter ranged from 8.75 to 8.78, all of which round to 8.8. There were 16 responses to this survey question that could not be matched to a participation date. These ratings averaged 8.4, thus lowering the CY 2016 average to 8.73, which rounds to 8.7.

Figure 201. CY 2016 Satisfaction with Program Contractors

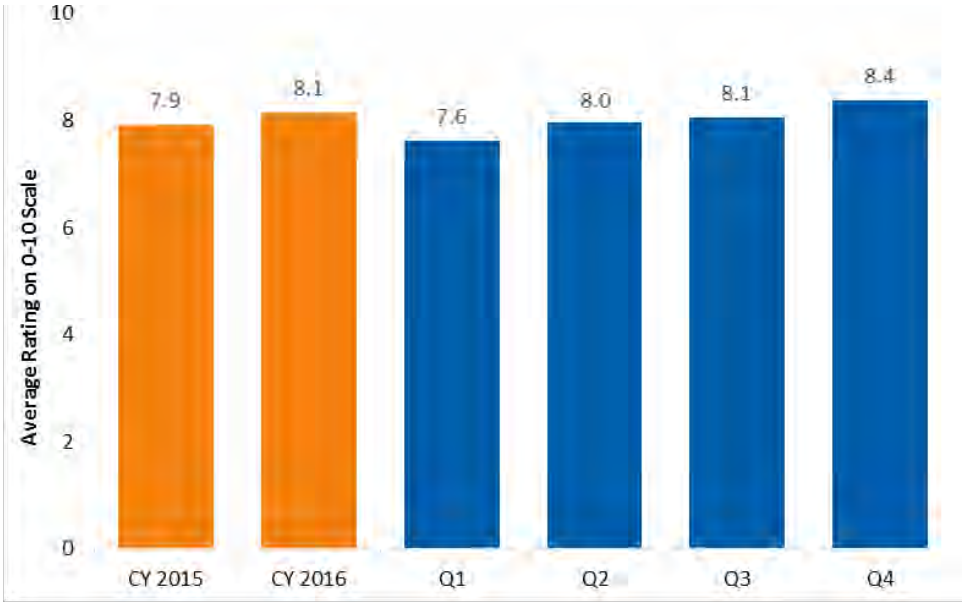


Source: CY 2015 and CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the contractor who provided the service?" (CY 2015 n=110, CY 2016 n=142, Q1 n=13, Q2 n=28, Q3 n=13, Q4 n=72)

Respondents gave an average rating of 8.1 for their satisfaction with the incentive they received (Figure 202). This rating was significantly higher in Q4 of CY 2016 than in CY 2015, but was not higher than the previous year for any other CY 2016 quarters or for CY 2016 overall.[184]

[184] $p < 0.10$ using binomial t-test.

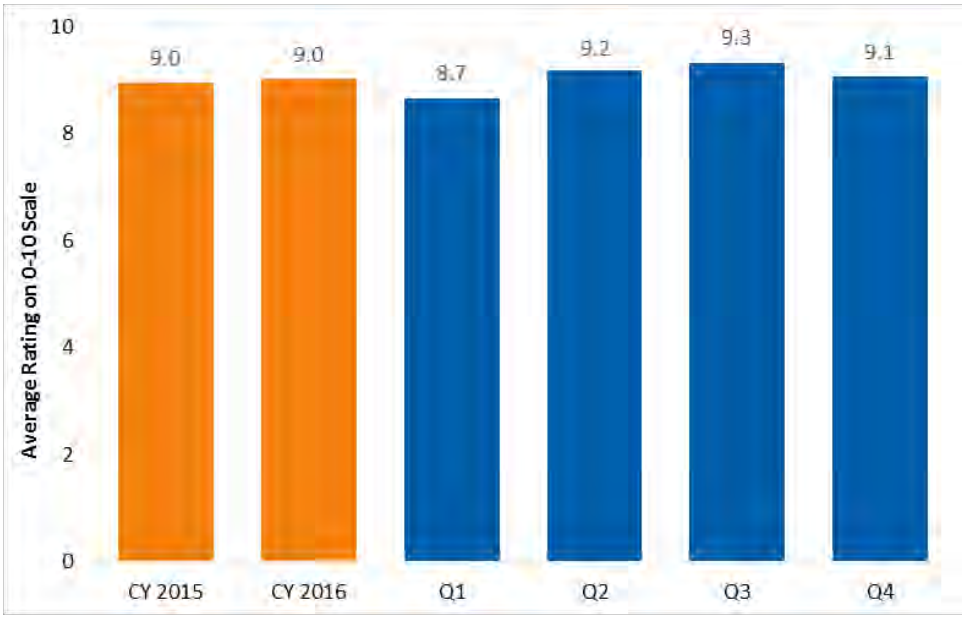
Figure 202. CY 2016 Satisfaction with Program Incentives



Source: CY 2015 and CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the amount of incentive you received?"
(CY 2015 n=129, CY 2016 n=166, Q1 n=18, Q2 n=28, Q3 n=19, Q4 n=83)

As shown in Figure 203, respondents rated the likelihood that they will initiate another energy efficiency project in the next 12 months as an average of 9.0, unchanged from the average rating in CY 2015.

Figure 203. CY 2016 Likelihood of Initiating Energy Efficiency Improvement

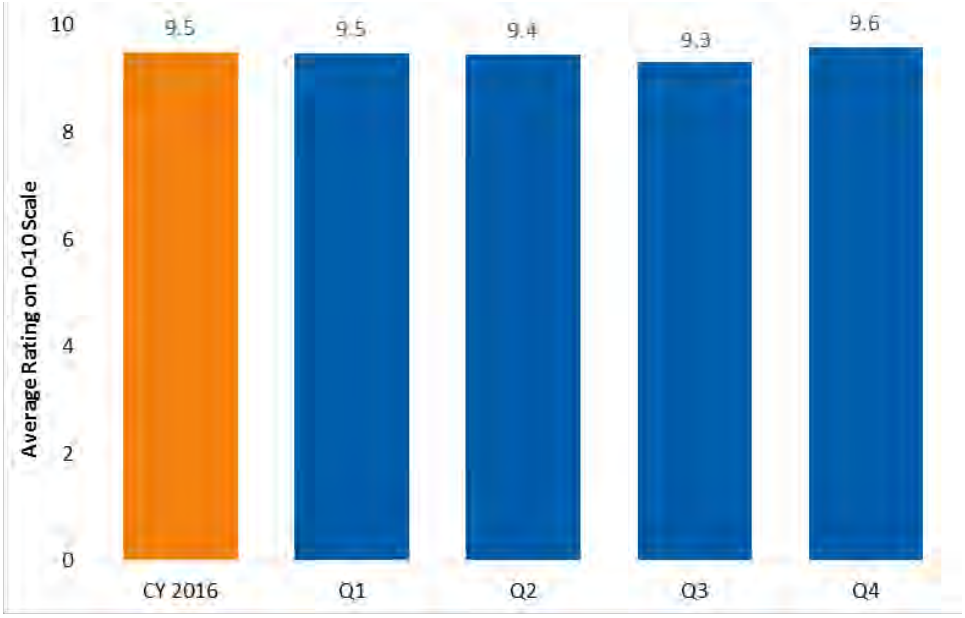


Source: CY 2015 and CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "How likely are you to initiate another energy efficiency improvement in the next 12 months?" (CY 2015 n=120, CY 2016 n=162, Q1 n=18, Q2 n=28, Q3 n=18, Q4 n=80)

Figure 204 shows that respondents gave a rating of 9.5 for the likelihood they would recommend the Program to other businesses.[185]

[185] Customers who said they already have recommended the Program were counted in mean ratings as a rating of 10 (most likely).

Figure 204. CY 2016 Likelihood of Recommending the Program



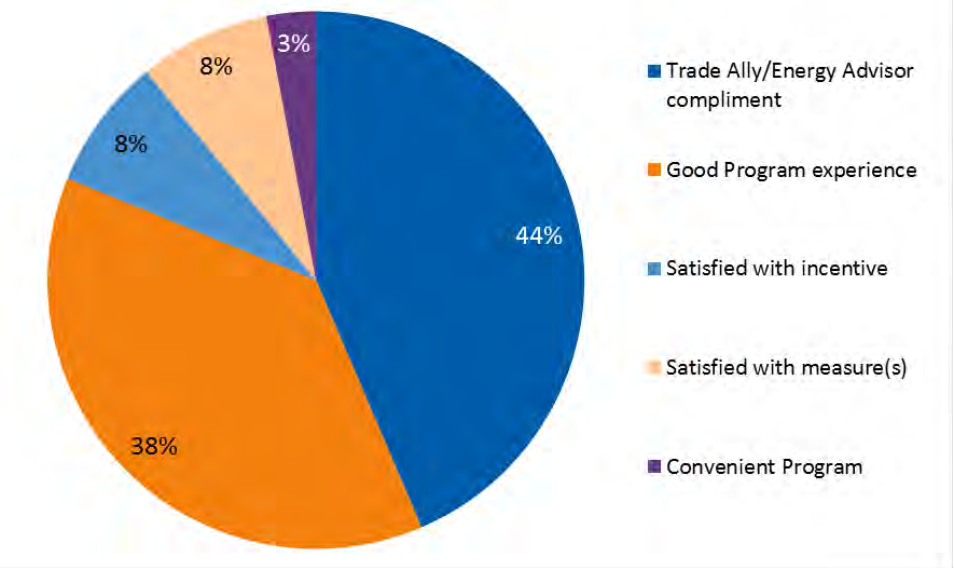
Source: CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "How likely is it that you would recommend this Program to others?" (CY 2016 n=165, Q1 n=17, Q2 n=29, Q3 n=19, Q4 n=81)

Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and percentage of detractors (respondents giving a rating of 0 to 6). The Large Energy Users Program NPS is +89, based on 90% of participants identifying as promoters and 1% identifying as detractors.

The ongoing participant satisfaction surveys also included a question about whether participants had any comments or suggestions for improving the Program. Of the 171 participants who responded to the survey, 74 (43%) provided open-ended feedback, which the Evaluation Team coded into a total of 102 mentions. Of these mentions, 66 (65%) were complimentary comments, and 36 (35%) were suggestions for improvement.

Respondents' positive comments are shown in Figure 205. More than three-quarters of these comments were either complimentary of the Program Energy Advisors and Trade Allies (44%) or reflected a positive Program experience (38%). The distribution of positive comments was similar to CY 2015.

Figure 205. CY 2016 Positive Comments about the Program

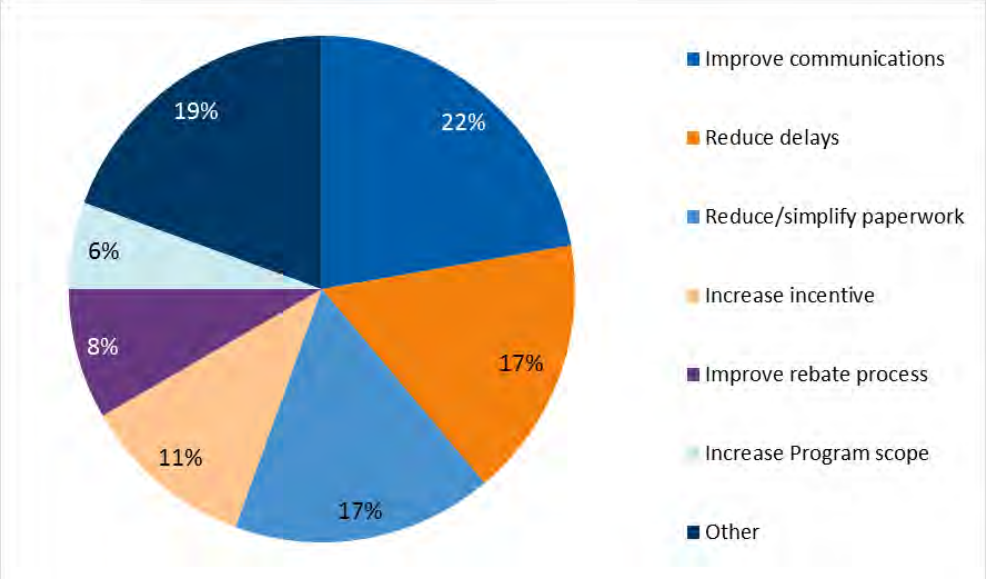


Source: CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total positive mentions: n=66)

Suggestions for improvement are shown in Figure 206. The most frequent suggestion in CY 2016 was to improve Program communications (22%), which was also true in CY 2015 (38%). The biggest change from the previous year was fewer suggestions to reduce delays (17% in CY 2016 compared to 31% in CY 2015).

In CY 2016, several suggestions concerning Program communications mentioned a lack of sufficient explanation when incentive amounts or equipment covered by the Program changed. Respondents suggested that Energy Advisors and Trade Allies should contact customers more frequently and should provide more detailed information about equipment covered by the Program.

Figure 206. CY 2016 Suggestions for Improving the Program

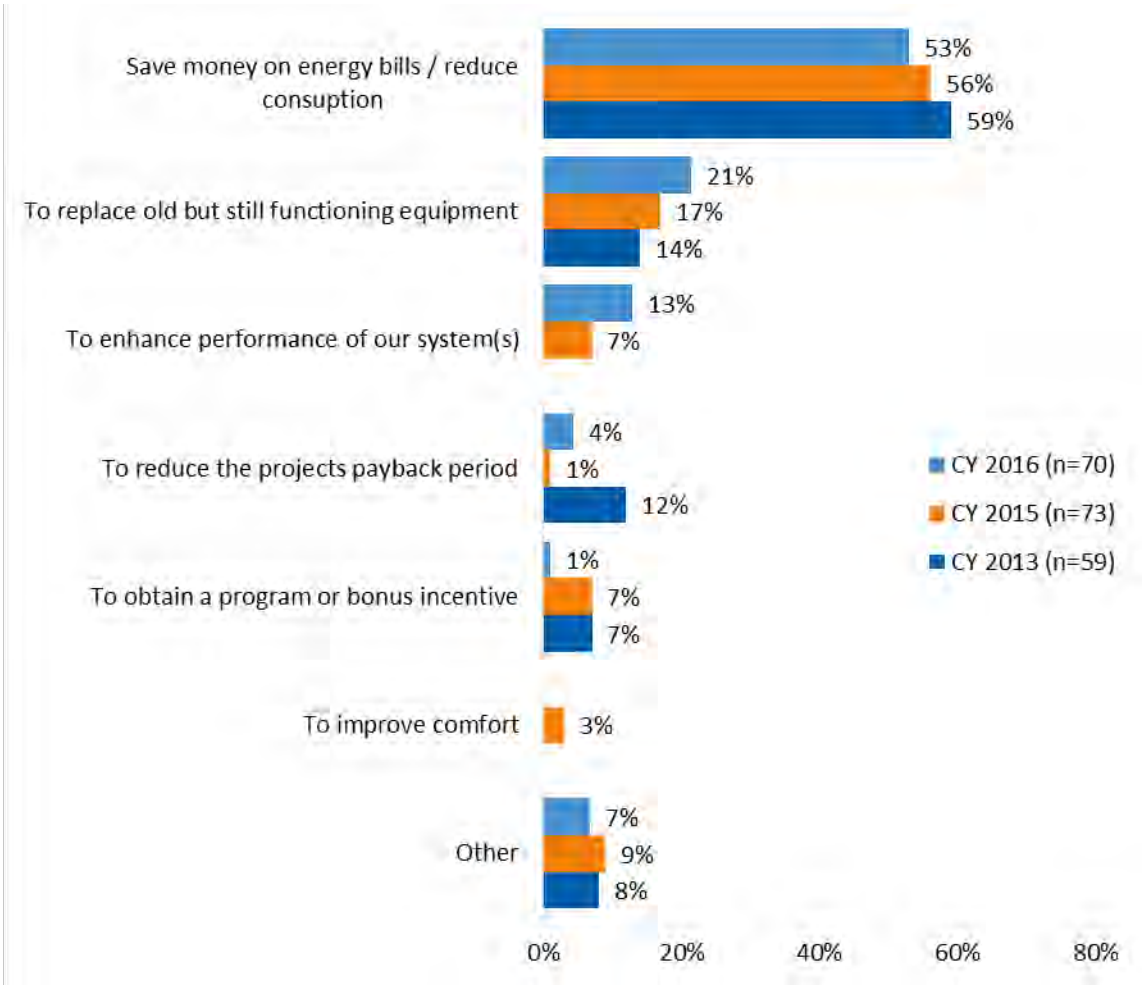


Source: CY 2016 Large Energy Users Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions: n=36)

Large Energy Users Program Customer Decision-Making Process

The Evaluation Team asked customers what single most important factor contributed to their decision to participate in the Large Energy Users Program. Saving money on energy bills and reducing consumption were by far the most important—more than half of the respondents (53%) said this was the primary reason for participating—and this response is congruent with the CY 2013 and CY 2015 survey efforts, as shown in Figure 207. Other important participating factors included replacing old but working equipment (21%), enhancing system performance (13%), reducing the payback period (4%), and obtaining a Program or bonus incentive (1%). None of the CY 2016 results were significantly different than the CY 2015 responses.

Figure 207. Most Important Participation Factor for Participating Customers



Source: CY 2013, CY 2015, and CY 2016 Participant Survey Question. "What factor was most important to your company's decision to make these energy-efficient upgrades?"

Most of the surveyed participants (84%, n=68) said they required approval from someone else at the organization before committing to an energy efficiency upgrade. The Team asked these customers how long it typically took to receive approval. Most customers (43 of 53) required six weeks or less to receive approval for energy efficiency projects.

The Team also asked customers if there is an internal payback threshold that projects must meet to move forward with an approval process. A majority of the respondents (66%, n=67) said there was. Of these respondents, most (36 of 42) said the threshold was three years or less, which is contradictory to the Program Administrator's statement that a reduction of the payback cap reduced the number of large projects (see *Large Energy Users Program Changes* section).

Only 41% of the survey respondents (n=68) said they (or somebody in their organization) attended at least one in-person or web-based training delivered by Focus on Energy. Of those who attended, 64%

(n=28) said the training was either *very important* or *somewhat important* in their decision to move forward with the energy efficiency project.

Large Energy Users Program Rebate Process

Nearly all of the surveyed participants (93%, n=68) said they received the rebate check in the mail; the rest (7%) said they received a contractor discount. Over a third of the participants (71%, n=70) said they personally (or someone at their organization) took the lead in completing the application for the financial incentive, 20% said the contractor filled it out, and 7% said the Energy Advisor filled it out. In CY 2016, significantly more surveyed participants said the Energy Advisors filled out applications compared to respondents in CY 2015.

Most (83%, n=45) participants said filling out the application was easy. Of the eight who experienced a challenge, five said the application required too many details. For example, one participant said the challenge was "making sure the right numbers are in the right place." Other challenges included the layout of the form and Program changes, such as measure eligibility, that differed from CY 2015 offerings.

Over half of the customers said the incentive check took six weeks or less to arrive in the mail. This delivery time was largely congruent with CY 2015 data. Nearly all respondents (93%) said they were satisfied with the amount of time it took to receive the incentive check.

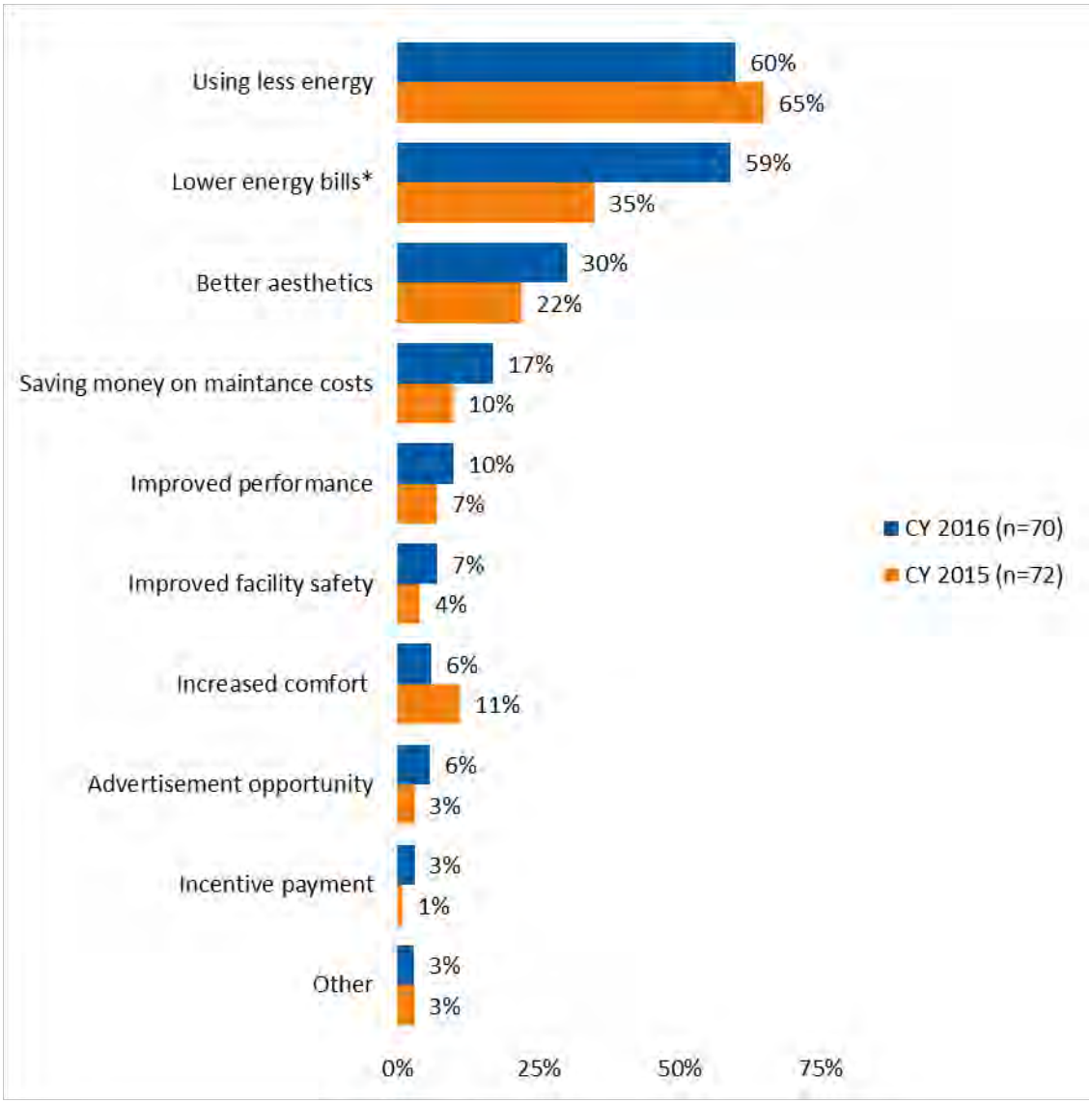
Large Energy Users Program Benefits and Barriers to Participation

The Evaluation Team asked customers about the benefits they received from, or any barriers to, participating in the Large Energy Users Program.

Benefits to Participation

Participants said benefits of participating in Program were using less energy (60%), lowering energy bills (59%), and better aesthetics from the measure installed (30%). Figure 208 shows the benefits that survey respondents identified and provides a comparison to responses to the same question asked in CY 2015. In comparing CY 2015 to CY 2016 results, one significant difference was noted. In CY 2016, 59% of respondents indicated lower energy bills as a benefit of participation compared to only 35% of CY 2015 respondents.

Figure 208. Benefits from Program Participation



Source: CY 2015 and CY 2016 Participant Survey Question. "What would you say are the main benefits your company has experienced as a result of the energy efficiency upgrades we've discussed?"
Multiple responses allowed.
* Indicates that CY 2016 results are significantly different from CY 2015 results at the 90% level (p≤0.10).

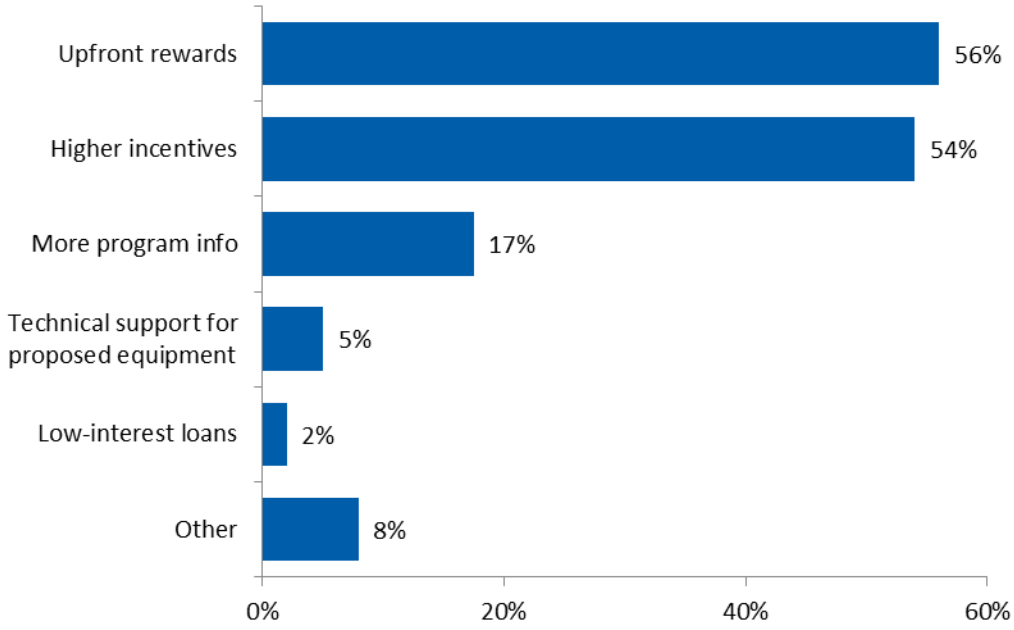
Barriers to Participation

The Evaluation Team asked customers what were the leading challenges to making energy-efficient improvements at their company. The leading challenge was the high initial costs (42%, n=67), followed by the long payback period and budget limitations (both 31%).

The Team asked customers what could be done to help their company overcome challenges with making energy-efficient improvements. The top two responses from over half of the 63 customers were to offer

upfront rewards or instant discounts from the contractor (56%) and higher incentives (54%). Figure 209 customers' suggestions to overcome the challenges with energy-efficient improvements.

Figure 209. Customer Suggestions



Source: CY 2016 Participant Survey Question D3. "What could be done to help your company overcome challenges with energy-efficiency improvements?" Multiple responses allowed (n=63)

Strategic Energy Management Pilot Program Customer Decision-Making Process

The Evaluation Team asked surveyed participants what their motivations were for participating in the Strategic Energy Management Pilot Program. One participant eloquently stated that the company wanted to create "… a focus and structure around energy management and to improve management of energy. [The Strategic Energy Management Pilot Program] is not just a project, [it is] documentation, strategy, understanding power within the facility, and getting involvement from all levels." Table 261 conveys participant's motivations for enrolling in the Strategic Energy Management Pilot Program.

Table 261. Strategic Energy Management Pilot Program Participant Motivating Factors

Motivating Factors	Count of Responses
To improve internal facility energy efficiency operations	5
To save money/lower utility bills	4
As a next step to becoming certified (ISO, DOE, others)	4
Previous FOE participation	2
To identify energy saving opportunities	1
To reduce waste	1

Source: CY 2016 Participant Survey Question B3. "What are the reasons your company decided to participate in the SEM program?" Multiple responses allowed (n=12)

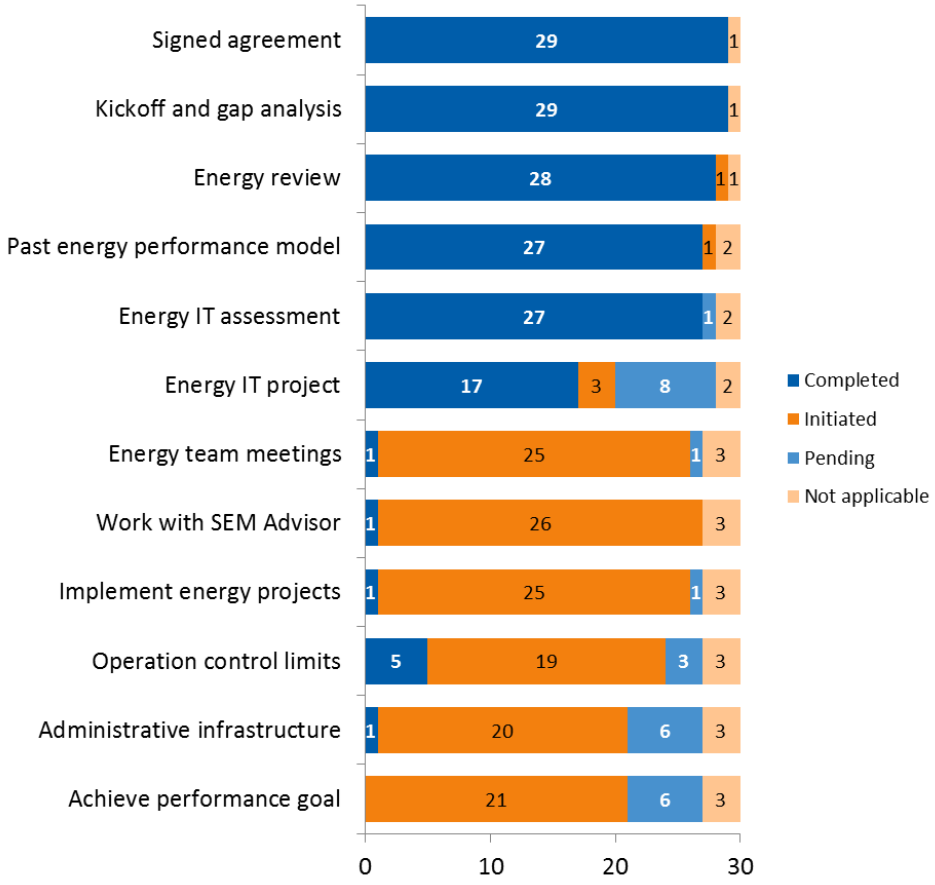
Customer Processes for Project Implementation

The Evaluation Team asked participants about specific processes and energy policies for implementing and pursuing energy-saving opportunities in their company. All participants (n=11) said they typically funded efficiency projects with capital budgets. Eight participants had payback standards ranging from one to five years or the respondent did not know.

Strategic Energy Management Pilot Program Elements

The Evaluation Team received a status update on the completion of several elements of the Pilot Program from the Program Implementer. Figure 210 provides detail on the Pilot Program elements.

Figure 210. Strategic Energy Management Pilot Program Elements Completed as of March 2017



Energy Team Meetings

Energy team meetings are designated times where an organization's staff gathers to discuss the facility's energy efficiency agenda and projects, an important Pilot Program element for keeping energy efficiency projects and communications moving forward. All interviewed participants reported having energy team meetings regularly, ranging from weekly to quarterly meetings. During these meetings, participants discussed energy efficiency with many different people, including facility managers, upper management, operations managers, all departments, maintenance and technical staff, the facilities' energy team (staff dedicated to moving the energy efficiency agenda forward), press and marketing staff, plant directors, electricians, and the environmental and safety managers.

Although participants were pleased with Focus on Energy's support for the energy team, they said most of the reported difficulties were internal. One participant said the energy team had difficulty keeping

the momentum going with the staff's other job obligations. Other barriers experienced with conducting energy team meetings included these:

- Summer vacations and slow communication with staff that are away
- Management priorities not always putting energy efficiency as a priority
- Language differences with Spanish-speaking employees
- Employee turnover and time-consuming efforts of retraining on energy efficiency topics

Roles and Responsibilities Matrix

All but one of the surveyed participants had completed the roles and responsibility matrix to support energy management. Six of 12 said the matrix was very valuable and that their staff had embraced it. The other participants said the matrix provided value but also that their matrix needed to be updated with more detail, referenced more often, or incorporated into the more comprehensive facility version. Preparation of this matrix is often started during the kick-off meeting while all Program actors are involved and discussing their roles and communication processes.

Gap Analysis

The gap analysis is typically a 90-minute meeting with the facility's key staff at which they determine current energy efficiency efforts and identify areas for improvement. All of the participants said they had completed a gap analysis at the kick-off meeting and found results of value. Five participants discussed specifically how the gap analysis provided the structure they needed to understand the current energy use at the facility and the path forward. For example, one participant said, "[the gap analysis] was helpful, knowing where we are at and where we need to go. Some of it we already knew, but it was formalized."

Energy Review

An energy review helps quantify the energy used throughout the facility and is an important step to identify significant energy uses. All of the participants said they had conducted an energy review, and all agreed that the data provided from the review were effective. Some participants were not surprised with the information but appreciated having all of the data displayed and in one place. Other participants were surprised by the results as they provided insights that were previously not held; for example, one participant said that the Energy Review was the first time ever seeing the facility's energy bill.

Past Energy Performance Model

Modeling a facility's past energy performance generates a baseline so energy performance can be tracked over time. Of the 11 participants who had modeled past energy performance, nine have referenced the model at least once in the past year, and eight update the model at least once a month. Of the other two, one had tried to use it as a forecasting tool but found it unreliable because of the type and variability of the facility's product.

The Evaluation Team followed up with the eight participants who made monthly updates by asking if there were performance indicators to measure progress toward goals in the past energy performance model. All eight participants did have indicators for goals on their model, but several did not find those indicators helpful. One participant was waiting to get meters on equipment to have better data. Another participant said the model had too much data and they were working on paring down the number of inputs. Another said the model worked well to show long-term trends but they were working on obtaining a more granular data read out.

Energy IT Assessment

The energy IT assessment results in an assessment of the hardware and software necessary to collect, analyze, and utilize the facility's energy data. At the time of the survey, six of 12 participants had conducted at least one IT assessment. Of these, four said the hardware and software provided all of the information needed. One participant said the assessment helped the facility identify the areas it wanted to monitor and review. The other two participants could not answer the question because the hardware and software were so recently installed, and they were still learning the software and gathering data.

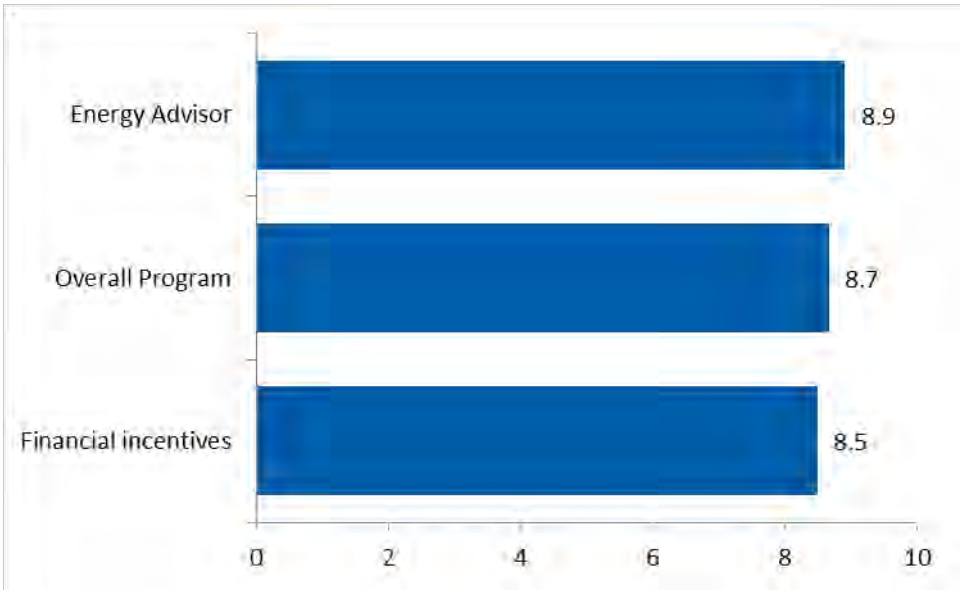
Operational Control Limits

The operational control limits result in the establishment of boundaries around the expected energy use to understand and assess energy-use deviations. Four of 12 participants had implemented their operational control limits around expected energy use. The Evaluation Team followed up with these four participants and asked if the company reviewed and corrected any energy use deviations. Of the four who had implemented operational control limits, only two were actively correcting deviations. One participant who was not actively correcting deviations said the facility's system had not developed far enough and they are still tracking data. The two participants who were correcting deviations said they were doing so daily and working to make each department responsible for the identified deviations. Only two of the 12 surveyed participants were holding departments individually responsible for energy costs.

Strategic Energy Management Participant Satisfaction

The Evaluation Team asked interviewed participants about their satisfaction with the Strategic Energy Management Pilot Program overall, their interactions with their Energy Advisor, and the Pilot Program's financial incentives. Participants measured their satisfaction level using a 10-point scale, with 10 being *very satisfied* and 0 being *not at all satisfied*. Participants reported high satisfaction on all three areas, with a mean satisfaction rating between 8.5 and 8.9 each. The results are consistent with findings from other nonresidential Focus on Energy programs. Figure 211 provides more detail on survey participant's satisfaction ratings.

Figure 211. Strategic Energy Management Pilot Program Satisfaction



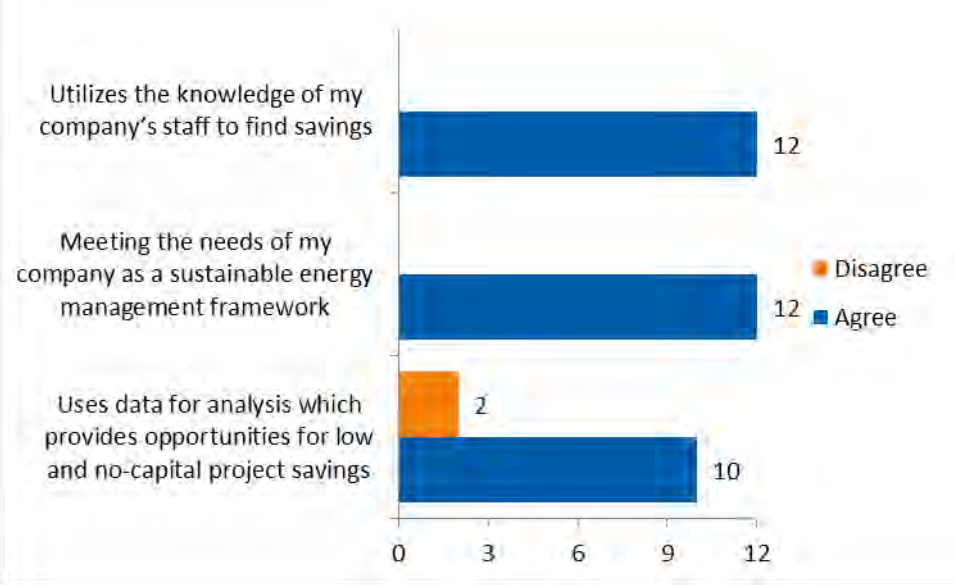
Source: CY 2016 Participant Survey Question G1. "Overall, how satisfied are you with Strategic Energy Management?" (n=12); Question G2. "Overall, how satisfied are you with the Energy Advisor who assisted you while participating in Strategic Energy Management Pilot Program?" (n=12); and Question G3. "How satisfied are you with the Program financial incentives?" (n=12)

The Team also asked interviewed participants about the likelihood they would recommend the Pilot Program to another facility. The participants rated the likelihood on a scale from 10 for *extremely likely* to 0 for *not likely at all*. The 12 respondents had a mean response of 9.1.

Figure 212 provides insight into how the Strategic Energy Management Pilot Program is meeting participating companies' needs. The Team asked participants to indicate their level of agreement with several statements. All 12 interviewed participants agreed with these two statements: "The Strategic Energy Management Pilot Program is meeting the needs of my organization as a sustainable energy management framework" and "The Strategic Energy Management Pilot Program utilizes the knowledge of my company's staff to find savings."

Ten of 12 agreed with the statement, "The Strategic Energy Management Pilot Program uses data for analysis which provides opportunities for low and no-capital project savings." Of the two participants who did not agree, one was not sure if the statement was true and the other reported that the firm's projects were not low or no cost.

Figure 212. Strategic Energy Management Meeting Company Needs



Source: CY 2016 Participant Survey Question G5: Please rate these statements: (1) The Strategic Energy Management Pilot Program is meeting the needs of my company or organization as a sustainable energy management framework; (2) The Strategic Energy Management Pilot Program utilizes the knowledge of my company's staff to find savings; and (3) The Strategic Energy Management Pilot Program uses data for analysis which provides opportunities for low and no-capital project savings. (n=12)

Strategic Energy Management Benefits and Barriers to Participation

Benefits

The Program Administrator spoke of benefits in terms of the company culture and that the Pilot Program was something that employees take a lot of pride in. The Project Implementer also spoke about the benefits in company development and economics and that participants experience improved communication companywide.

The Evaluation Team asked participants what they believe was the most beneficial aspect of participating in the Pilot Program. Eight of 12 participants surveyed said the most beneficial was the Pilot Program's provision of a structure for implementing energy efficiency beyond the project level. These participants' responses about structure ranged widely and included supportive advisors and experts who provided knowledge on pursuing energy-savings actions, being empowered to proactively manage energy, and simply having templates for communication and recordkeeping.

Two respondents said communication was the most beneficial aspect of the Pilot Program. For example, one respondent said the Pilot Program put an "…emphasis on floor personnel involvement, and awareness talks. Getting people involved and having people know that we are serious about this and doing trainings and seeing it, and getting the sense that this is not going away." The other two respondents said energy savings was the single most beneficial aspect of Pilot Program participation.

Additionally, many of the surveyed participants were seeking to implement aspects of ISO 50001 Energy Management standards into their operations. The Evaluation Team asked participants if they wanted to achieve an ISO standard or participate in the ENERGY STAR Challenge or Superior Energy Performance through the U.S. Department of Energy.[186,187] Six of 12 participants said they wanted to achieve the ISO 50001 Energy Management standard, one had already achieved ISO 50001 certification, and another three plan to incorporate the elements of the ISO 50001 standard without pursuing the certification (commonly known as "ISO Ready"). Two participants were also pursuing or were already certified with ISO 14001 Environment Management.[188]

Participants also reported on other energy-saving initiatives at their facilities. One organization is participating in the ENERGYSTAR Challenge, and four are either currently involved with or are working toward achieving the Superior Energy Performance certification from the U.S. Department of Energy.

Barriers

The Evaluation Team asked surveyed participants to give the most challenging aspects of Pilot Program participation. The top response from six of 12 participants was the resources to implement energy saving activities. Specific resources were varied, ranging from the availability of the primary Pilot Program contacts amid other job responsibilities, the availability of other staff members to help implement initiatives, management protocols, and financial resources.

Three respondents said the documentation requirements. For example, one reported that the challenge was the difficulty of getting all data and detail in one place and setting up the process and parameters. Two said changing the behavior of their colleagues. One said time was a challenge, specifically the time and effort it takes to get dollars for a project.

Large Energy Users Program Trade Ally Experience

The nine Trade Allies expressed satisfaction with Focus on Energy, rating their mean satisfaction level at 8.1 out of 10, where 10 is *extremely satisfied* and 0 is *not at all satisfied*. The Evaluation Team asked Trade Allies for their impressions about a number of elements of the Large Energy Users Program. As shown in Figure 213, Trade Allies offered mixed impressions about the Program, indicating their strongest satisfaction was with Program support, education opportunities, and training. Their lowest-rated satisfaction was associated with communication and paperwork.

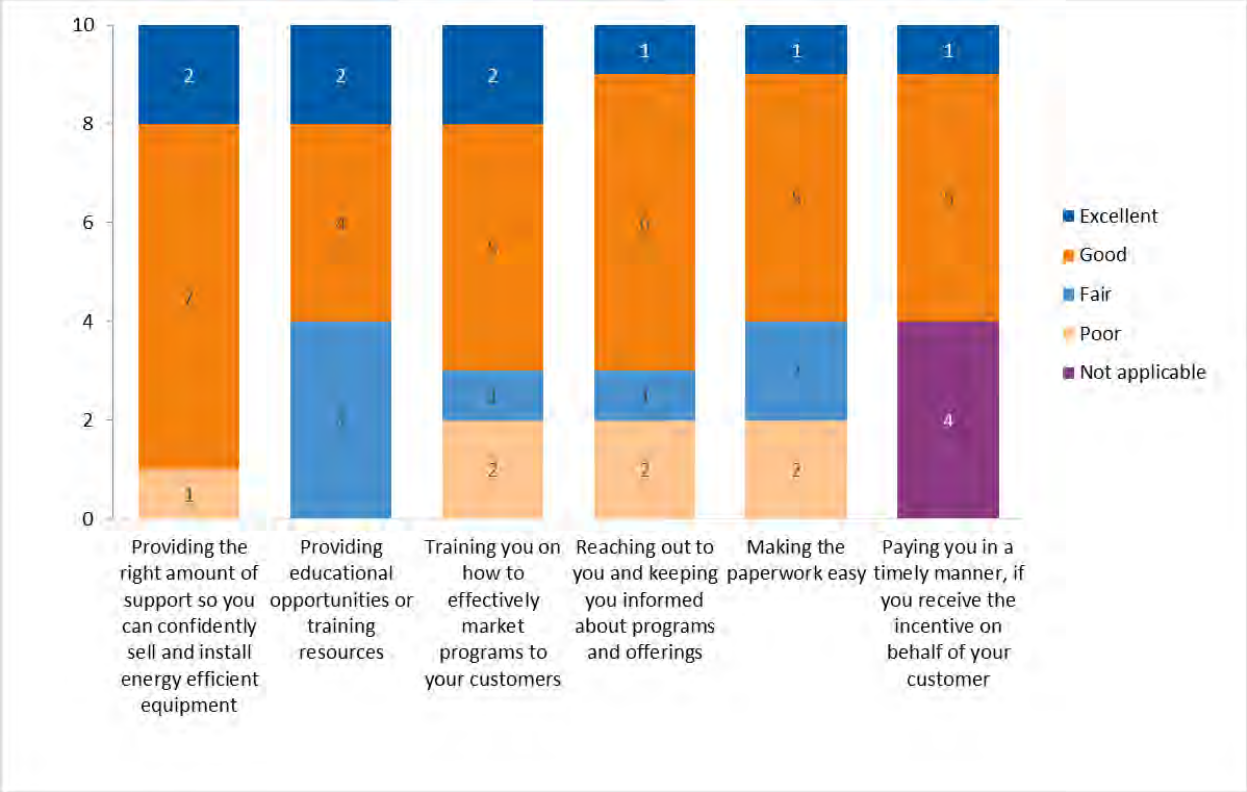
---

186 The ENERGY STAR Challenge for Industry is a global call to action for industrial sites to reduce their energy intensity by 10% within five years.

187 Superior Energy Performance provides guidance, tools, and protocols to drive deeper, more sustained savings from ISO 50001. To become certified, facilities must implement an energy management system that meets the ISO 50001 standard and demonstrate improved energy performance.

188 ISO 140001 is different from ISO 50001 in that ISO 50001 specifically focuses on an organization's ability to manage its energy sources and energy use. The UISO 14001 focuses on the environmental media the organization can affect, but it does not prescribe detailed specifications for an energy management system.

Figure 213. Trade Ally Satisfaction with Program Elements



Source: CY 2016 Trade Ally Survey Question F1. "How is Focus on Energy doing when it comes to the following: …?" (n=10)

All but one of the 10 Trade Allies said they were either *very satisfied* or *somewhat satisfied* with the Energy Advisor. All Trade Allies believed the level of communication with Energy Advisors was sufficient, but four said they wanted to hear from their Energy Advisor more frequently.

The Team followed up with Trade Allies, asking what Focus on Energy can improve to increase their satisfaction with the Program. Two Trade Allies said streamlining the application process. Other responses included these:

- Allowing non-Design Light Consortium (DLC) products in the Program
- Sharing corporate information to help reach important customers
- Reducing the number of authorizations needed
- Improving incentives to help customers receive a better payback

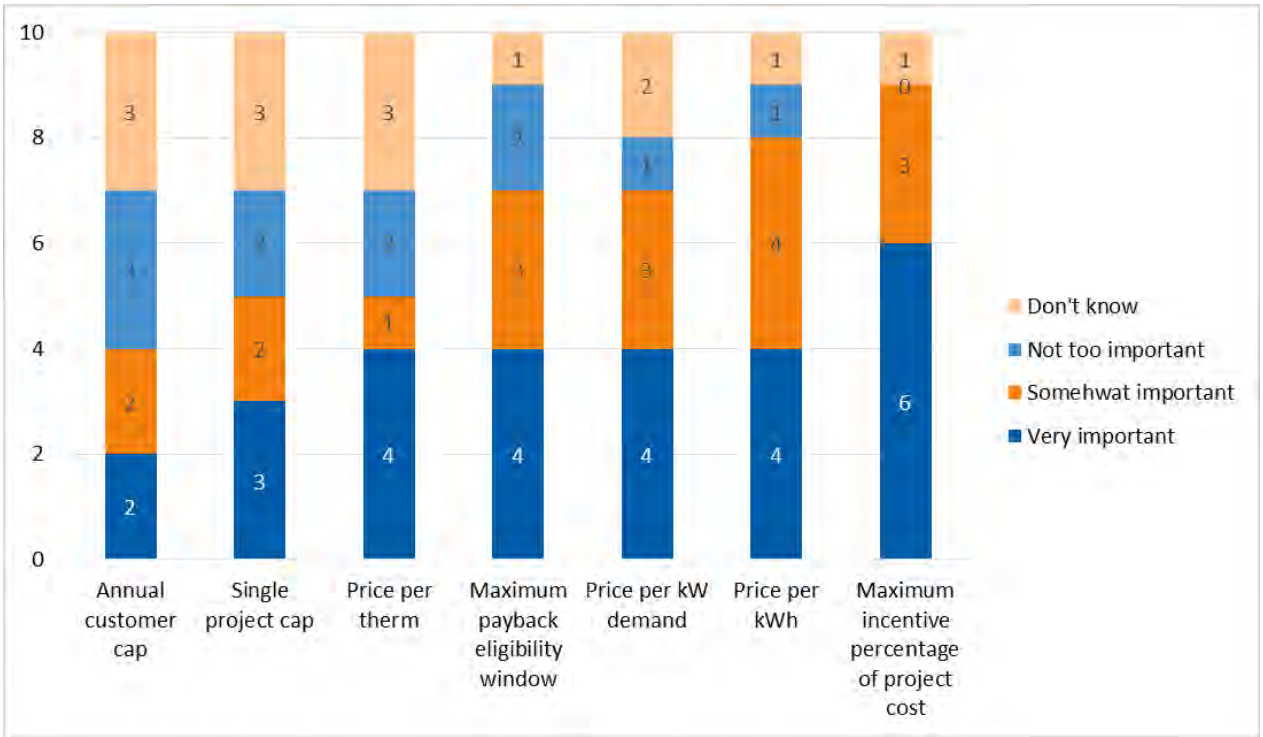
Program Incentive Level Reductions

As reported above, the CY 2016 Large Energy Users Program reduced its offerings from CY 2015. The Evaluation Team asked Trade Allies about these changes and how they were affected. All but one were aware that the incentives had changed in CY 2016. Of these nine, six said they were still promoting the Program as frequently as in CY 2015, and three said they promoted the Program less.

The Team also asked Trade Allies to compare Focus on Energy incentives with incentives provided in other states. Eight of 10 interviewed Trade Allies work in other states. Of these eight, three said they were more satisfied with Focus on Energy's incentive levels, and three said they were less satisfied. The other two Trade Allies were equally satisfied or did not know.

The Team asked Trade Allies which elements of the incentive offering motivated customers to participate. Trade Allies said the primary motivating factors were the maximum incentive percentage of project costs, the price per kWh, and the price per kW demand. Figure 214 provides greater detail in the motivating factors that the surveyed Trade Allies reported.

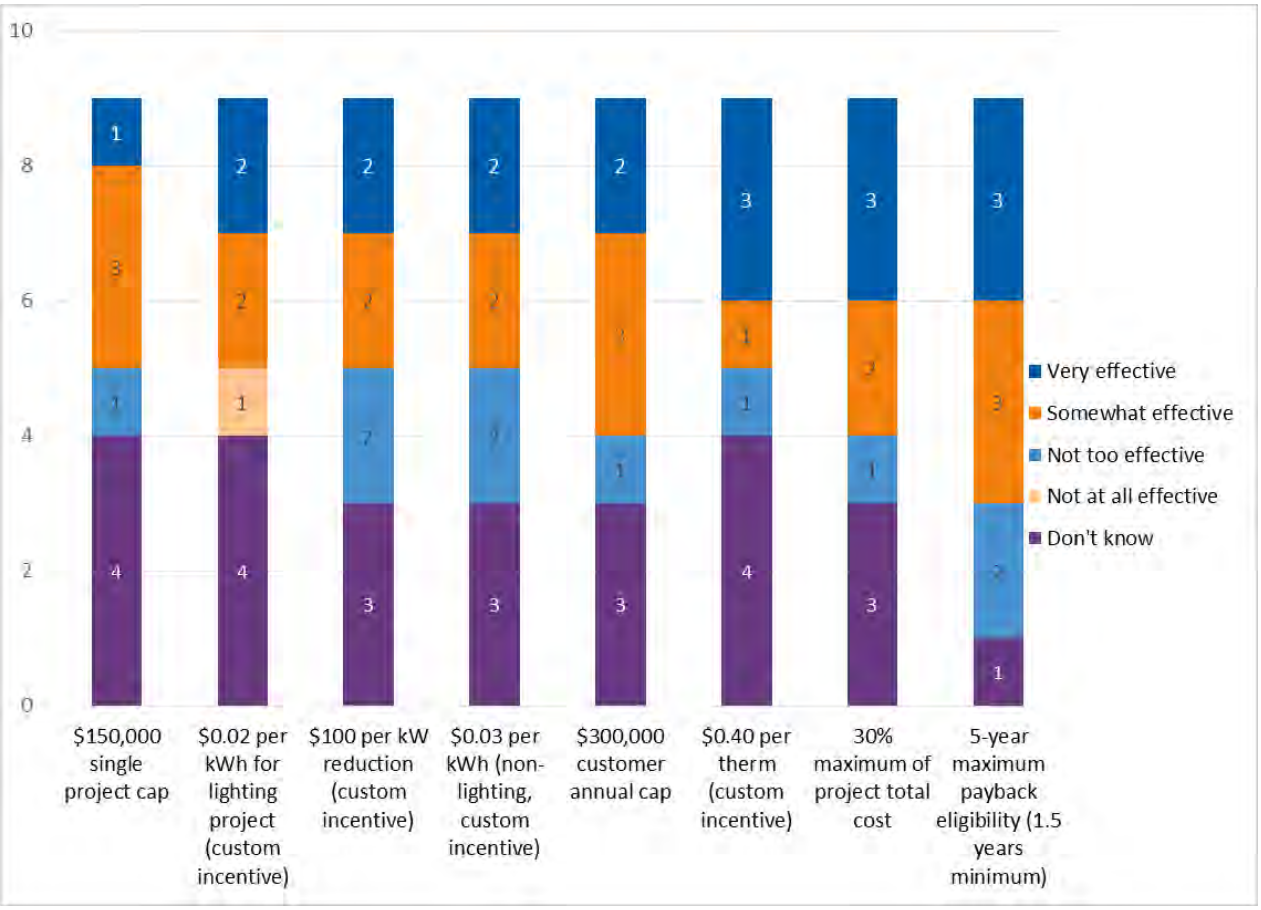
Figure 214. Trade Ally Rating of Importance of Incentive Factors to Motivate Customers



Source: CY 2016 Trade Ally Survey Question L1. "How important are the following incentive factors in motivating customers to participate in the Large Energy Users Program?" (n=10)

Figure 215 provides insight into the effectiveness of the Program's financial incentives to motivate customers to participate. Surveyed Trade Allies said the five-year maximum payback eligibility was the most effective out of the other incentives. They also thought the 30% maximum of project total costs incentive and the $0.40 per therm custom incentive were effective financial incentives to motivate customers.

Figure 215. Trade Ally Report of Effectiveness of Financial Incentives to Motivate Customers

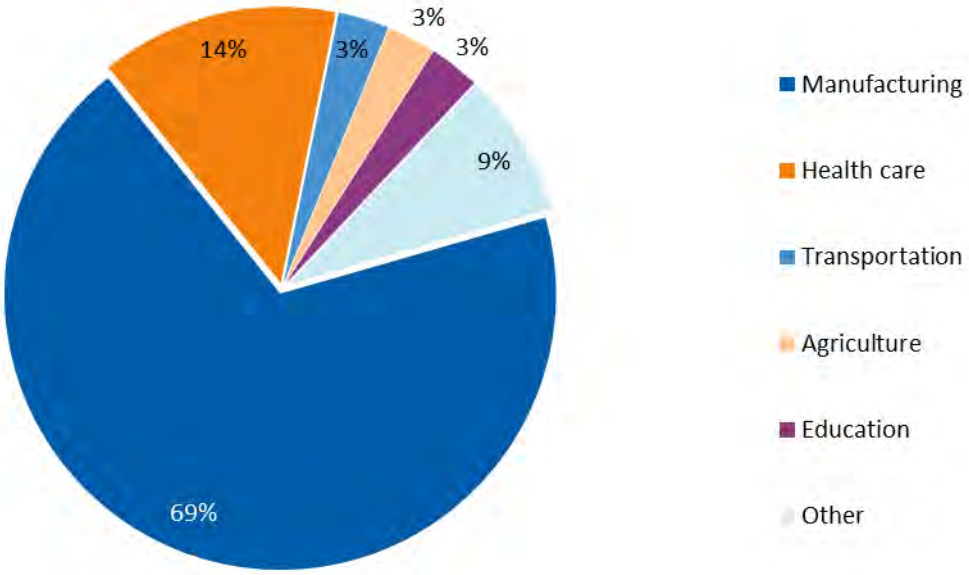


Source: CY 2016 Trade Ally Survey Question L2. "How effective are the 2016 Focus on Energy financial incentives in motivating customers to participate in the Large Energy Users Program?" (n=9)

Large Energy Users Program Participant Demographics

For the CY 2016 evaluation, surveyed participants in the Large Energy Users Program provided information regarding their industry type, number of locations the company operates in Wisconsin, ownership status of the facility, and the number of employees where the work took place. As shown in Figure 216, the majority of customers (69%, n=70) represent manufacturing facilities. Other Industries include the health care industry (14%) and transportation, agriculture, and education (each at 3%). Other categories were construction, financial institutions, restaurants, and government facilities (each with only one respondent).

Figure 216. Participant Company Industry Segment



Source: CY 2016 Participant Survey Question L2: "What industry is your company in?" (n=70)

More than a quarter of respondents (29%, n=69) had only one facility operating in Wisconsin. Nearly a third (31%) had five or more facilities in the state. Most participants (71%, n=68) reported they owned their facility, while another 22% reported a combination of leasing and owning depending on the facility. Only 7% of the respondents leased the facility that their company operated in. The locations where participants' projects were implemented averaged 484 employees.

Strategic Energy Management Pilot Program Participant Demographics

The Evaluation Team learned that all of the Strategic Energy Management Pilot Program participants pay their own energy bills and own their own facilities. Of the 12 responding participants, 10 were manufacturing facilities, while one was in the agricultural industry and the other representing food processing.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 262 lists the CY 2015 and CY 2016 incentive costs for the Large Energy Users Program.

Table 262. Large Energy Users Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$10,341,953	$13,920,708

The Evaluation Team found the CY 2016 Program was cost-effective (4.54). Table 263 lists the evaluated costs and benefits.

Table 263. Large Energy Users Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$1,201,920	$1,048,361
Delivery Costs	$4,907,942	$4,280,895
Incremental Measure Costs	$49,792,860	$53,682,911
Total Non-Incentive Costs	**$55,902,722**	**$59,012,167**
Benefits		
Electric Benefits	$97,457,224	$132,363,885
Gas Benefits	$124,834,595	$133,828,779
Emissions Benefits	$31,688,806	$37,417,087
Total TRC Benefits	**$253,980,625**	**$303,609,751**
Net TRC Benefits	**$198,077,903**	**$244,597,584**
TRC B/C Ratio	**4.54**	**5.14**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Large Energy Users Program and the Strategic Energy Management Pilot Program.

Outcome 1. Participants find their contractor and Energy Advisors as trusted sources of information.

The Energy Advisors and KAMs played a greater role in Large Energy Users Program project initiation than reported in CY 2015. Moreover, nearly twice as many participants in CY 2016 (49%) reported that Focus on Energy representatives were a source of Program awareness than in CY 2015 (25%). Seventy percent of surveyed participants reported that their contractor and Energy Advisor were trusted sources of information, and 29% said their utility representative was a trusted source of information.

Recommendation 1: Consider ways to improve Large Energy Users Program participants' trust of utility representatives as a source of information. This may include more training so utility representatives can speak with greater confidence about the Program or have utility representatives (KAMs) participate in training and other outreach events.

Outcome 2. The Large Energy Users Program incentives and offerings changed substantially from the CY 2015 offerings.

Both the Program Implementer and Administrator emphasized the reduction in the incentives and offerings was the greatest change in the CY 2016 Program. Some surveyed participants noted challenges with filling out the application because of the changes in measure offerings from CY 2015 to CY 2016. The Large Energy Users Program participants commonly implement projects that take more than six months. Trade Allies said the most important Program incentives were the maximum incentive allowed

as a percentage of the actual project cost, the price per kWh, and price per kW demand. Moreover, some Trade Allies are not marketing the Program as much as they were last year. Moreover, there was one Trade Ally out of the ten that was unaware that incentives has changed from CY 2015, while Trade Allies rating on communication was not rated as one of the highest Program elements for satisfaction.

Recommendation 2: Review processes for announcing changes in Program offerings to identify opportunities to reach customers and Trade Allies more quickly and thoroughly (shortly after decisions are made known to Program staff).

Outcome 3. There is a subset of participants who are motivated to implement energy efficiency projects for more than energy and financial savings.

Although in general the findings concluded that most participants wanted energy and financial savings, over one-third (36%) of the surveyed participants highly ranked two statements that indicated they were most interested in learning more about saving energy and money and using energy smarter.[189] The Evaluation Team also saw a declining trend over the last three years in the surveyed participants' responses about the importance of saving money on energy bills and reducing consumption to participation (59% in CY 2013, 56% in CY 2015, and 53% in CY 2016). The Team also observed a positive trend in the surveyed participants' responses about the importance of enhancing the performance of their systems (0% in CY 2013, a significant increase to 7% in CY 2015, and 13% in CY2016). This trend may be indicative of some Large Energy Users Program participants' valuing performance enhancement measures beyond saving money and/or reducing energy consumption.

Recommendation 3: Consider identifying the subset of participants who are placing a higher emphasis on performance enhancement and if they are good candidates for the Strategic Energy Management Pilot Program through ensuring that complete understanding of motivational factors is known.

Outcome 4. Customers prefer money up front, but only 7% are getting it.

Findings show that Large Energy Users Program customers want money up front. Although this is not an option formally offered by the Program, 7% of participants reported receiving money upfront, likely through direct discounts offered by their contractor.

Recommendation 4: Consider encouraging Trade Allies to offer money up front to help sell more and/or larger prescriptive and custom measure projects.

Outcome 5. The originally anticipated one-year timeline for Strategic Energy Management Pilot Program participation completion was underestimated.

As reported by the Program Implementer and Administrator, as well as through an analysis of participants' project start time, projects in the Strategic Energy Management Pilot Program are taking

[189] The two statements were: "Focus on Energy helps Wisconsin businesses with solutions to use energy smarter and save money" and "Focus on Energy helps Wisconsin businesses grow by making smarter decisions about their energy use."

much longer to complete than expected for all participants. Participants reported this was for several reasons, including their time and resources and the time to sub-meter installation and gather subsequent data.

Recommendation 5a: In the next iteration of the Program materials and participant recruitment communications (i.e., for CY 2018), consider conveying in detail the amount of time eligible participants can expect the Program to take. Align eligible participant's expectations to the amount of time, resources, and efforts the Program will likely take, however; materials should not emphasize a long timeline to turn off participants.

Recommendation 5b: Consider benchmarking the Focus on Energy Strategic Energy Management Program communications to similar programs in other territories to identify methods for improved communication.

Outcome 6. Program marketing and outreach is not systematized with concrete criteria.

Both the Program Administrator and Implementer stated that Strategic Energy Management Pilot Program marketing was by word of mouth and the criteria to participate in the Pilot Program was not well defined as participants were asked if they would like to participate, instead of requesting to participate. In CY 2016, we saw one participant drop out and the participation level remained at 29.

Recommendation 6: Consider other, more effective and less time-consuming methods of marketing and outreach that go beyond word of mouth such as brochures or a website. Develop clear criteria for Program participation so Program eligibility is made known. Other utilities are known to have an application website for the public where formal applications are submitted along with a letter of commitment and a signed participation agreement (e.g., New York State Energy Research and Development Authority [NYSERDA]).

Outcome 7. Installing and analyzing data from sub-meters is a Pilot Program bottleneck.

Many surveyed participants reported that waiting for funds to install sub-meters, waiting to install sub-meters, or gathering and analyzing sub-meter data is a major bottleneck to advancing participants along the path to completion.

Recommendation 7: Increase support during the implementation of this Program element to help participants gather data faster by clearly defining the steps of the process, the ways to reduce waiting for meter installation, and by providing resources for participants to plan their participation timeline.

Outcome 8. Custom measures drove the deviation of evaluated savings from expected (*ex ante*) values.

The Evaluation Team made few adjustments to prescriptive and hybrid measure projects. The custom measures installed through the program provided more opportunity for discrepancy between reported (or planned) and verified (or installed) operation due to the complexity of the analyses and technologies.

Recommendation 8. To mitigate similar discrepancies in future program years, the Evaluation Team recommends the following for implementer post-installation inspections:

- For HVAC measures, confirm estimated savings are not greater than existing heating or cooling equipment capacities.
- Use average values (load, etc.) rather than peak values in savings calculations.
- Verify key set-point values (temperatures, pressures, flowrates, etc.) and parameters (operating hours, staging, etc.) with participants. Third-party engineers or suppliers may use inaccurate default values to provide savings estimates, whereas end-users will be more familiar with typical or planned operating conditions.

Small Business Program

Through the Small Business Program, launched in CY 2012, Focus on Energy encourages customers with a monthly peak demand of less than 100 kW to install affordable, energy-efficient products at their business facilities. Focus on Energy offers a free lighting assessment, a consultation on energy-efficient upgrades, and direct installation of the energy-efficient products by a Trade Ally. Customers work with the Trade Ally to assess and select energy-efficient products. Focus on Energy passes along the product discounts directly to the customers to help reduce upfront costs. Trade Allies, who are registered with Focus on Energy's Trade Ally Network, then receive incentives for the products and installation on behalf of their customers.

In the past, Focus on Energy offered energy-efficient Program products to customers in the form of packages (Free and Gold Packages in CY 2014; Silver, Gold, and Platinum Packages in CY 2015). However, due to confusion over the years regarding the packages, there were no Program packages starting in CY 2016. Customers now freely choose which products they want and the amount they need with a minimum co-pay of $199. Focus on Energy also added refrigeration equipment to the Program offerings, such as LED cold case lighting and anti-sweat heater controls, midway through CY 2016.

Focus on Energy decided to transition the Program to a new implementer in CY 2017, and redesigned the Program for CY 2017.

The Program performed well relative to its goals. Realization rates were relatively high (between 100% and 117% across various parameters), and there were no major trends or systematic issues that merited adjustments to the evaluated savings apart from several evaluated lighting measures and one refrigeration measure which were not aligned with TRM values.

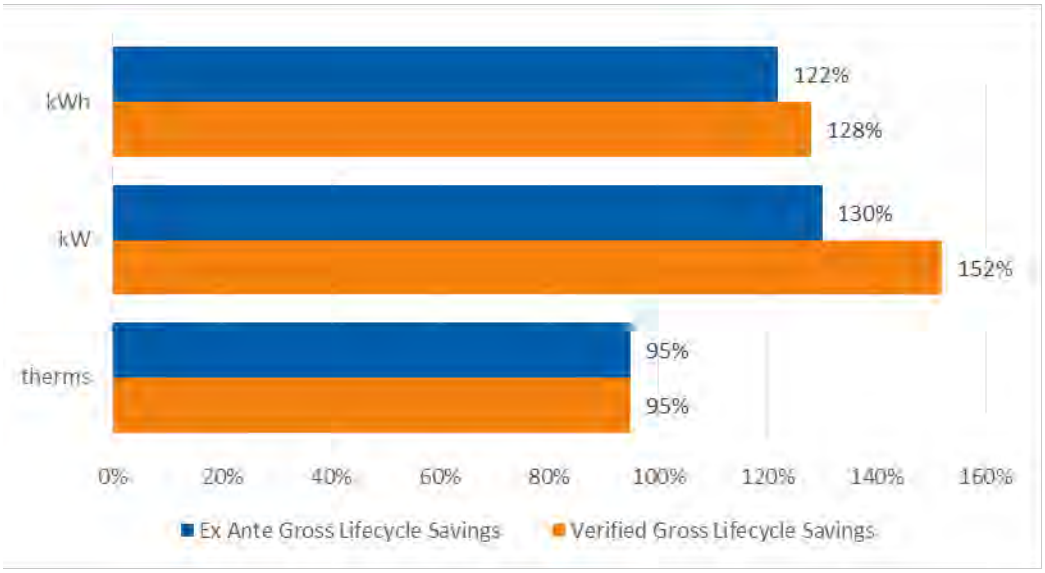
Table 264 lists the actual Program spending, savings, participation, and cost-effectiveness.

Table 264. Small Business Program Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$4,142,650	$3,759,992
Participation	Number of Participants	1,608	1,980
Verified Gross Lifecycle Savings	kWh	479,711,634	392,972,035
	kW	6,155	5,184
	therms	214,446	248,114
Verified Gross Lifecycle Realization Rate	MMBtu	105%	100%
Annual Net-to-Gross Ratio	MMBtu	95%	88%
Net Annual Savings	kWh	30,138,409	24,702,720
	kW	5,847	4,536
	therms	20,567	20,907
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.99	2.82

Figure 217 shows the percentage of gross lifecycle savings goals achieved by the Small Business Program in CY 2016. The Program exceeded the CY 2016 electric goals for both *ex ante* and verified gross savings, but did not meet the CY 2016 *ex ante* and verified gross savings goals for natural gas.

Figure 217. Small Business Program Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program Implementer's contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations of the Small Business Program in CY 2016. The Team designed its EM&V approach to integrate multiple perspectives in assessing the Program performance. Table 265 lists the specific data collection activities and sample sizes used in the evaluations.

Table 265. Small Business Program Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Program Actor Interviews	2
Tracking Database Review	Census
Participant Surveys	70
Ongoing Customer Satisfaction Surveys[1]	202
Participating Trade Ally Surveys	18
Engineering Desk Reviews	58
Verification Site Visits	10

[1] The Program Implementer used data collected during ongoing customer satisfaction surveys to assess performance and help meet contractual obligations related to satisfaction KPIs.

Program Actor Interviews

The Evaluation Team interviewed the Program Administrator (CB&I) and the Program Implementer (Staples Energy) in July 2016 to learn about the current state of the Small Business Program and to assess Program objectives, Program performance, and implementation challenges and solutions. The Team also asked interviewees about their marketing and outreach efforts for engaging Trade Allies and customers.

Tracking Database Review

The Evaluation Team conducted a census review of the Small Business Program's records in the Focus on Energy database, SPECTRUM, which included the following tasks:

- Conducting a thorough review of the data to ensure that the totals in SPECTRUM matched the totals reported by the Program Administrator
- Reassigning savings from a number of database adjustment measures to the corresponding program measures
- Checking for complete and consistent application of information across data fields (measure names, application of annual savings, application of EUL, etc.)

Participant Surveys

To gather feedback on Program experiences and data to inform NTG calculations (freeridership and spillover), the Evaluation Team conducted a telephone survey with participating customers. The Team

constructed the survey population frame using the CY 2016 year-to-date Program participants listed in SPECTRUM. At the time of the surveys, the population size consisted of 511 participants (as determined by unique phone numbers). Seventy participants completed the survey, which was the identified target designed to meet 10% precision at 90% confidence. Participants also receive a verification battery which is used to calculate a program-level ISR.

Ongoing Customer Satisfaction Surveys

The PSC requested that the Evaluation Team conduct satisfaction surveys beginning in CY 2015 for the 2015-2018 quadrennial. The goal of these surveys is to provide a quick and easy feedback opportunity to recent Program participants, ensure timely feedback close to the participation experience, enable problem identification at any time of year, and identify energy efficiency opportunities for delivering follow-up information to interested participants.

The Program Administrator deployed online surveys through SPECTRUM to all CY 2016 participants with email addresses within two weeks of them completing their participation in the program. The Evaluation Team gathered online survey results via SPECTRUM and sent, received, and scanned mail survey responses, which were combined with the online results for quarterly and annual reporting.

In CY 2016, 202 Small Business Program participants responded to the ongoing customer satisfaction survey.

Participating Trade Ally Surveys

The Evaluation Team conducted an online survey of participating Trade Allies. The Team sourced the population frame from SPECTRUM and included all registered Trade Allies who completed projects for the Small Business Program in CY 2016. Due to overlap between the nonresidential Focus on Energy programs, some Trade Allies also may have worked on projects for other programs. To avoid response confusion, the Evaluation Team structured the first half of the online survey to ask about general, non-Program-specific questions pertaining to Focus on Energy, and the second half of the survey to ask questions specific to the Small Business Program. From the total population of 77 registered Trade Allies in the Program, the Evaluation Team contacted 65 and received 18 responses.

Engineering Desk Reviews

The Evaluation Team conducted a detailed review of all available project documentation in SPECTRUM for a sample of 58 program measures. This review included an assessment of the savings calculations and methodology applied by the Program Implementer. The Team leveraged applicable Focus on Energy TRMs (dated October 2015 and February 2016) and associated workpapers to determine methodology and data for all of the Small Business Program measures. The evaluation sample for these reviews is selected using a weighted, random stratified sampling approach known as PPS (Probability Proportional to Size, here lifecycle total energy savings).

Verification Site Visits

The Evaluation Team conducted 10 verification site visits for the Small Business Program in CY 2016. Site visits involved verifying the type and quantity of equipment installed, determining how the installed equipment is controlled, and documenting the operating hours of the installed equipment. Site visits are selected as a subset of the evaluation sample of desk reviews. This selection is made by the Evaluation Team based upon measure type (custom and hybrid measures are targeted for site visits more often than prescriptive), savings share of the evaluation sample and program (very large measures are often targeted for site visits), and field logistics (not all chosen sites may be able to support site visits at a given time).

Impact Evaluation

The Evaluation Team used the following methods to conduct an impact evaluation of the Program:

- Tracking database review
- Participant surveys
- Engineering desk reviews
- Verification site visits

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data to determine reported installations, then applied the results from participant surveys (n=70), engineering desk reviews (n=58), and verification site visits (n=10) to calculate verified gross savings.

As a part of the tracking database review, the Team evaluated the census of the CY 2016 Small Business Program data contained in SPECTRUM. The Team reviewed data for appropriate and consistent application of unit-level savings values and EUL values in alignment with the applicable TRM (October 2015 and February 2016). If the measures were not explicitly captured in the TRM, the Team referenced other secondary sources (deemed savings reports, workpapers, other relevant TRMs, and published studies).

Cadmus found that the overall accounting of demand and energy savings in the SPECTRUM database was generally accurate and adhered to industry best practices. SPECTRUM offers a number of "date" fields which go above and beyond typical program tracking databases and normal "Paid Date" and "Application Received Date" fields, and these fields allow database users to track projects at a detailed level. SPECTRUM also employs unique customer identifier numbers, which is a best practice not followed in many other jurisdictions (where account numbers and customer contact information is used to classify unique customers with some difficulty). Nearly all database issues detected for these programs resulted from a lack of current, accepted workpapers to support the savings in the database. In addition, the review identified one case in which a cooler evaporator fan control measure was assigned savings in SPECTRUM, even though supporting documentation in the system indicated the measure had not been installed.

The Evaluation Team identified several types of measures that lacked current, accepted workpapers in the TRM. These measures included the following measure identification numbers:

- 3093 (LED Fixture, <250 Watts, Replacing 400 Watt HID, High Bay)
- 3287 (LED Fixture, <250 Watts, Replacing 400 Watt HID, High Bay, SBP A La Carte)
- 3511 (LED Replacement of 4-Foot T8 Lamps with Integral or External Driver)
- 2201 (Anti-Sweat Heater Controls, Refrigerated Case, Standard Door)

The Evaluation Team worked with the PSC and Program Administrator to assess the causes and impacts of these inaccuracies. For measure 3093 (LED Fixture, <250 Watts, Replacing 400 Watt HID, High Bay), the Program Administrator identified a data error in SPECTRUM during CY 2016. The Program Administrator updated the SPECTRUM records in November 2016 and created adjustment measures in December 2016 to capture missed savings.

Measure 3287 (LED Fixture, <250 Watts, Replacing 400 Watt HID, High Bay, SBP A La Carte) is similar to measure 3093, but is listed under measure 3092 in the deemed savings table in SPECTRUM. The Evaluation Team and Program Administrator agreed that measure 3287 should be updated in SPECTRUM by the Program Administrator.

The Evaluation Team and Program Administrator also identified a SPECTRUM error for measure 3511 (LED Replacement of 4-Foot T8 Lamps with Integral or External Driver). The deemed savings for this measure in the October 2015 TRM are almost four times higher than all historic savings values from SPECTRUM.

The October 2015 TRM does not include an algorithm of measure 2201 (Anti-Sweat Heater Controls, Refrigerated Case, Standard Door). The Evaluation Team referenced a workpaper created in January 2017 to determine verified savings, since there were no other existing governing reference documents. In the absence of current and/or valid savings documentation, the application of a new workpaper which does not pre-date the program year was accepted by the PSC as a reasonable basis for evaluation.

Site visits generally confirmed that program measures were installed and operating as planned. Any deviations observed were minor and captured in the realization rates for the program. As is customary, the Team has also shared anecdotal observations and recommendations which might serve to improve program offerings and implementation. Two verification site visits identified a number of light fixtures which were not installed at the time of the visit, and the resulting impact on savings and realization rates are reflected in the final program values.

In-Service Rates

The ISR represents the percentage of measures still installed, in use, and operating as planned following installation by the Program Implementer. In CY 2016, the Evaluation Team conducted participant surveys to verify the installed measures and estimate ISRs at the measure level.

The Evaluation Team applied a combined, weighted ISR of 94% from these surveys to all engineering desk reviews without a completed site visit. The Team applied a site-specific ISR to all measures where verification site visits were performed.

Verified Gross Savings Results

Table 266 lists the annual and lifecycle realization rates for the CY 2016 Program. Overall, the Program achieved an annual evaluated realization rate of 103%, weighted by total (MMBtu) energy savings.[190] Realization rates are generally the same for a given savings type. These results represent weighted average realization rates for the entire Program.

Table 266. CY 2016 Small Business Program Annual and Lifecycle Realization Rates

Annual Realization Rate				Lifecycle Realization Rate			
kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
103%	117%	100%	103%	105%	117%	100%	105%

Table 267 lists the *ex ante* and verified annual gross savings for the CY 2016 Program by measure category.

Table 267. CY 2016 Small Business Program Annual Gross Savings Summary

Measure	*Ex Ante* Gross Annual Savings			Verified Gross Annual Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	521,787	113	17,584	537,104	131	17,584
Controls	3,116,096	78	0	3,207,570	91	0
Delamping	788,549	163	0	811,697	190	0
Fluorescent, Compact (CFL)	12,302	3	0	12,664	4	0
Fluorescent, Linear	2,499,580	531	0	2,572,956	620	0
Insulation	77,308	0	880	79,578	0	880
Light Emitting Diode (LED)	23,123,243	4,361	0	23,802,035	5,091	0
Motor	179,044	22	0	184,300	26	0
Other[1]	346,548	-7	0	356,721	-9	0
Refrigerated Case Door	12,636	0	0	13,007	0	0
Showerhead	62,177	0	3,186	64,002	0	3,186
Strip Curtain	80,640	9	0	83,007	11	0
Total Annual	**30,819,911**	**5,273**	**21,650**	**31,724,642**	**6,155**	**21,650**

[1] This measure category comprises several types of bonus and adjustment measures. Bonus measures are used to track program funds and have no savings impacts. Adjustment measures are used to modify existing savings values when errors are corrected or updates are applied.

[190] The Evaluation Team calculated realization rates by dividing annual verified gross savings values by *ex ante* savings values.

Table 268 lists the *ex ante* and verified gross lifecycle savings by measure category for the CY 2016 Program.

Table 268. CY 2016 Small Business Program Lifecycle Gross Savings Summary

Measure	*Ex Ante* Gross Lifecycle Savings			Verified Gross Lifecycle Savings		
	kWh	kW	therms	kWh	kW	therms
Aeration	8,044,976	113	176,853	8,455,930	131	176,853
Controls	40,498,116	0	0	42,566,843	0	0
Delamping	12,441,882	78	0	13,077,439	91	0
Fluorescent, Compact (CFL)	56,354	163	0	59,232	190	0
Fluorescent, Linear	33,369,480	3	0	35,074,062	4	0
Insulation	790,294	531	0	830,664	620	0
Light Emitting Diode (LED)	352,223,294	0	8,923	370,215,588	0	8,923
Motor	2,852,824	4,361	0	2,998,552	5,091	0
Other	5,175,334	22	0	5,439,701	26	0
Refrigerated Case Door	63,180	-7	0	66,407	-9	0
Showerhead	559,593	0	0	588,178	0	0
Strip Curtain	322,560	0	28,670	339,037	0	28,670
Total Lifecycle	**456,397,887**	**5,264**	**214,446**	**479,711,634**	**6,144**	**214,446**

Evaluation of Net Savings

The Evaluation Team used participant surveys to assess net savings for the Small Business Program. The Team calculated a NTG percentage of 95% for the CY 2016 Program.

Freeridership

The Evaluation Team used the self-report survey method to determine the Program's freeridership level for CY 2016. The Team estimated an average self-reported freeridership of 6%, weighted by evaluated savings, for the CY 2016 Program. In CY 2015, the Evaluation Team found freeridership of 12.5% to all of the Program measure categories.

The decrease in freeridership from CY 2015 to CY 2016 was driven by lower freeridership among the largest projects in each year's survey sample. In CY 2016, the Evaluation Team again relied solely on the self-reported freeridership, and applied this value to all the Program measure categories. The eight CY 2016 respondents with the greatest savings accounted for 53% of the total analysis sample gross savings, with an average weighted freeridership rate of 0%. In CY 2015, the eight respondents who achieved the greatest savings accounted for 39% of the total gross savings for the survey sample, and the average savings weighted freeridership rate for these eight respondents was 24%. As a direct comparison with consistent methods, Table 269 lists the CY 2015 and CY 2016 self-reported freeridership estimates, weighted by participant gross evaluated energy savings.

Table 269. CY 2015 and CY 2016 Self-Reported Freeridership

Year	Number of Survey Respondents	Percentage of Freeridership
CY 2015	70	12.5%
CY 2016	70	6.0%

Spillover

The Evaluation Team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment following their participation in the Small Business Program. The Evaluation Team applied evaluated and deemed savings values to the spillover measures that customers said they had installed as a result of their Program participation, presented in Table 270

Table 270. Small Business Program Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MMBtu Savings Estimate
LED Lighting	25	59.71

Next, the Evaluation Team divided the sample spillover savings by the Program gross savings from the entire survey sample, as shown in this equation:

$$Spillover\ \% = \frac{\sum \text{Spillover Measure EnergySavings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 1% spillover estimate, rounded to the nearest whole percentage point, for the Small Business Program respondents (Table 271).

Table 271. Small Business Program Participant Spillover Percentage Estimate

Variable	Total MMBtu Savings Estimate
Spillover Savings	59.71
Program Savings	11,647.8
Spillover Estimate	**1%**

Verified Net Savings Results

To calculate the Program NTG, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG estimate of 95% for the Program. Table 272 shows total net-of-freeridership, participant spillover, and total net savings in MMBtu, as well as the overall Program NTG.[191]

Table 272. CY 2016 Small Business Program Annual Net Savings and NTG Ratio

Net-of-Freeridership (MMBtu)	Participant Spillover (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Total Annual Net Savings (MMBtu)	Program NTG Ratio
103,785	1,104	110,409	104,889	95%

Table 273 shows the annual Program net demand and energy impacts (kWh, kW, and therms) by measure category. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 273. CY 2016 Small Business Program Annual Net Savings

Measure Category	Annual Net Savings		
	kWh	kW	therms
Aeration	510,249	125	16,705
Controls	3,047,192	86	0
Delamping	771,112	181	0
Fluorescent, Compact (CFL)	12,030	4	0
Fluorescent, Linear	2,444,309	589	0
Insulation	75,599	0	836
Light Emitting Diode (LED)	22,611,933	4,836	0
Motor	175,085	25	0
Other	338,885	-8	0
Refrigerated Case Door	12,357	0	0
Showerhead	60,802	0	3,026
Strip Curtain	78,857	10	0
Total Annual	**30,138,409**	**5,847**	**20,567**

Table 274 lists the lifecycle Program net demand and energy impacts (kWh, kW, and therms) by measure category.

[191] Although nonparticipant spillover was measured through Trade Ally interviews in CY 2016, these savings will be reviewed by the EWG and a determination of if and how these savings should be applied will occur at the end of the CY 2015–CY 2018 quadrennial, consistent with broader sampling practices design to draw full-quad conclusions.

Table 274. CY 2016 Small Business Program Lifecycle Net Savings

Measure Category	Lifecycle Net		
	kWh	kW	therms
Aeration	8,033,134	125	168,010
Controls	40,438,501	86	0
Delamping	12,423,567	181	0
Fluorescent, Compact (CFL)	56,271	4	0
Fluorescent, Linear	33,320,359	589	0
Insulation	789,131	0	8,477
Light Emitting Diode (LED)	351,704,809	4,836	0
Motor	2,848,625	25	0
Other	5,167,716	-8	0
Refrigerated Case Door	63,087	0	0
Showerhead	558,769	0	27,237
Strip Curtain	322,085	10	0
Total Lifecycle	**455,726,052**	**5,847**	**203,724**

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews and surveys as part of the process evaluation activities. The Team focused its process evaluation on these key topics for the Small Business Program:

- Customer and Trade Ally responses to LED and refrigeration product offerings
- Impact of new refrigeration product offerings on customer and Trade Ally businesses
- Improvements made to Energy Snapshot[192] and resulting outcomes from those improvements
- Ways to engage customers to participate in other Focus on Energy programs

Program Design, Delivery, and Goals

The Evaluation Team interviewed key staff members of the Program Administrator and Program Implementer to get an overview of the Program design, delivery process, and any changes or challenges. The Evaluation Team also reviewed Program materials that document the objectives, operations, and workflow.

[192] Energy Snapshot is a proprietary, tablet-based tool the Trade Ally uses to collect information about the customer's facility, to calculate savings, and to generate an assessment report.

Program Design

Through the CY 2016 Small Business Program, Focus on Energy offered customers:

- A free walk-through assessment
- A self-selected variety of discounted energy-efficient products starting at $199
- Direct installation of the products by a trained, registered Trade Ally

A customer's energy bill must show that their business has an average monthly peak demand of less than 100 kW in order to qualify for the Program. Upon initial inquiry into the Program, either Focus on Energy or the registered Trade Ally will confirm the customer's eligibility to participate.

To begin Program participation, customers start by having the registered Trade Ally conduct a free walk-through lighting assessment to review the business facility's existing lights and hours of operation. On occasion, the Trade Ally may also identify opportunities in HVAC and refrigeration. The Trade Ally then reviews the assessment and potential savings with customers using the Energy Snapshot tool.

Next, customers select energy-efficient products based on the assessment results and product recommendations made by the Trade Ally. After the Trade Ally completes the installation work, the Program Implementer inspects the Trade Ally's work, and provides the Trade Ally with a Program incentive check for the products installed. To inspect the Trade Ally work, the Program Implementer has its Energy Advisors conduct quality assurance site visits on the first five installations completed by each Trade Ally, then review 5% to 25% of installations on subsequent jobs.

Program Management and Delivery Structure

The Small Business Program continued to be administered by CB&I (Program Administrator) and implemented by Staples Energy (Program Implementer) in CY 2016. The Program Implementer subcontracted with GDS Associates to provide the role of Energy Advisors and conduct engineering and Program forecasting. CY 2016 was the final year in which Focus on Energy contracted with Staples Energy as the Program Implementer. Franklin Energy will deliver the Program in CY 2017 as the new Program Implementer.

The Program Administrator manages the overall Program and Program design, while the Program Implementer executes the day-to-day Program operations, such as marketing and outreach activities, data management, and incentives processing.

Utility Partners also contribute to Program marketing and outreach activities, and provide Trade Ally support. Trade Allies, as the Program's main marketing channel, interface with customers and are responsible for educating and promoting the Program to customers, conducting the free energy assessment, setting up projects, and installing products. Energy Advisors review the work completed by Trade Allies for quality assurance, and also provide technical support to Trade Allies and Utility Partners.

Program Changes

Focus on Energy introduced three major Program changes in CY 2016:

- **No package model.** The Program Administrator and Program Implementer decided to move away from the package model because of confusion over the years among themselves, Trade Allies, and Utility Partners on what products were part of which packages and differences between the packages. The Program Administrator reported that since the change, the Program has become easier for involved parties to understand.
- **Reduced budget and lower incentives.** In CY 2016, Program Implementers across the Business Portfolio faced budget constraints, necessitating a more proactive management of incentive budgets. The Program operated in CY 2016 with an initial budget of $4.25 million, $500,000 less than the CY 2015 budget of $4.75 million. Focus on Energy reduced incentive levels across all nonresidential programs in CY 2016. Halfway through the Program year, the Program Administrator and Program Implementer requested $500,000 in incentive funding to supplement Program demand, a request that was fulfilled in addition to funding for labor.
- **Refrigeration product offerings.** According to the Program Administrator, Focus on Energy added refrigeration products midway through CY 2016 to balance out the Program costs and energy savings and to get customers to pursue a larger variety of products. LEDs had created an imbalance between Program costs and energy savings due to their high installation uptake by participants. The Program Administrator noted that the refrigeration rollout did not go smoothly, and expressed dissatisfaction with the rollout timing and preparation; the refrigeration rollout experienced a delay and did not adequately prepare Trade Allies for the new offering. At the end CY 2016, refrigeration represented 5% of the total products installed through the Program and LEDs represented 76%.

Program Goals

The overall Program objective is to encourage small businesses to use more energy-efficient products. The CY 2016 Program performance targets were as follows:

- Demand reduction goal of 4,061 kW
- Electric lifecycle savings goal of 374,379,218 kWh
- Natural gas lifecycle savings goal of 225,000 therms

The Program met its CY 2016 demand reduction and electric savings goals, and nearly met its natural gas savings goal. The Program Administrator and Program Implementer attributed the savings successes to the Program changes (the no package model and new marketing), as well as to the additional funding received near the end of CY 2016.

In addition to the energy and demand goals, the Program Administrator and Program Implementer tracked five KPIs, which they revised in CY 2016. Table 275 shows the five KPIs and their CY 2016 results based on the Program actor interviews, SPECTRUM data, participating Trade Ally surveys, and ongoing customer satisfaction surveys. The Program achieved three of the five KPI goals.

Table 275. Small Business Program CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Training	Host a minimum of four refrigeration trainings with Trade Allies	Reached goal by hosting three refrigeration awareness trainings and 19 one-on-one trainings	Reported by Program Implementer
Geographic Distribution	80% of participating utilities have customers who participated in the Program each year	Did not meet goal; reached 60% of participating utilities	Confirmed by final CY 2016 SPECTRUM data
Trade Ally Satisfaction	Maintain or increase the baseline of average Trade Ally satisfaction from 7.6 out of 10	Reached goal of increasing satisfaction, with average rating of 8.4	Confirmed by Participating Trade Ally Surveys
Inactive Trade Ally Projects	Ten inactive Trade Allies to complete five or more jobs annually	Did not meet goal; reached two of 10 inactive Trade Allies. The Program manual defines inactive Trade Allies as a Trade Ally with less than five jobs during the previous calendar year. There were 54 inactive Trade Allies in CY 2015, and the Evaluation Team checked the number of jobs each of these 54 Trade Allies completed in CY 2016. Only two of these Trade Allies are tracked as having completed five or more jobs. This differs from a statement by the Program Implementer, who reported having met the KPI goal of 10 Trade Allies.	Confirmed by final CY 2016 SPECTRUM data
Customer Satisfaction	Maintain or increase customer satisfaction above CY 2015 levels	Reached goal. The CY 2016 Program maintained statistically similar customer satisfaction levels as CY 2015 in all four categories: overall program satisfaction (2016=8.9, 2015=9.0), satisfaction with upgrades (2016=9.0, 2015=9.1), satisfaction with contractor (2016=9.1, 2015=9.1), and satisfaction with discounts (2016=8.6, 2015=8.6).	Confirmed by Ongoing Customer Satisfaction Surveys

Data Management and Reporting

In CY 2016, the Program Administrator and Program Implementer continued to manage data and generate reports through the Energy Snapshot tool and SPECTRUM. Trade Allies use this proprietary, tablet-based Energy Snapshot tool to collect customer data and generate the assessment report sent to customers. When the customer decides to move forward with the energy-efficient upgrades, Trade Allies send the customer data and a pending work order to SPECTRUM through Energy Snapshot. After

completing the work, the Trade Ally sends a signed work order with installation data to the Program Implementer, who enters the data manually into SPECTRUM.

In CY 2016, Focus on Energy made two enhancements to Energy Snapshot. First, based on the Evaluation Team's CY 2015 recommendation, Focus on Energy expanded Energy Snapshot's device compatibility beyond the iPad, enabling it to work on any tablet device or smartphone. Second, Focus on Energy updated the desktop version of Energy Snapshot to include a program documents section with manuals, marketing materials, and product directories. This program documents section had previously only been available on the tablet version of Energy Snapshot.

Although Focus on Energy addressed Energy Snapshot's device compatibility limitation, there were no major improvements concerning SPECTRUM during CY 2016. The Program Implementer manually entered customer data into SPECTRUM, since few data fields are transferrable between Energy Snapshot and SPECTRUM. The Program Administrator and Program Implementer did not mention any problems with the current data management structure, and have not made the capability of direct data uploads a Program priority.

Marketing and Outreach

In CY 2016, Focus on Energy concentrated the Program customer marketing and Trade Ally outreach on:

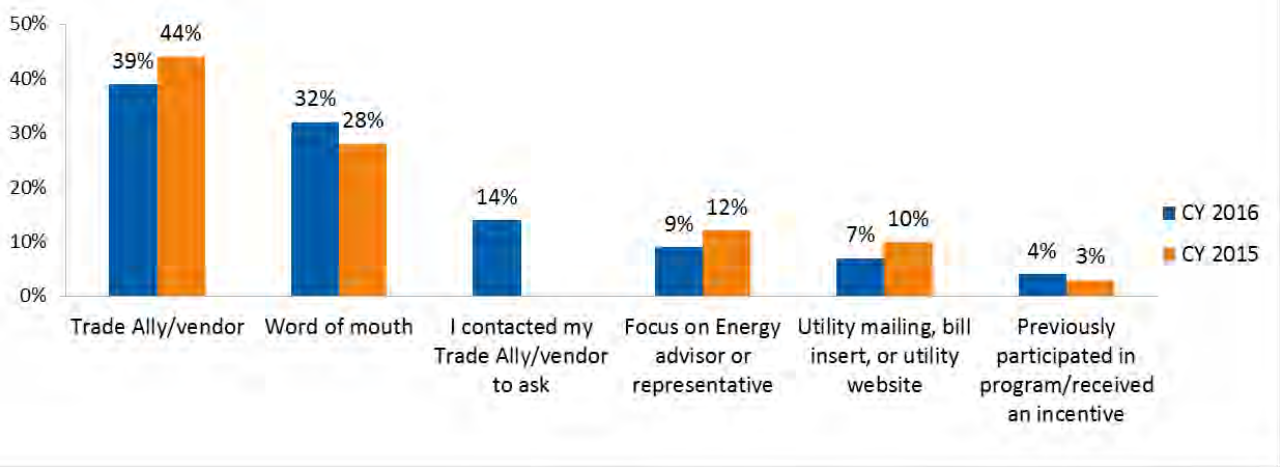
- Reaching and engaging new customers
- Re-engaging past participants and inactive Trade Allies
- Promoting the new refrigeration products

To attract new customers and re-engage past participants, the Program Implementer revised existing marketing materials and used mainly bill inserts, mailers, and social media (posts on participant testimonials) to promote the Program. To re-engage inactive Trade Allies, the Program Implementer hosted several trainings, disseminated up-to-date Program information through Energy Snapshot, and recognized outstanding Trade Allies in a quarterly newsletter. To promote the new refrigeration products, the Program Implementer developed refrigeration marketing materials, hosted Trade Ally refrigeration trainings, and targeted the Tavern League of Wisconsin (an association comprised of bars and restaurants).

Customer Program Awareness and Engagement

Trade Allies, vendors, and word of mouth continued to be the main ways small businesses learned about the Program. As shown in Figure 218, 39% of participant survey respondents learned about the Program from a Trade Ally or vendor, and 32% learned through word of mouth. Learning about the Program through a Trade Ally or vendor decreased from 44% in the CY 2015 evaluation, while learning about the Program through word of mouth increased from 28% in CY 2015. However, these changes were not statistically significant. Notably, 14% of respondents in CY 2016 asked their Trade Ally or vendor about the Program, whereas no respondents in CY 2015 inquired about the Program.

Figure 218. How Small Business Program Participants Learned About the Program



Source: Participant Survey Question C2. "How did your business learn about the discounts available for energy-efficient products through Focus on Energy's Small Business Program?" Multiple responses allowed (CY 2016 n=69; CY 2015 n=68)

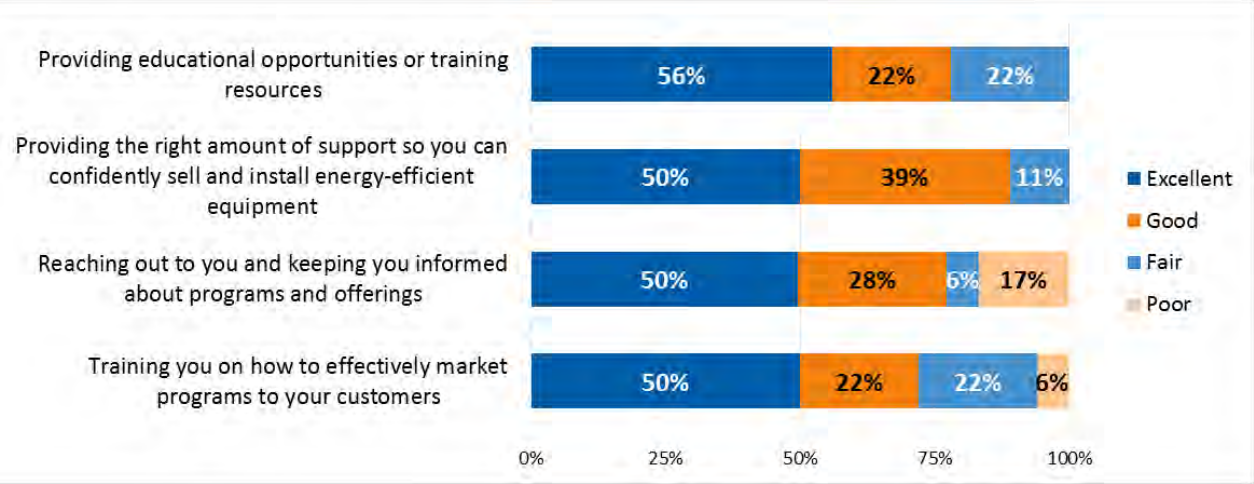
The Program largely attracted new participants rather than past participants. The Evaluation Team analyzed SPECTRUM Program data from CY 2014 through CY 2016 to determine the percentage of repeat participants. The Team reviewed the full participants (those showing a status of "paid") and determined the number of repeat service addresses with unique participation dates. The Team found that 9% of participants were repeat and 91% were new or first-time participants.

Trade Ally Program Awareness and Engagement

All 18 Trade Ally survey respondents said they were *very familiar* with the Small Business Program. Moreover, all 18 respondents said they promote Focus on Energy programs to customers *all the time* (78%) or *frequently* (22%).

The majority of respondents gave positive ratings on the Program marketing and outreach efforts, as shown in Figure 219. Half or more of the respondents gave an *excellent* rating for the Program's training resources, marketing support, and communications. To improve marketing and outreach, respondents suggested keeping Trade Allies constantly informed about Program changes and getting information out sooner; a few respondents were already anticipating the CY 2017 Program and wanted to know of CY 2017 changes as soon as possible so they can continue to promote the Program without pause.

Figure 219. Trade Ally Assessment of Marketing and Outreach Efforts



Source: Participating Trade Ally Survey Question F1. "How is Focus on Energy doing when it comes to the following…" (n=18)

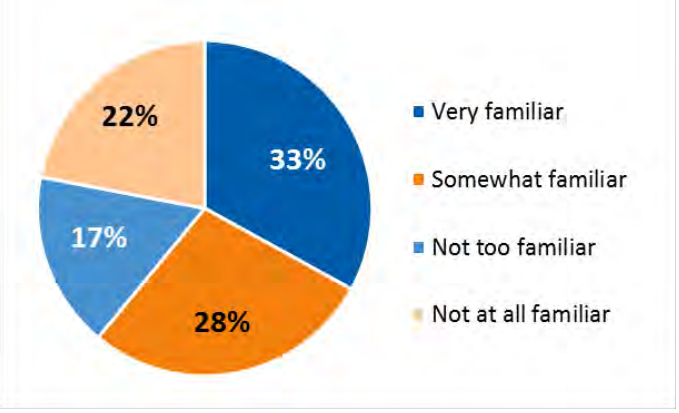
Ten of the 18 Trade Ally respondents said they attended Focus on Energy sponsored trainings, with the largest number of Trade Allies recalling the refrigeration trainings (four respondents). The 10 respondents gave a mean rating of 7.3 for the usefulness of the trainings, on a 10-point scale where 0 means *not at all useful* and 10 means *extremely useful*. Seven of the 10 respondents also said the training was *very important* in their decision to promote Focus on Energy programs and projects.

Awareness of New Refrigeration Product Offerings

Because Focus on Energy began offering Program refrigeration products midyear, and the Evaluation Team fielded participant surveys soon after the offering began in August 2016, few participant respondents were aware of the refrigeration offerings: only 13% (n=70). To obtain another customer pulse on the refrigeration offerings at a later point (December 2016), the Evaluation Team asked the 18 Trade Ally survey respondents to indicate their agreement level with the statement, "My customers are interested in the new refrigeration equipment offerings." According to the Trade Allies, customers are interested in the refrigeration offerings: 17% *strongly agreed* with the statement, 33% *somewhat agreed*, 17% *somewhat disagreed*, 6% *strongly disagreed*, and 28% said they did not know.

Even though Trade Allies received specific refrigeration trainings, Figure 220 shows that only one-third of respondents said they were *very familiar* with the refrigeration offerings. Over one-third of the respondents were not familiar with the refrigeration offerings.

Figure 220. Trade Ally Familiarity with New Refrigeration Product Offerings



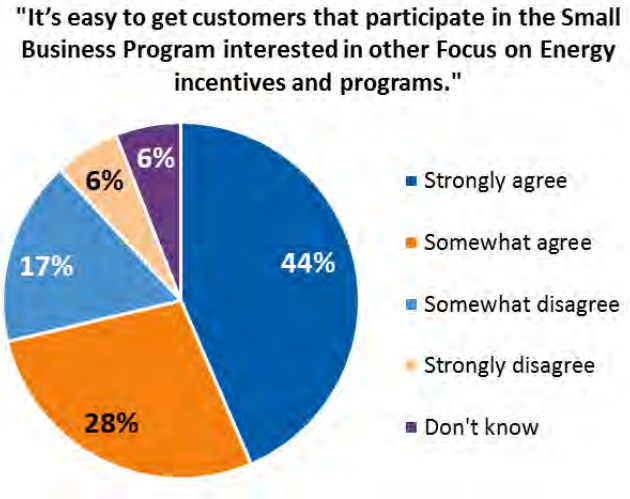
Source: Participating Trade Ally Survey Question N2. "Refrigeration equipment are some of the newest energy-efficient products available to Small Business Program customers. How familiar are you with the new refrigeration equipment offerings and incentives available?" (n=18)

Promotion of Other Programs

The Small Business Program serves as the gateway to other nonresidential Focus on Energy programs, with Trade Allies often referring customers to other programs when they do not qualify for the Small Business Program. In the participant survey, 7% of respondents (n=69) reported that their Trade Ally mentioned or referred them to other Focus on Energy programs (specifically to the Business Incentive Program). Not surprisingly, Small Business Program Trade Allies have the most familiarity with the Business Incentive Program: 95% of Trade Ally survey respondents (n=18) reported being familiar with the Business Incentive Program, with 56% saying they are *very familiar* and 39% saying they are *somewhat familiar*.

Trade Allies do not find it difficult to get customers interested in other Focus on Energy programs. As shown in Figure 221, 72% of respondents (n=18) agreed with the statement, "It's easy to get customers that participate in the Small Business Program interested in other Focus on Energy incentives and programs." Specifically, 44% of respondents *strongly agreed* with the statement and 28% *somewhat agreed*.

Figure 221. Trade Ally Agreement Level to Statement



Source: Participating Trade Ally Survey Question N3. "Please indicate whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the following statement…" (n=18)

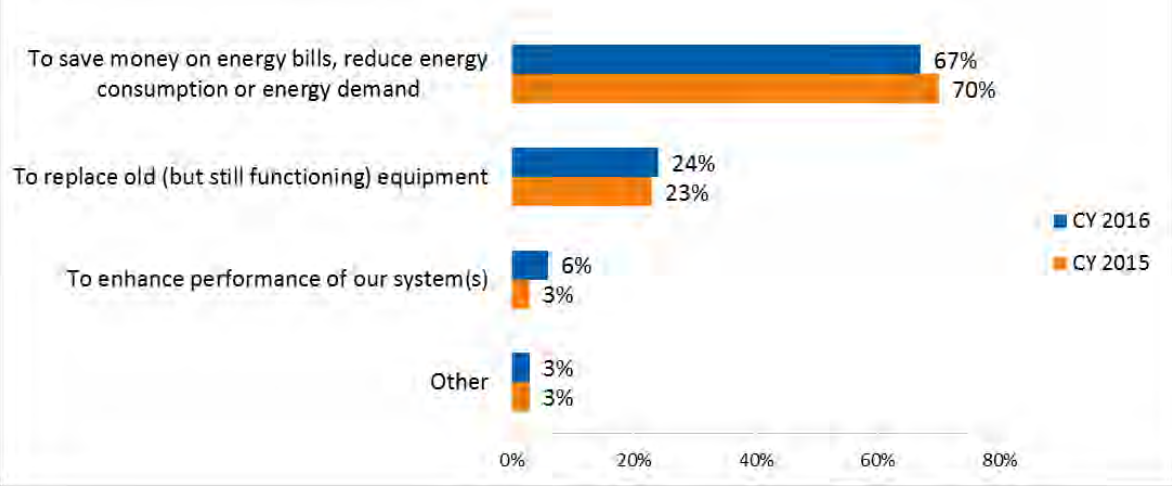
Customer Experience

In CY 2016, the Evaluation Team conducted ongoing customer satisfaction surveys (n=202) and telephone surveys (n=70) with Program participants. The Team contacted customers for the survey who participated in the Small Business Program during CY 2016 and who had a phone number or e-mail address listed in SPECTRUM. Together, these surveys allowed the Evaluation Team to investigate marketing, satisfaction, customer decision making, participation barriers, and reactions to the new product offerings. Whenever possible in the findings section below, the Evaluation Team compared the CY 2016 participant survey results to the CY 2015 participant survey results to document any changes and progress.

Decision-Making Process

Participants consider energy efficiency as an important decision-making factor. When asked about the importance of energy efficiency in decision making, 63% of respondents said energy efficiency was *very important* and the remaining 37% said it was *somewhat important*. When asked to name the most important decision-making factor for making energy-efficient upgrades through the Program, saving money and energy was reported by 67%, while 24% said the biggest factor was replacing old equipment (Figure 222). No changes emerged between the CY 2016 and CY 2015 survey results regarding the energy efficiency importance rating or the most important decision-making factor.

Figure 222. Most Important Factor in Making Energy-Efficient Upgrades



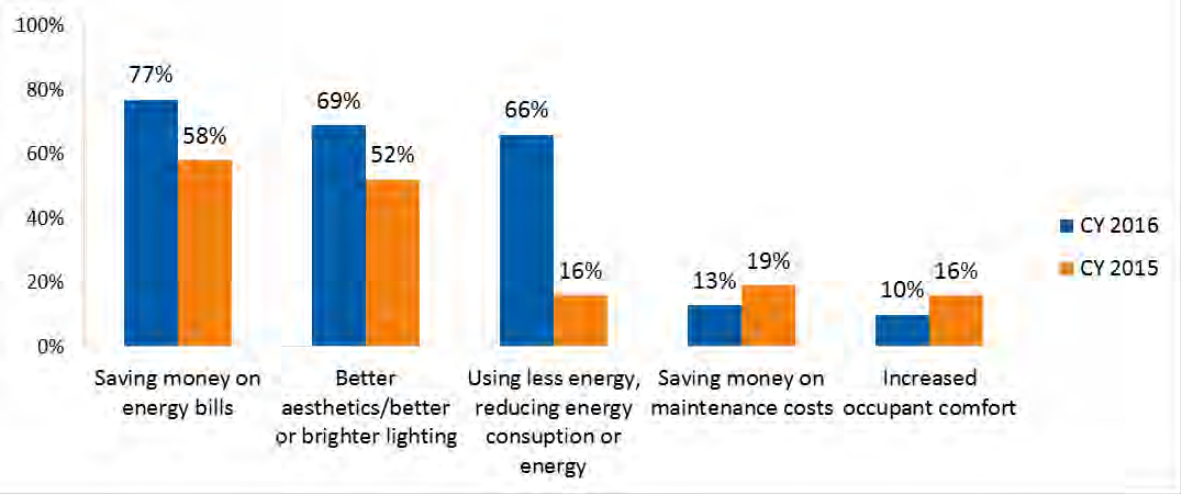
Source: Participant Survey Question D1. "What factor was most important to your business' decision to make these energy-efficient upgrades through the Small Business Program?" (CY 2016 n=70; CY 2015 n=70)

Program Benefits

Participants consider saving money on energy bills, better aesthetics, and using less energy as the greatest benefits from making the Program energy-efficient upgrades. As shown in Figure 223, 77% of respondents said saving money on energy bills was one of the top benefits, followed by 69% who said better aesthetics and 66% who said using less energy. The percentages for the top three benefits yielded statistically significant increases between CY 2015 and CY 2016.[193]

[193] $p < 0.05$ using a binomial t-test.

Figure 223. Top Benefits Resulting from Energy-Efficient Upgrades

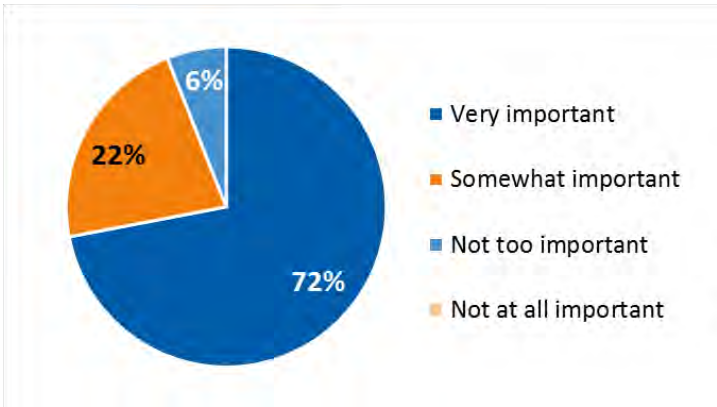


Source: Participant Survey Question E1. "What would you say are the main benefits your business has experienced as a result of the energy efficiency upgrades through the Small Business Program?" Multiple responses allowed (CY 2016 n=70; CY 2015 n=69)

LED Impact on Participation

LEDs provide aesthetic value and serve as a compelling driver of participation for small businesses. As shown in Figure 224, 72% of respondents said LED products were *very important* in their decision to participate in the Program. Only 6% of respondents said LED products were *not too important*.

Figure 224. LEDs' Importance on Decision to Participate in Program



Source: Participant Survey Question F2. "How important were the new LED products in your decision to participate in the Small Business Program? Would you say…" (n=68)

To understand possible reasons for LED products being important, the Evaluation Team used the participant survey to learn about the benefits gained by businesses from installing the LEDs. A large majority of respondents (84%, n=69) said LEDs improved aesthetics (the product looks better than other

bulbs or helps the business place look better). LEDs generated a stronger aesthetic benefit (84%) than the general Program (69%, see the *Program Benefits* section).

Barriers to Participation and Opportunities

Cost remains the biggest barrier to participation: 80% of respondents (n=66) said high initial cost is the biggest challenge to making energy-efficient improvements inside their business. Not surprisingly, when asked what could be done to overcome participation challenges, 56% of respondents said higher incentives and 44% said instant discounts (n=66).

Despite the high initial cost, there appears to be less of a chain of command burden among small business customers as compared to other nonresidential customers. Sixty-seven percent of Small Business Program respondents said they do not require approval from someone else in the business for making energy-efficient upgrades, compared to 50% of Business Incentive Program respondents (n=70), 37% of Multifamily Energy Savings Program respondents (n=70), and 16% of Large Energy User Program respondents (n=68).

With regards to future engagement, 27% of respondents said they are *very likely*, 26% said they are *somewhat likely*, and 26% said they are *not too likely* to complete another energy-efficient upgrade in the next 12 months (n=70). Of the respondents who indicated a likelihood to complete another upgrade (n=55), 84% said they are *very likely* and 13% said they are *somewhat likely* to apply for a Focus on Energy incentive.

Suggestions for Improvement

Most respondents (81%, n=70) did not have any comments on what Focus on Energy could do to improve the overall Program experience. Of the 13 respondents who offered comments, the most popular responses were to provide more face-to-face interactions and lighting-related suggestions such as the following:

- "Add more variety of lights that are included in the Program."
- "Would like the LEDs as an upgrade and incentive option."
- "Can lighting please have incentives?"

Lighting products are already discounted for these customers, and those discounts are reflected in the Trade Allies' incentives.

Annual Results from Ongoing Customer Satisfaction Survey

Throughout CY 2016, the Program Administrator and Evaluation Team surveyed participants to measure their satisfaction with various aspects of the Small Business Program.[194] Respondents answered

[194] The Evaluation Team found that some surveys did not include identifying information to allow it to match survey responses to program participation dates. Survey responses without participation dates were included in the year-end total but not the quarterly breakdown.

satisfaction and likelihood questions on a scale of 0 to 10, where 10 indicated the highest satisfaction or likelihood and 0 the lowest.

Figure 225 shows that the average overall satisfaction rating with the Program was 8.9 among CY 2016 participants, which is not significantly different from the average rating of 9.0 in CY 2015 or from the portfolio baseline of 8.8 (indicated by the purple line).[195] The average rating during Q1 (9.5) was significantly higher than the baseline and the average rating from CY 2015, but the remaining CY 2016 quarterly ratings were equivalent to CY 2015 and the baseline.[196]

Figure 225. CY 2016 Overall Satisfaction with the Small Business Program



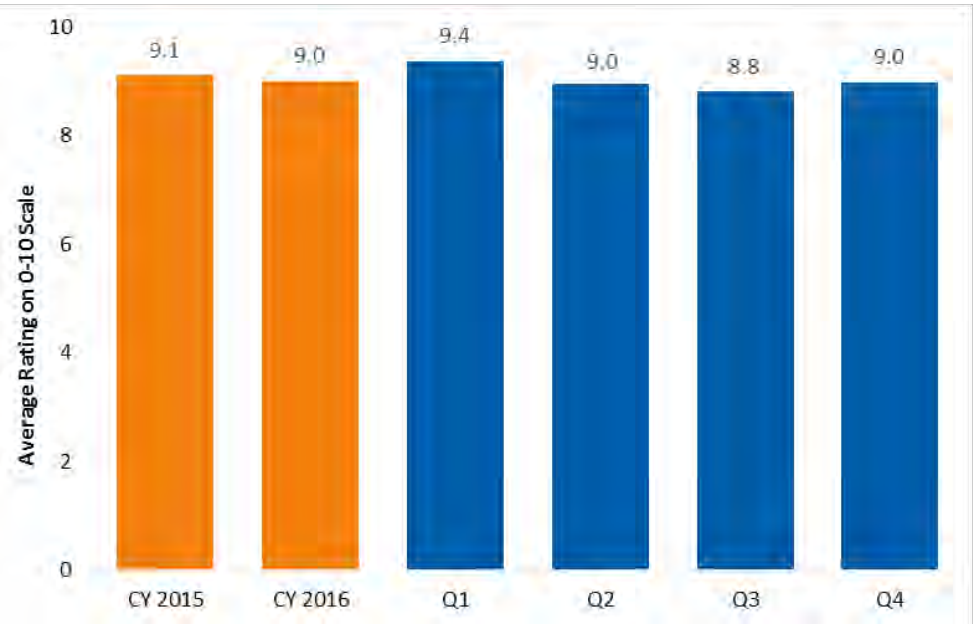
Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Overall, how satisfied are you with the program?" (CY 2015 n=256, CY 2016 n=198, Q1 n=26, Q2 n=40, Q3 n=42, Q4 n=73).
The portfolio baseline (8.8) is indicated by a purple line.

As shown in Figure 226, respondents gave an average rating of 9.0 for their satisfaction with the upgrades they received through the Program, which was not significantly different from the average rating in CY 2015 (9.1).

[195] The portfolio baseline of 8.98 is a participation-weighted average of CY 2015 program satisfaction ratings from across the portfolio. This baseline value established a KPI for the Program Implementer (i.e., to meet or exceed the baseline value over the last three years of the 2015-2018 quadrennium).

[196] $p < 0.05$ using a binomial t-test.

Figure 226. CY 2016 Satisfaction with Small Business Program Upgrades

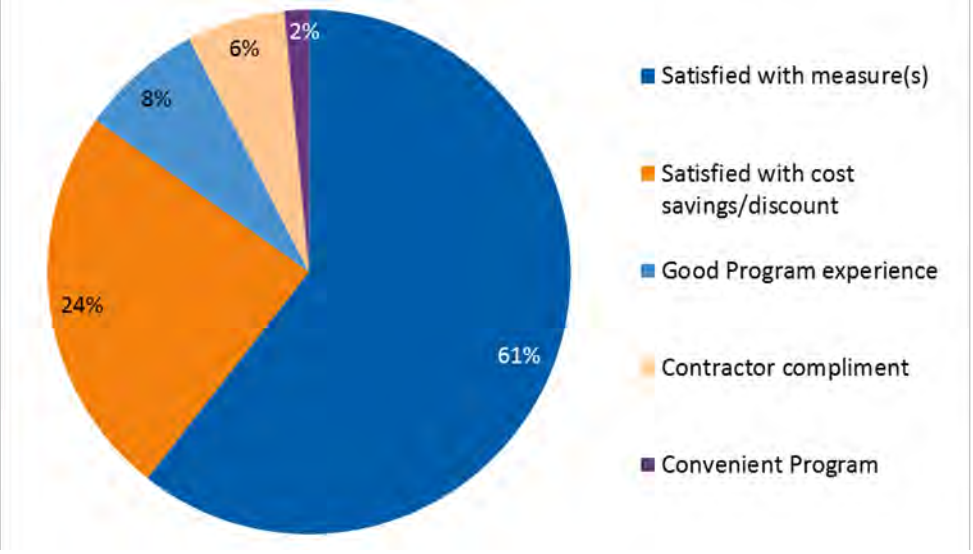


Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the energy-efficient upgrades you received?" (CY 2015 n=254, CY 2016 n=192, Q1 n=24, Q2 n=40, Q3 n=43, Q4 n=69)

Survey respondents answered whether they had any additional comments or suggestions for improvement regarding the energy-efficient equipment they had installed. Of the 202 participants who responded to the survey, 81 (or 40%) provided open-ended feedback, which the Evaluation Team coded into a total of 95 topics (or mentions). Of these mentions, 66 were positive or complimentary comments (73%), and 29 were suggestions for improvement (27%).

The positive responses are shown in Figure 227. Most of these comments reflected positive attributes of the measures installed. Since most projects involved lighting, positive comments about lighting (brightness, color, and aesthetics) dominate. Nearly one in four positive mentions about measures noted the financial benefits of the program in saving money on equipment costs and energy bills.

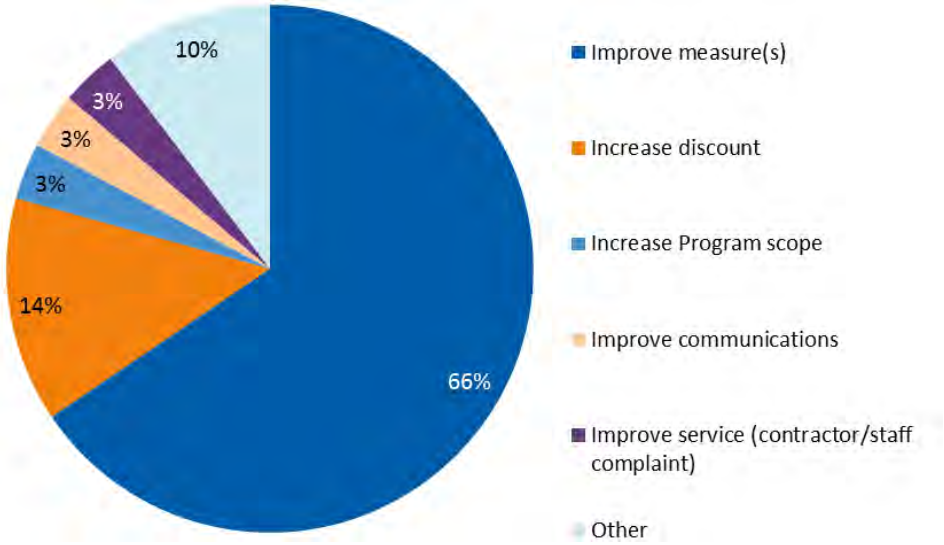
Figure 227. CY 2016 Positive Comments About Small Business Program Measures



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Please indicate below why you gave the energy-efficient product(s) this rating and any suggestions for improvement." (Total positive mentions: n=66)

Suggestions for improving measures are shown in Figure 228. The most frequent of these comments reflect negative comments about the equipment that was installed. Since lighting measures dominate the program, most of these comments are about lighting not being bright enough or as aesthetically pleasing as the lighting that had been replaced. Issues with cost (discounts and payback) were occasionally reported (14% of mentions).

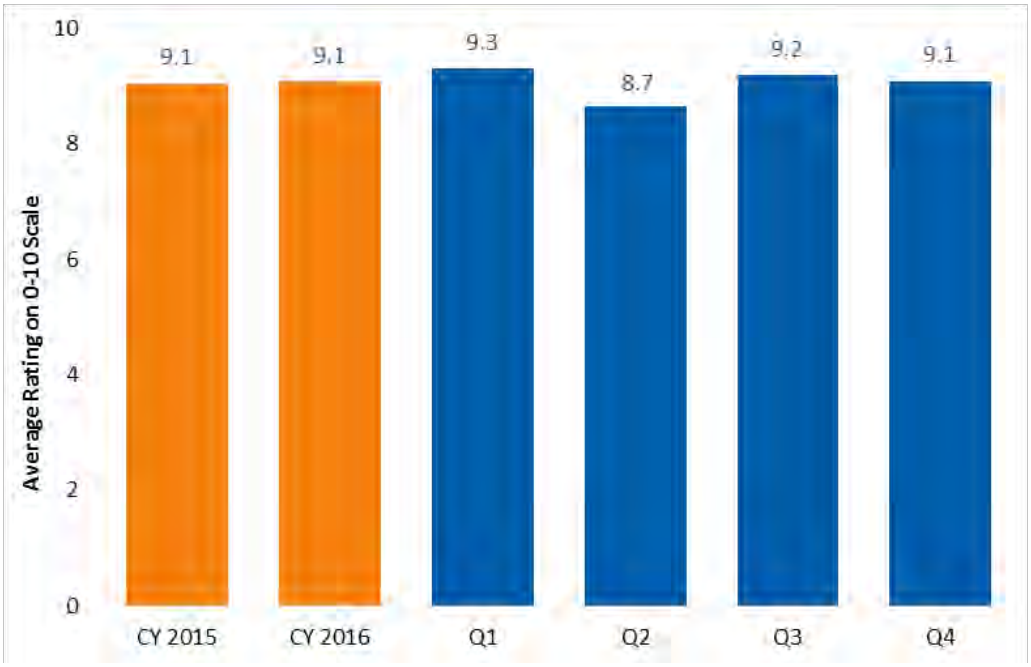
Figure 228. CY 2016 Suggestions for Improvement for Small Business Program Measures



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Please indicate below why you gave the energy-efficient product(s) this rating and any suggestions for improvement." (Total suggestions for improvement mentions: n=29)

Respondents gave an average rating of 9.1 for their satisfaction with their contractor (Figure 229), which was the same and not significantly different from the average rating of 9.1 in CY 2015.

Figure 229. CY 2016 Satisfaction with Small Business Program Contractors

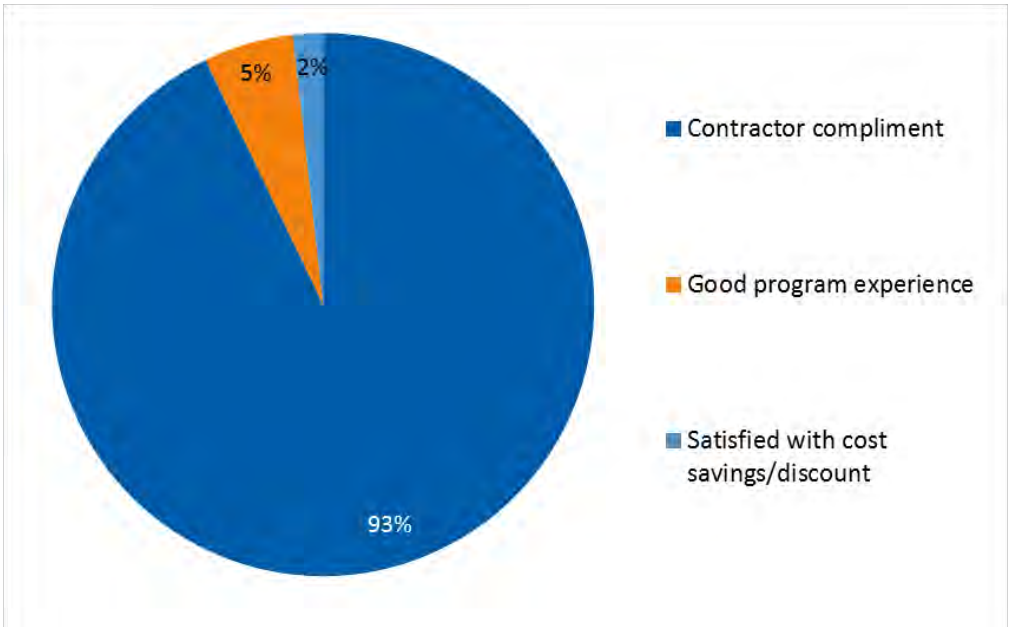


Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the contractor who provided the service?" (CY 2015 n=256, CY 2016 n=200, Q1 n=26, Q2 n=41, Q3 n=44, Q4 n=72)

The Evaluation Team also asked participants if they had any additional comments or suggestions for improvement regarding their Trade Ally. Of the 202 participants who responded to the survey, 71 (or 35%) provided open-ended feedback, which the Evaluation Team coded into a total of 84 mentions. Of these mentions, 56 were positive or complimentary comments (67%), and 28 were suggestions for improvement (33%).

The positive responses are shown in Figure 230. A large majority of these comments relayed examples of Trade Allies meeting or exceeding expectations. Common themes were the politeness and professionalism of Trade Ally staff, positive communications, timeliness, and flexibility in accommodating the customer schedule.

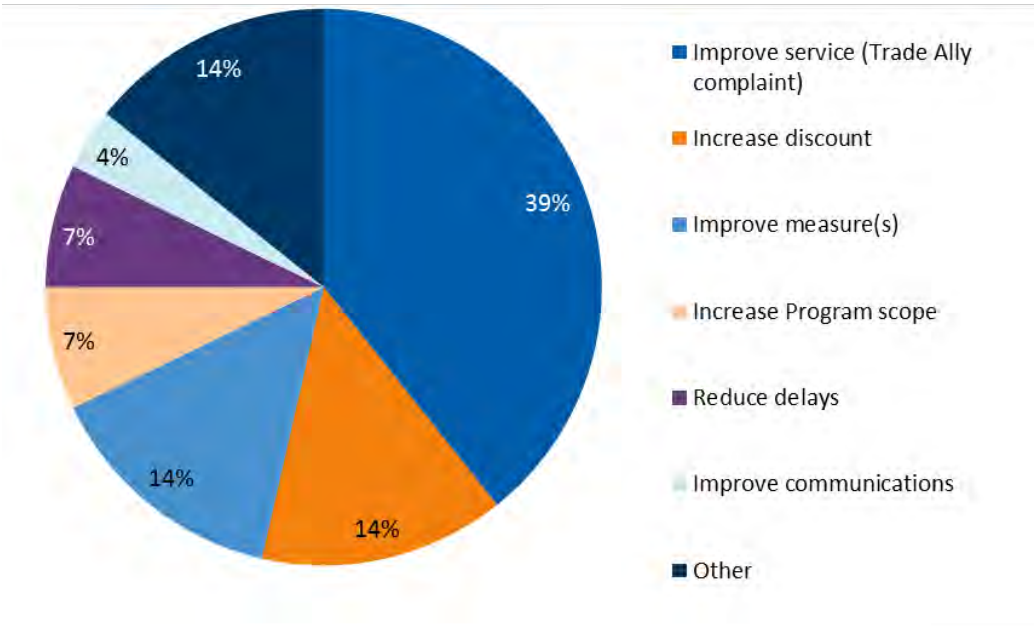
Figure 230. CY 2016 Positive Comments About Small Business Program Trade Allies



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience with this Trade Ally and any suggestions for improvement."
(Total positive mentions: n=56)

Figure 231 shows suggestions for Trade Ally improvements: the most frequent of these comments reflect disappointing service from the Trade Ally, ranging from contractors not leaving clean workspaces, disposing of items improperly, and causing minor damage to customer property, to contractors being rude and appearing disorganization. However, positive comments about Trade Allies far outpaced criticisms (52 compliment mentions compared to 11 complaints). A number of suggestions for improvement reflected Program areas where Trade Allies have limited authority, such as increasing the discount amounts (12%) and increasing the program scope (7%).

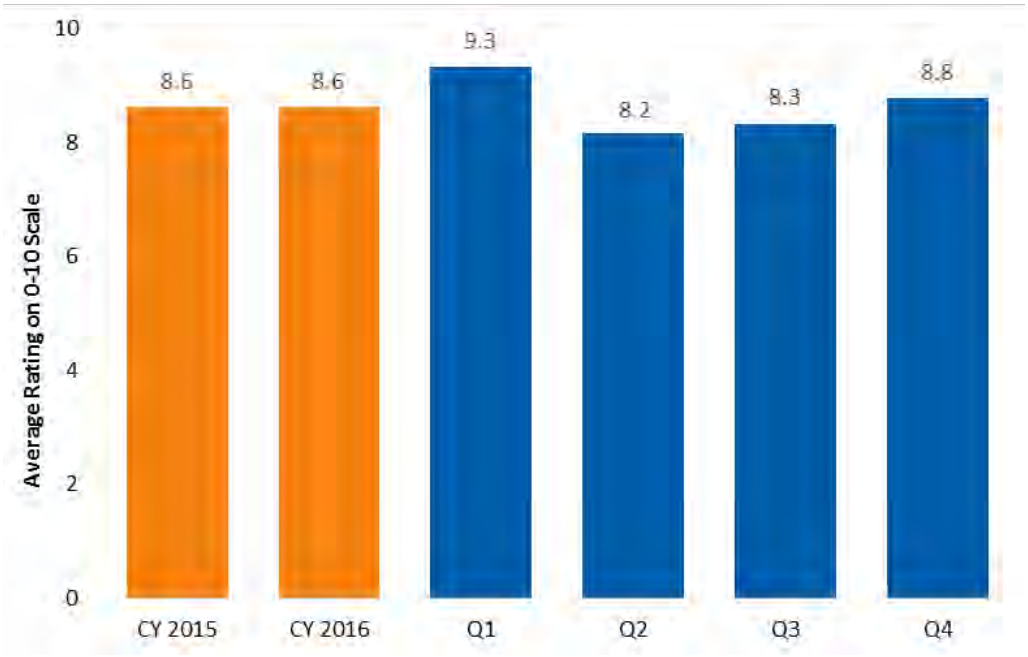
Figure 231. CY 2016 Suggestions for Small Business Program Trade Ally Improvement



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience with this Trade Ally and any suggestions for improvement."
(Total suggestions for improvement mentions: n=28)

Respondents gave an average rating of 8.6 for their satisfaction with the discount they received (Figure 232), unchanged from the average rating in CY 2015. Average ratings during Q1 (9.3) were significantly higher than the average rating from CY 2015, but the remaining CY 2016 quarterly ratings were not significantly different from the previous year.[197]

Figure 232. CY 2016 Satisfaction with Small Business Program Discounts

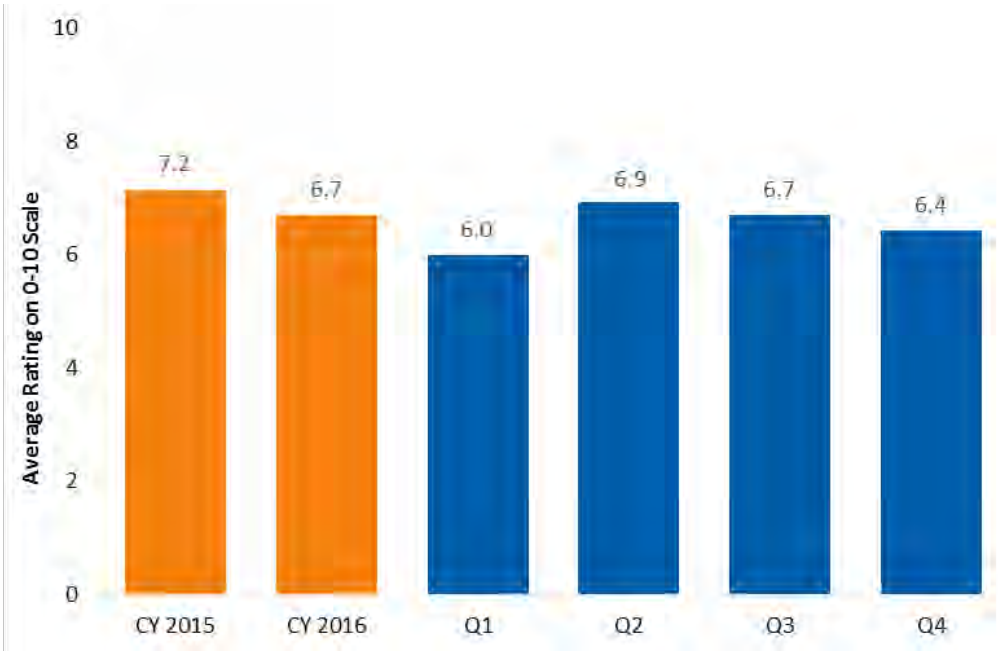


Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "How satisfied are you with the amount of discount you received?" (CY 2015 n=256, CY 2016 n=184 Q1 n=21, Q2 n=37, Q3 n=42, Q4 n=67)

[197] $p < 0.05$ using a binomial t-test.

Figure 233 shows that respondents' average rating for the likelihood they will initiate another energy efficiency project in the next 12 months was 6.7. The difference compared to the 7.2 rating in CY 2015 is not statistically significant.

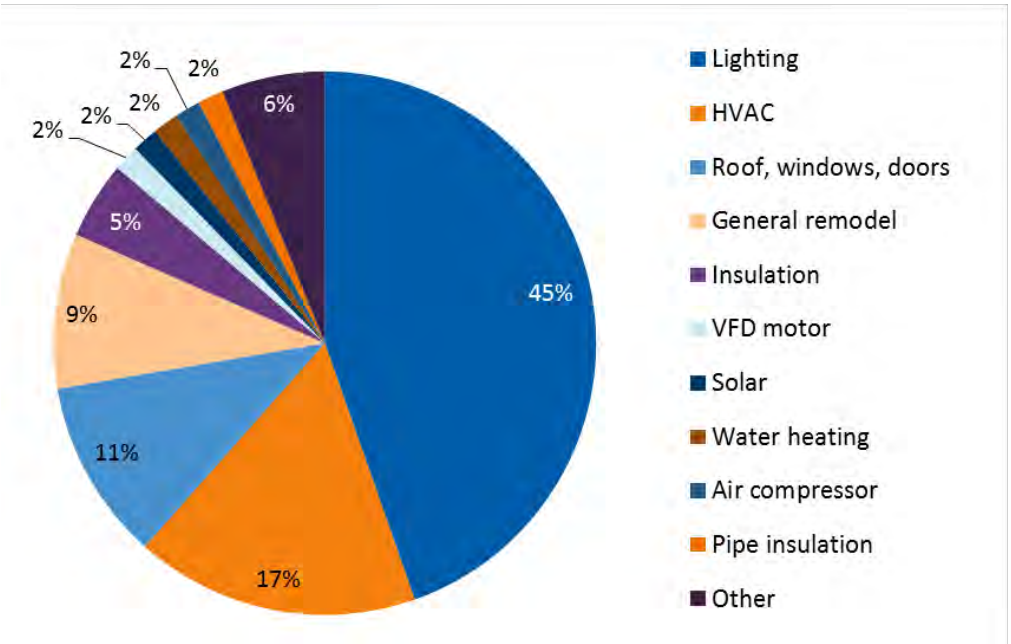
Figure 233. CY 2016 Likelihood of Initiating Another Energy Efficiency Improvement



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "How likely are you to initiate another energy efficiency improvement in the next 12 months?" (CY 2015 n=206, CY 2016 n=158, Q1 n=18, Q2 n=31, Q3 n=33, Q4 n=60)

Survey respondents also shared what improvements they are considering. Of the 202 participants who responded to the survey, 62 (or 31%) provided specific examples, which the Evaluation Team coded into a total of 65 mentions shown in Figure 234. Nearly half of the projects mentioned are lighting measures (45%), followed by HVAC upgrades (17%), and roofs, windows, and doors (11%).

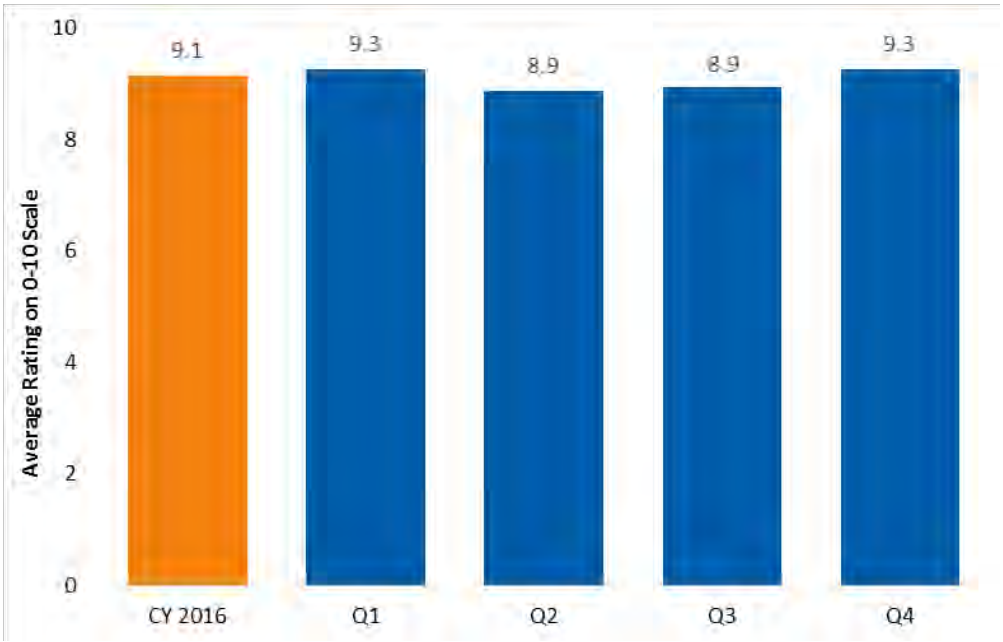
Figure 234. CY 2016 Intentions for Future Improvements



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "What improvements do you plan to complete over the next 12 months, if applicable?" (Total mentions: n=65)

Figure 235 shows that respondents' average rating for the likelihood they would recommend this Program to other small businesses was 9.1.[198]

Figure 235. CY 2016 Likelihood of Recommending the Small Business Program



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "How likely is it that you would recommend this program to other small businesses?" (CY 2016 n=190, Q1 n=23, Q2 n=37, Q3 n=43, Q4 n=70)

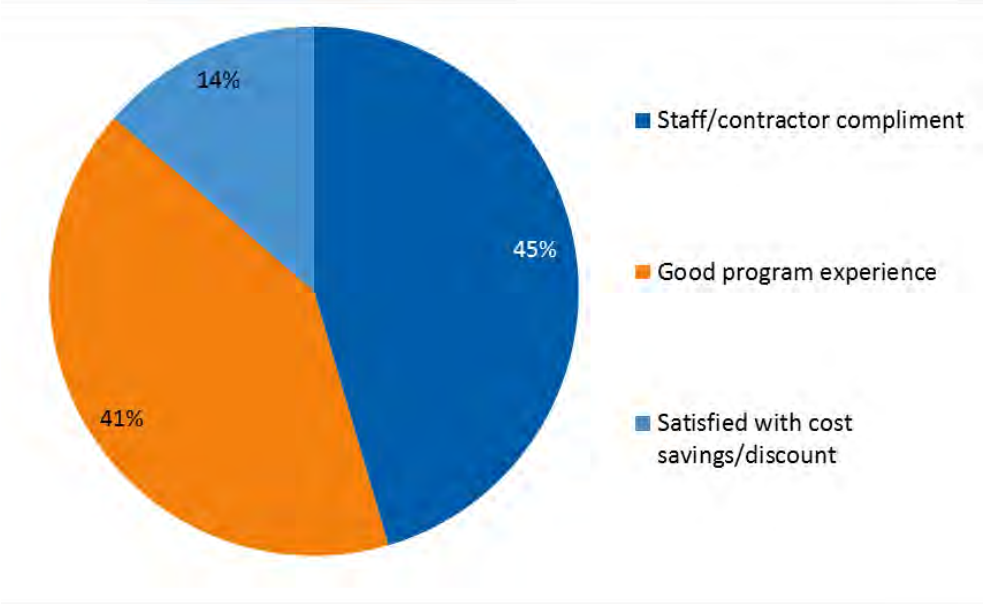
Using these survey data, the Evaluation Team calculated a NPS based on customers' likelihood to recommend the Program. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Small Business Program NPS is +74, based on 80% of participants identifying as promoters and 6% identifying as detractors.

At the conclusion of the ongoing customer satisfaction survey, respondents answered whether they had any additional comments or suggestions for improving the Program. Of the 202 participants who responded to the survey, 31 (or 15%) provided open-ended feedback, which the Evaluation Team coded into a total of 39 mentions. Of these mentions, 22 were positive or complimentary comments (56%), and 17 were suggestions for improvement (44%).

[198] Customers who responded that they already have recommended the Program are counted as a rating of 10 (most likely).

The positive responses are shown in Figure 236. Most of these comments reflect a generally positive experience (41%) or compliments about the contractor (45%), which were also the most common comments in CY 2015.

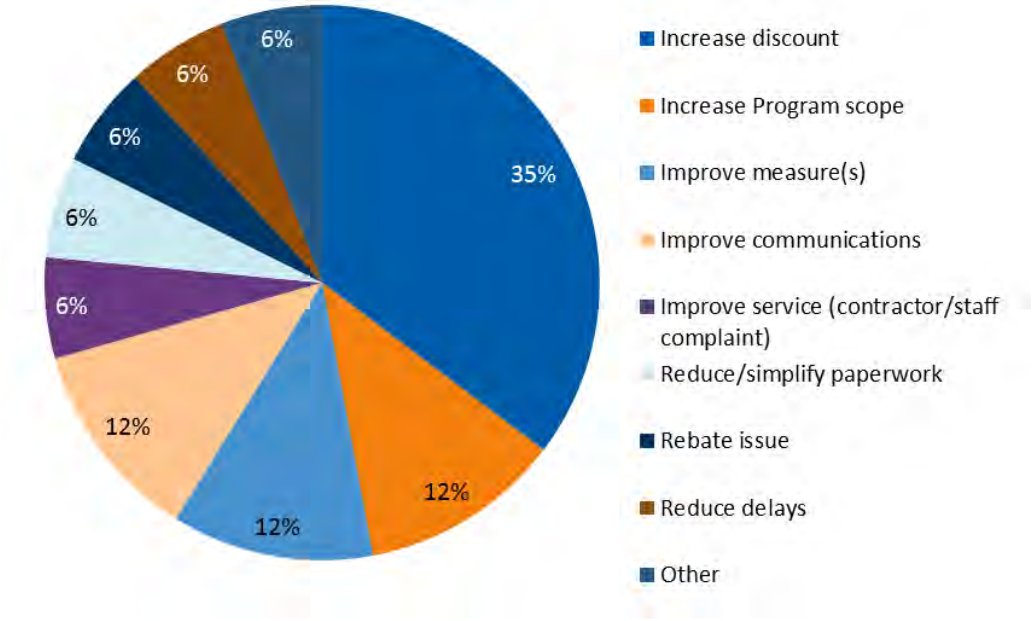
Figure 236. CY 2016 Positive Comments About the Small Business Program



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total positive mentions: n=22)

Suggestions for improvement are shown in Figure 237. The most frequent of these comments reflect dissatisfaction with discount amounts (35%), with no other category being mentioned by more than two respondents. Only one surveyed customer reported a service issue in CY 2016 (6% of 17 mentions), which was customers' most commonly mentioned area for improvement in CY 2015 (19%; nine of 48 mentions).

Figure 237. CY 2016 Suggestions for Improving the Small Business Program



Source: Small Business Program Ongoing Participant Satisfaction Survey Question: "Please tell us more about your experience and any suggestions." (Total suggestions for improvement mentions: n=17)

Trade Ally Experience

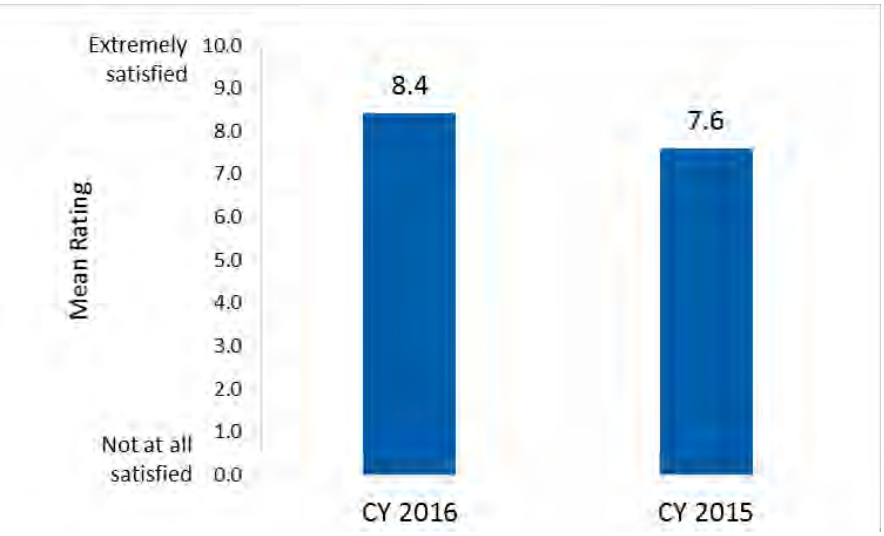
In CY 2016, the Evaluation Team invited 65 registered Small Business Program Trade Allies to take an online survey, and obtained 18 completes. With the survey, the Team investigated topics such as satisfaction, incentives, Energy Snapshot, business impacts from the Program, and suggestions for improvement. The following sections describe the survey findings for these topics.

Satisfaction

As shown in Figure 238, Trade Ally satisfaction with Focus on Energy in CY 2016 improved from CY 2015. Although the sample size was too small to verify whether the difference was statistically significant, CY 2016 respondents (n=17) gave a mean rating of 8.4 for overall satisfaction with Focus on Energy, on a 10-point scale where 0 means *not at all satisfied* and 10 means *extremely satisfied*. In contrast, CY 2015 respondents (n=25) gave a mean rating of 7.6.[199]

[199] The Evaluation Team did not statistically test for significant differences between the mean ratings in CY 2016 and CY 2015. Statistical tests must meet the sample size assumption of n≥20 respondents in each group, which CY 2016 (n=18) did not meet.

Figure 238. Trade Ally Satisfaction with Focus on Energy



Source: Participating Trade Ally Survey Question F5. "On a 10-point scale where 0 means *not at all satisfied* and 10 means *extremely satisfied*, how satisfied are you with Focus on Energy overall?" (CY 2016 n=17; CY 2015 n=25)

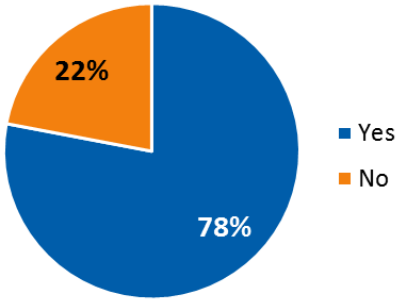
The high Trade Ally satisfaction with Focus on Energy may be associated with their improved satisfaction with Energy Advisors in CY 2016 compared to CY 2015. Although the sample size was too small to verify whether the difference was statistically significant, in CY 2016, 89% of respondents (n=18) said they were *very satisfied* with the Program support they receive from the Energy Advisors, compared to just 61% (n=18) in CY 2015.

Moreover, 50% of the CY 2016 respondents (n=18) ranked their Energy Advisor as the number one source for staying up-to-date with the Program, compared to 28% in CY 2015 (n=18). One respondent, eager about the CY 2017 Program year, said, "At this point, I am unsure who our advisors will be less than a month from now. We are very concerned [about] where the Program is going in the next few years." This comment not only stresses the importance of the Energy Advisor role in being a familiar face for Program participants, but also reveals that Focus on Energy will have to help Trade Allies navigate as the Program is transitioned to a new Program Implementer in CY 2017.

Incentives

Focus on Energy reduced the incentive amounts in CY 2016 across all nonresidential programs, including the Small Business Program. In the Trade Ally survey, respondents answered whether they were aware of the reduced incentives. As shown in Figure 239, 78% of the respondents (n=18) said they were aware. Of those who were aware (n=14), half said the incentive reduction did not change how much they promoted Focus on Energy programs, but 36% said the incentive reduction caused them to not promote programs as often.

Figure 239. Trade Ally Awareness of Reduced Incentives



Source: Participating Trade Ally Survey Question H1. "Were you aware that Focus on Energy reduced incentives in 2016 across all of their nonresidential programs?" (n=18)

Surveyed Trade Allies also indicated their agreement with the statement, "I am satisfied with the current incentive amounts for the Small Business Program." Respondents showed satisfaction with the current incentive amounts, with 28% saying they *strongly agreed* with the statement, 56% indicating they *somewhat agreed*, and 17% saying they *somewhat disagreed* (n=18).

About one-quarter of the respondents (28%) reported performing jobs in states other than Wisconsin. Of these five respondents, three were less satisfied with Wisconsin's Focus on Energy incentives compared to incentives from other states.

Energy Snapshot

For Trade Allies, the Program has become synonymous with the tablet device that houses Energy Snapshot, as evidenced by the following respondent comments:

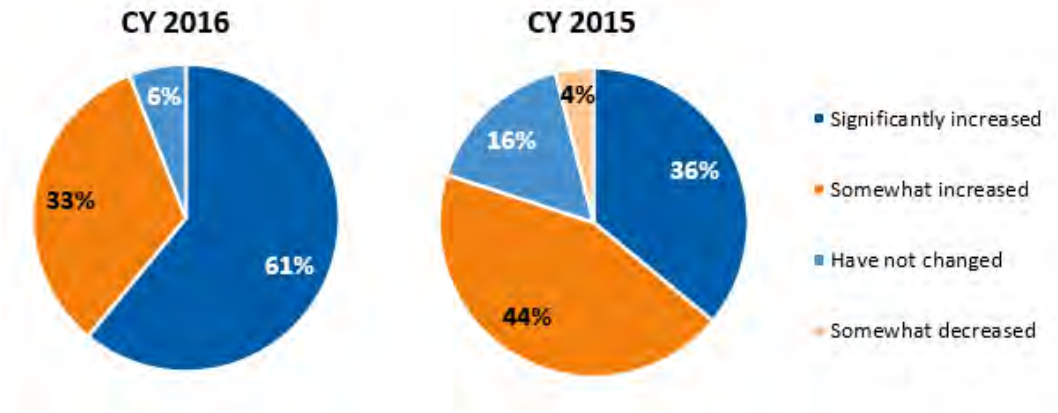
- "The current iPad program works great for us."
- "All incentive programs should be on an iPad like the Small Business Program."
- "I like how the Small Business Program is set up with the iPad."

As described earlier, Focus on Energy made Program enhancements to the Energy Snapshot tool in CY 2016. In the Trade Ally survey, respondents indicated their agreement with the statement, "The usability of the Energy Snapshot tool has improved since last year." Respondents noted an improvement in Energy Snapshot's usability: 41% *strongly agreed* with the statement, 35% *somewhat agreed*, 6% *somewhat disagreed*, and 18% said they did not know (n=17).

Program Impacts on Business

The impacts from the Program on Trade Ally businesses increased in CY 2016 from CY 2015. In CY 2016, 94% of respondents reported an increase in sales volume due to involvement with Focus on Energy, with 61% reporting a *significant* sales increase. In CY 2015, 80% of respondents reported an increase in sales, with 36% specifying a *significant* increase. Figure 240 shows a side-by-side comparison of changes in sales volume between the two Program years.

Figure 240. Changes in Trade Allies' Sales Volume Due to Focus on Energy



Source: Trade Ally Survey Question E2. "How has the volume of your sales changed as a result of your involvement with Focus on Energy?" (CY 2016 n=18; CY 2015 n=25)

LEDs have the greatest impact on Trade Ally business, as well as being on top of mind. Respondents emphasized LEDs several times throughout the survey:

- All 18 respondents said that between LEDs and CFLs, LEDs have had the greatest impact on their Focus on Energy projects and business.
- All 18 respondents said the product that customers are most interested in is LEDs.
- Two Trade Allies said "LEDs" as one of the first three words that come to mind when they think of Focus of Energy.

Suggestions for Improvement

Most respondents (72%, n=18) offered suggestions for what Focus on Energy could do to improve the Program. Respondents gave a variety of suggestions, most often mentioning LED products, as highlighted by the following comments:

- "[Offer] more LED-approved products, [such as] relamp with LED and LED corn lamps."
- "[Offer] an incentive for 'corn cob' LED lamps. New fixtures are very expensive and they don't have the same footprint as the one you are replacing."
- "A little wiggly room on the 100 kW threshold might be nice. I have had a few small businesses that could really use the added incentive but were slightly over, because of refrigeration demands I assume."

Participant Demographics

Based on data collected through the Small Business Program participant survey, the Evaluation Team determined the following demographic information (n=70):

- 73% of respondents own their business facility
- 33% of respondents work in the retail or wholesale industry, 14% in the food service or restaurant industry, 13% in other industries (cleaning, dental, IT, and entertainment), 10% in the nonprofit/churches/schools industry, and 6% in the finance/insurance/real estate industry
- Respondents employ an average of 9.2 people at their business facility
- 97% of respondents have not attended any trainings offered by Focus on Energy

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 276 lists the CY 2015 and CY 2016 incentive costs for the Small Business Program.

Table 276. Small Business Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$4,142,650	$3,759,992

The Evaluation Team found the CY 2016 Program was cost-effective (2.99). Table 277 lists the evaluated costs and benefits.

Table 277. Small Business Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$313,672	$337,049
Delivery Costs	$1,280,855	$1,376,311
Incremental Measure Costs	$10,818,975	$8,398,051
Total Non-Incentive Costs	**$12,413,501**	**$10,111,411**
Benefits		
Electric Benefits	$31,802,438	$24,317,163
Gas Benefits	$179,719	$162,637
Emissions Benefits	$5,193,825	$3,992,762
Total TRC Benefits	**$37,175,982**	**$28,472,561**
Net TRC Benefits	**$24,762,480**	**$18,361,150**
TRC B/C Ratio	**2.99**	**2.82**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. The no package model, improved marketing and outreach, and strong Trade Ally engagement contributed to the Small Business Program meeting its CY 2016 demand reduction and electric savings goals.

For many years, Focus on Energy had used the Program package model to offer different amounts and levels of products and savings. This caused confusion for customers, Trade Allies, and Utility Partners, who could not determine what products were part of which packages and differences between packages. Adopting the no package model in CY 2016 makes it easier for Trade Allies to work with customers and offers greater flexibility for customers in making decisions about measures.

Also in CY 2016, the Program Implementer updated and created new marketing materials, promoted participant testimonials on social media, and targeted bars and restaurants for the new refrigeration offerings. Though not statistically significant, the Program experienced greater word-of-mouth leads and greater customer-initiated Program inquiries in CY 2016 than in CY 2015.

The Program Implementer also worked to engage Trade Allies in CY 2016, through outreach efforts such as hosting multiple trainings, disseminating Program information via Energy Snapshot, and recognizing stellar Program performance. These outreach efforts boosted Trade Allies' Program familiarity, Program promotion, and satisfaction.

Recommendation 1. Retain key successful Program elements as the Program is transitioned to a new implementer in CY 2017. Constant changes to the Program, like changing the Program model, can confuse Trade Allies and customers, and creates the need to re-offer the trainings and re-write the marketing materials. Maintain key successful Program elements (such as the no package model and marketing/outreach efforts) to help build consistency and save on Program operation costs even with a new implementer.

Outcome 2. The Small Business Program required an unplanned budget need in the second half of the year to ensure that customers were served.

In CY 2016, Program Implementers across the Business Portfolio faced budget constraints, necessitating a more proactive management of incentive budgets. The Small Business Program initially received a smaller incentive budget in CY 2016 than that of CY 2015, since Focus on Energy reduced incentive amounts across all nonresidential programs in CY 2016. Halfway through the year, the Program Administrator requested and received an additional $500,000 in incentive funding for the Program to continue through the end of the year: this request primarily reflected the need at the beginning of the year for additional measures and incentive planning to manage to the budget. Most Trade Ally survey respondents (78%) were aware of the incentive reduction, and half of those who were aware did not change how much they promoted Focus on Energy programs as a result. The majority of Trade Ally respondents (84%) also agreed that they are satisfied with the current incentive amounts.

Recommendation 2. Consider other ways of rewarding Trade Allies for Program work to help stretch the incentive budget. The Program Administrator managed to secure additional Program funds at the last minute in CY 2016, but additional funds may not be granted every year. Trade Allies do not appear to be solely motivated by the Program incentives, suggesting that they may welcome other forms of reward. Other ways of rewarding Trade Allies could include paying for further technical education and training, having end-of-year prize drawings (e.g., tablet and mobile devices), and offering free marketing (such as having a featured Trade Ally on Focus on Energy's social media).

Outcome 3. LEDs dominated product installations and drove customer participation in the Small Business Program in CY 2016.

All 18 Trade Ally respondents said the product that customers are most interested in is LEDs. LEDs provide aesthetic value and serve as a compelling driver of participation for small businesses: 84% of CY 2016 respondents said LEDs improved aesthetics (such as the products themselves looking better or helping the business look better), and 72% said LED products were *very important* in their decision to participate in the Program.

Even though LEDs attracted customers to the Program, the Program Administrator explained that as an LED-driven Program, there was an imbalance between costs and energy savings, and said that diversification in product installations would be needed to strike a balance. Hence, Focus on Energy introduced refrigeration products in CY 2016. However, the rollout of refrigeration products experienced a delay, taking place halfway through the year (which explains why just 13% of participant respondents were aware of the refrigeration offerings). Even though Trade Allies received specific refrigeration trainings, nearly half of Trade Ally respondents were not familiar with the refrigeration offerings. At the end of CY 2016, refrigeration represented 5% of the total products installed through the Program and LEDs represented 76%.

The CY 2016 Program generated a TRC benefit/cost ratio of 2.99, making it more cost-effective than the 2.82 in CY 2015. The additional $500,000 in incentive funding for the Program plus the strong performance from LEDs likely contributed to the Program's higher cost-effectiveness. With only a short offering period for the refrigeration products in CY 2016, the Evaluation Team could not clearly determine the impacts of these products on costs and energy savings. The Team will obtain more information about impacts in the CY 2017 evaluation.

Recommendation 3. Work with Trade Allies to develop customer opportunities and incentives that encourage the installation of non-LED products. Although the Program moved away from the package model and diversified its product offerings, the Program products customers purchased most were LEDs. The Program may want to adjust or try out a new program design that still offers the products that customers are interested in the most, as well as introducing them to other products.

Outcome 4. Energy Advisors played a pivotal role in Trade Ally communication and satisfaction.

Trade Ally satisfaction with Focus on Energy in CY 2016 improved from CY 2015. CY 2016 respondents gave a mean rating of 8.4 for overall satisfaction with Focus on Energy, compared to a mean rating of 7.6

from CY 2015 respondents. It is notable that Trade Ally satisfaction with Energy Advisors also improved in CY 2016 from CY 2015. In CY 2016, 89% of respondents were *very satisfied* with the Program support they receive from the Energy Advisors, compared to 61% of CY 2015 respondents. Moreover, 50% of the CY 2016 respondents ranked their Energy Advisor as the number one source for staying up-to-date with the Program, compared to 28% in CY 2015. As the Program transitions to a new implementer, Energy Advisors may be a key Program stakeholder.

Recommendation 4. Get Energy Advisors more involved in Trade Ally outreach efforts and Program communications, in order to increase their Program support and consolidate their technical expertise and project work. This can include inviting Energy Advisors to trainings and Tavern League events, or developing an Energy Advisor chat line where Trade Allies can instantly communicate Program issues and questions to an Energy Advisor.

Outcome 5. The CY 2016 Small Business Program largely attracted one-time participants who have the potential to be guided towards participation in other energy efficiency programs.

One marketing objective of the CY 2016 Small Business Program was to re-engage past participants, though there was not a set target amount. The Evaluation Team found that from CY 2014 through CY 2016, the Program attracted mostly new or one-time participants (91%) instead of repeat participants (9%). Nevertheless, one-time participants can be guided to other programs and energy efficiency opportunities: half of participant respondents said they are *very likely* or *somewhat likely* to complete another energy-efficient upgrade in the next 12 months.

Small businesses also reported less of a chain of command burden compared to other nonresidential customers, with 67% saying they do not require approval from someone else in the business for making energy-efficient upgrades (compared to 50% of Business Incentive Program respondents, 37% of Multifamily Energy Savings Program respondents, and 16% of Large Energy User Program respondents). Their high likelihood to complete another upgrade, combined with having a lesser chain of command burden, make Small Business participants good candidates for continual engagement.

Recommendation 5. Identify one-time participants with the greatest propensity to participate in another program for follow-up energy assessments with Trade Allies or Energy Advisors. Trade Allies, with their frequent face-to-face customer interactions, can help identify participants who are more likely to participate in additional energy efficiency opportunities. Have the follow-up energy assessments take place six to 12 months after installation, with questions focused on whether the products met participant expectations and their further interests in energy-efficient upgrades.

Outcome 6. Measures which were not supported by current approved workpapers drove the deviation of evaluated savings from expected (*ex ante*) values.

The Wisconsin TRM is made up of workpapers which have been reviewed and accepted by stakeholders. There are also a number of accepted workpapers which are not included in the TRM but are still used to support SPECTRUM savings values. Finally, a number of measures in SPECTRUM are not supported by the current TRM or current accepted workpapers, but rather are based on old, outdated workpapers or

other substandard documentation. These active measures with insufficient documentation are a major source of deviation from expected savings values, since the Evaluation Team must rely upon other algorithms, input parameters, and sources.

Recommendation 6. Increase the measure management process rigor to mitigate the effects of old or insufficient documentation on current program savings. Consider employing sunset dates on all measures to restrict how long a measure savings value can persist in the SPECTRUM database. Consider, also, creating an "opt-in" process where only those measures with current, approved methodology are listed for use in the current program year database.

Renewable Energy Competitive Incentive Program

The Renewable Energy Competitive Incentive Program (RECIP, or the Program) offers financial incentives for eligible, cost-effective renewable-energy projects to Wisconsin business customers through a competitive bid process. The Program Administrator selects winning proposals and the Program Implementers (Franklin Energy, CESA, and Leidos) process the awarded projects similar to the custom program path requirements of the Business Incentive, Agriculture, Schools, and Government, and Large Energy Users programs.

In CY 2016, Focus on Energy offered a revolving loan fund for qualified residential and nonresidential renewable energy projects. Focus on Energy did not release RFPs for renewable funding through RECIP in 2016, but it did allocate incentives for previously awarded RECIP projects that closed in 2016. In November 2016 the PSC determined that, due to low uptake and market barriers associated with the loan fund, and continued indications of high demand for financial incentives, Focus on Energy would discontinue the loan fund in CY 2017 in favor of offering RECIP incentives through RFPs. Evaluation results of the revolving loan fund are detailed in the Renewable Energy Loan Fund chapter.

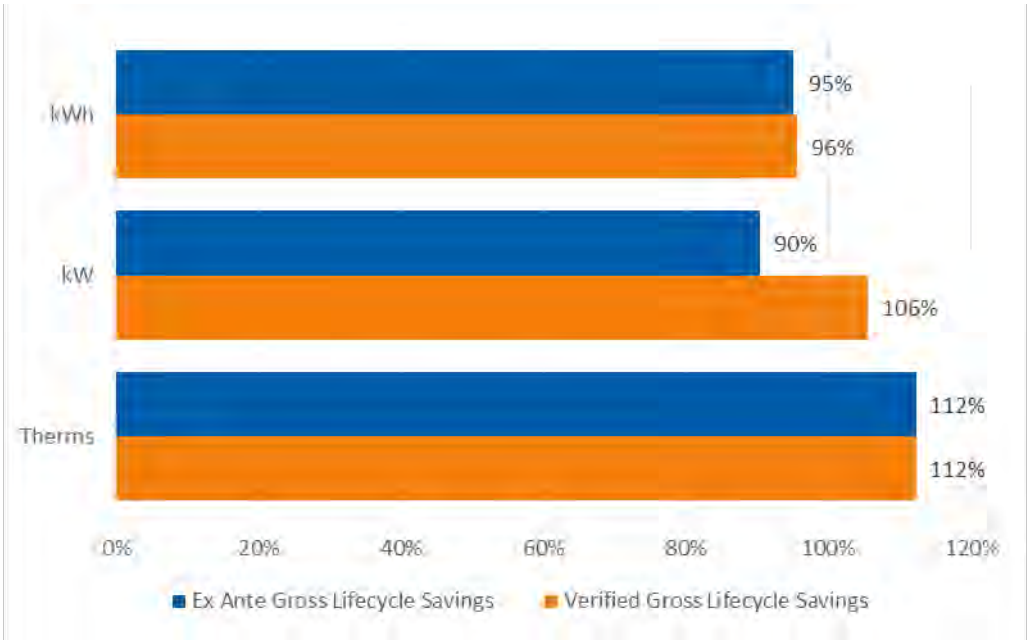
Table 278 lists the actual Program spending, savings, participation, and cost-effectiveness.

Table 278. RECIP Summary

Item	Units	CY 2016	CY 2015
Incentive Spending	$	$2,042,803	$4,122,150
Participation	Number of Participants	13	58
Verified Gross Lifecycle Savings	kWh	175,759,964	291,506,193
	kW	1,543	2,618
	therms	4,688,080	3,912,870
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%	100%
Net Annual Savings	kWh	8,782,106	17,357,479
	kW	1,543	2,618
	therms	245,238	239,698
Annual Net-to-Gross Ratio	% (MMBtu)	100%	100%
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.00	1.53

Figure 241 shows the percentage of gross lifecycle savings goals achieved by RECIP in CY 2016. The Program exceeded its CY 2016 *ex ante* and verified gross therms savings but did not achieve its *ex ante* and verified gross energy savings.

Figure 241. RECIP Achievement of CY 2016 Gross Lifecycle Savings Goal[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Program implementation contract goals for CY 2016. The verified gross lifecycle savings contribute to the Program Administrator's portfolio-level goals.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for RECIP in CY 2016.[200] The Team designed its EM&V approach to integrate multiple perspectives in assessing Program performance. Table 279 lists the specific data collection activities and sample sizes used in the evaluations.

Table 279. RECIP Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Tracking Database Review	Census
Online Participant Surveys	4
Participant Phone Interviews	2
Engineering Desk Reviews	25
Verification Site Visits	10

[200] In its desk review and site visit samples, the Evaluation Team included projects completed in both CY 2015 and CY 2016. As CY 2015 projects had not previously been evaluated, there were no notable differences between the two Program years for this group, and the larger sample resulted in better confidence and precision in the results.

Tracking Database Review

The Evaluation Team review of the census of the Program SPECTRUM tracking data involved these tasks:

- Thoroughly reviewing the data to ensure the SPECTRUM totals matched the totals reported by the Program Administrator
- Reassigning adjustment measures to measure names
- Checking for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Participant Surveys and Interviews

The Evaluation Team surveyed a census of photovoltaic (PV) and biogas participants to achieve 90% confidence at ±10% precision at the measure level. The Evaluation Team fielded an online survey to PV participants and received four responses. It fielded a phone survey with biogas participants and received two responses. Survey topics included Program awareness, satisfaction with Program processes, demographics, freeridership, and spillover.

Engineering Desk Reviews

The Evaluation Team randomly selected 25 PV systems to review in order to calculate Program realization rates. The Team used the PVWatts calculator and information from each participant's application to estimate verified gross savings.[201] Of the 25 applications, 10 were selected for on-site inspections to verify the information contained within each application.

Verification Site Visits

Cadmus conducted site visits for 10 PV projects, which were selected from the projects that received a desk review because their realization rate was greater than one standard deviation above or below the mean. For each project, the Evaluation Team verified system components and system configuration, including site characteristics such as tilt, azimuth, and shading of the PV arrays. The Evaluation Team also inspected the installation quality and workmanship and noted any obvious defects.

Impact Evaluation

This chapter provides impact evaluation findings for RECIP, based on the following methods:

- Tracking database review
- Participant surveys and interviews
- Engineering reviews
- Site visits

[201] National Renewable Energy Laboratory. "PVWatts Calculator." Accessed March 2017: http://pvwatts.nrel.gov/

Evaluation of Gross Savings

The Evaluation Team reviewed CY 2016 tracking data and measure-level inputs from participant interviews, desk reviews, and site visits and applied the results to the gross savings.

Tracking Database Review

As a part of the tracking database review, the Evaluation Team assessed the census of the CY 2016 RECIP data contained in SPECTRUM. The Team reviewed data for appropriate and consistent application of unit-level savings values and EUL values in alignment with the applicable Wisconsin TRM. If the measures were not explicitly captured in the Wisconsin TRM, the Team referenced secondary sources (deemed savings reports, work papers, other relevant TRMs, and published studies).

The Evaluation Team found no discrepancies or data issues for the Program as part of the review.

Engineering Desk Reviews

The Evaluation Team calculated verified gross savings for 25 participants. During the desk reviews, the Evaluation Team reviewed each application for key system characteristics such as tilt, system size, and azimuth then identified the sites in Google Earth to confirm key orientation details and the accuracy of reported shading. Finally, the Evaluation Team entered the resulting parameters into PVWatts and created an hourly generation profile that produced results for both the annual electricity generation and peak load reduction.

The Evaluation Team attempted to complete desktop reviews of biogas systems but was unable to do so without knowledge of the actual feedstock inputs used in each system. The Evaluation Team reviewed documents received from the Program Administrator; however, these documents did not provide sufficient detail to verify energy yield calculations. (The Evaluation Team provides suggestions for data collection improvements in the *Evaluation Outcomes and Recommendations* section.) After the initial round of desk reviews, the Evaluation Team obtained copies of project proposals and found that these documents contained the necessary information to verify that the participants and Program Administrator exercised a sound basis for project awards and *ex ante* savings estimates, though the Team was still unable to obtain information necessary to verify calculation inputs and assumptions.

Participant Interviews

The Evaluation Team attempted to conduct phone interviews with biogas participants to gain more information about their systems and ask specifically about fuel used in the system (amount and frequency) and system operational and maintenance history. The Team also sought to verify project documentation of characteristics such as the size of the system, make and model, and efficiency ratings. However, only two of the eight participants were willing to answer questions, and neither could speak to the technical components of their systems. Therefore, the Evaluation Team was not able to calculate verified gross savings for biogas systems.

Verification Site Visits

During the engineering desk reviews, the Evaluation Team flagged 10 PV systems for verification site visit analysis because their site-specific realization rate was greater than one standard deviation above or below the mean (104% ±14.6%) or they had other anomalies. At the site, the Evaluation Team visually inspected the installation, including all major components, measured the available solar resource/shading, and recorded meter readings. The Evaluation Team also documented notable installation deficiencies (e.g., violations of electrical code, deviations from manufacturer instructions) and compared on-site observations to Program records.

The on-site inspections found minimal deviations between actual installations and SPECTRUM records and systems appeared to be operating as expected.

CY 2016 Verified Gross Savings Results

Overall, the RECIP achieved an evaluated realization rate of 100%, weighted by total (MMBtu) energy savings, as shown in Table 280.[202] This result is heavily driven by an assumed 100% realization rate for biogas, based on the Evaluation Team's inability to receive meaningful technical feedback on the completed projects.

Table 280. CY 2016 RECIP Annual Realization Rates by Measure Type

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Biogas	100%	100%	100%	100%	100%	100%	100%	100%
Ground Source Heat Pump	100%	100%	100%	100%	100%	100%	100%	100%
Solar PV	102%	134%	n/a	102%	102%	134%	n/a	102%
Total	**100%**	**117%**	**100%**	**100%**	**100%**	**117%**	**100%**	**100%**

For solar PV, although the *ex ante* and evaluated values were generally similar, the evaluated systems were generating both more energy savings on an annual basis and more peak demand reduction. This similarity in *ex ante* and evaluated values was driven by the RECIP requirement that the participant provide site-specific energy savings calculations, which were generally found to be the same as those completed by the Evaluation Team. To the extent these calculations differed, they were generally from minor differences in modeling assumptions.

Notably, the Evaluation Team found a high realization rate for PV peak demand reduction. In examining the RECIP applications in more detail, the Evaluation Team found that this rate was driven by three submissions (all from the same Trade Ally) that had very low estimated peak demand savings. Although the applications and supporting materials did not contain any detail regarding this calculation, they were

[202] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

much less than the capacity peak demand calculation stipulated in the RECIP RFP.[203] The realization rates (kW) for these three projects ranged from 281% to 351%.

Aside from the three notably high outliers, the Evaluation Team found a 101% median realization rate for peak demand savings, with a range of 70% to 158%, which indicates most applicants were able to provide a reasonably close estimate.

Table 281 lists the ex ante and verified annual gross savings for RECIP for CY 2016.

Table 281. CY 2016 RECIP Annual Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
Biogas	6,489,500	600	201,902	6,489,500	600	201,902
Ground Source Heat Pump	187,326	71	43,336	187,326	71	43,336
Solar PV	2,069,874	651	0	2,105,280	872	0
Total Annual	**8,746,700**	**1,322**	**245,238**	**8,782,106**	**1,543**	**245,238**

Table 282 lists the ex ante and verified gross lifecycle savings by measure type for RECIP in CY 2016.

Table 282. CY 2016 RECIP Lifecycle Gross Savings Summary by Measure Type

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Biogas	129,790,000	600	4,038,040	129,790,000	600	4,038,040
Ground Source Heat Pump	2,809,890	71	650,040	2,809,890	71	650,040
Solar PV	42,434,213	651	0	43,160,074	872	0
Total Lifecycle	**175,034,103**	**1,322**	**4,688,080**	**175,759,964**	**1,543**	**4,688,080**

Evaluation of Net Savings

This section describes the Evaluation Team's methods for estimating the net Program savings based on two key components: freeridership and spillover. The Evaluation Team used participant surveys to assess net savings for RECIP and calculated a NTG ratio of 100% for the CY 2016 Program.

Freeridership

The Evaluation Team used the self-report survey method to determine the Program's freeridership for CY 2016. The Team estimated an average self-reported freeridership of 0%, weighted by evaluated savings, from surveys conducted with CY 2016 Program participants. Because of the small analysis sample size in CY 2016, the Team combined CY 2016 participant freeridership responses with those from CY 2015 participants to estimate a freeridership ratio of 0% for the CY 2016 program.

[203] The calculation for capacity peak demand is 0.5 * kW.

RECIP self-reported freeridership estimates for CY 2013, CY 2015, and CY 2016 are shown in Table 283.

Table 283. Historical RECIP Self-Reported Freeridership

Year	Survey Respondents	Percentage of Freeridership
CY 2016	3	0%
CY 2015	32	0%[1]
CY 2013	5	0%

[1] Actual value is 0.1%. Value was rounded to the nearest whole percent.

Spillover

The Evaluation Team determined there was no participant spillover for the Program based on self-report survey data. No survey respondents attributed additional energy-efficient equipment purchases for which they did not receive an incentive to their participation in the Program.

CY 2016 Verified Net Savings Results

To calculate the Program NTG ratio, the Evaluation Team combined the self-reported freeridership and spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

This yielded an overall NTG ratio estimate of 100% for the Program. Table 284 shows total net-of-freeridership savings, participant spillover savings, and total net savings in MMBtu by Program component and overall NTG ratio for the Program.

Table 284. CY 2016 RECIP Annual Net Savings and NTG Ratio

Net-of-Freeridership Savings (MMBtu)	Participant Spillover (MMBtu)	Total Annual Net Savings (MMBtu)	Total Annual Gross Verified Savings (MMBtu)	Program NTG Ratio
54,488	0	54,488	54,488	100%

Table 285 shows the annual net energy impacts (kWh, kW, and therms) by measure for the Program. The Evaluation Team attributed these savings net of what would have occurred without the Program.

Table 285. CY 2016 RECIP Annual Net Savings

Measure	Annual Net		
	kWh	kW	therms
Biogas	6,489,500	600	201,902
Ground Source Heat Pump	187,326	71	43,336
Solar PV	2,105,280	902	0
Total Annual	**8,782,106**	**1,573**	**245,238**

Table 286 shows the lifecycle net energy impacts (kWh, kW, and therms) by measure for the Program.

Table 286. CY 2016 RECIP Lifecycle Net Savings

Measure	Lifecycle Net		
	kWh	kW	therms
Biogas	129,790,000	600	4,038,040
Ground Source Heat Pump	2,809,890	71	650,040
Solar PV	43,160,074	872	0
Total Lifecycle	**175,759,964**	**1,543**	**4,688,080**

Process Evaluation

In CY 2016, the Evaluation Team conducted surveys as part of the process evaluation activities. The Team focused the process evaluation on these key topics for RECIP:

- Participant awareness
- Satisfaction and ease with the Program application process
- Participant demographics

Program Design, Delivery, and Goals

Focus on Energy launched the RECIP in 2012 to offer financial incentives to Wisconsin business customers for eligible cost-effective, renewable energy projects through a competitive bid process. Through the Program, Focus on Energy solicits proposals from eligible business customers for six renewable energy technologies: solar photovoltaic, solar thermal, wind, geothermal, biogas, and biomass.

Program Design

The RECIP did not accept new RFPs in CY 2016, but did process 14 projects that were approved in previous years. The Program Administrator scored and awarded projects that fit these criteria, as listed in the RFP:

- Cost-effectiveness
- Project completion date (with priority for projects with earlier completion dates)
- Focus on Energy impact on project to identify projects where the Focus on Energy incentive is an important consideration for moving the project forward and where applicants are committed to installing the project if awarded an incentive
- Reasonability of savings estimate
- System optimization (e.g., optimization of engineering design to store excess energy or system production alignment with peak demand schedule)

To reduce uncertainty regarding timing of project completion, the Program Administrator also implemented a committed incentive reduction (up to 25%) for projects that were not completed by their proposed completion date. Although applicants were not required to commit to a reduced

incentive for completing projects after their proposed deadline, they received additional proposal points for committing to the funding reduction.

Incentive amounts were calculated based on first-year net energy production (or offset) of the system. Applicants proposed a $/kWh and/or $/therm incentive amount up to $0.50 per kWh produced or up to $1.00 per therm, not to exceed 50% of total project costs. In addition, Focus on Energy capped the maximum total incentives per customer (including both energy efficiency and renewable energy incentives) at $500,000.

Program Management and Delivery Structure

The Program Administrator is responsible for issuing RFPs for the Program's renewable energy incentives, reviewing and scoring the proposals (including technical review conducted by an internal engineering team), selecting winning projects, and signing award letters. The Program Administrator then provides the Program Implementers a list of customer projects and supporting information that includes the customer type and the program for which the customer is eligible (Large Energy User, Agriculture, Schools and Government, or Business Incentive Programs) as well as approved energy savings, annual energy cost, and incentive award.

A Program Implementer is assigned to the customer according to the program for which the customer is eligible. The Program Implementer is responsible for ensuring proper installation of the renewable projects, verifying installed equipment and, in some cases, verifying the accuracy of energy savings estimates. Focus on Energy relies on Trade Allies to inform customers about the Program, help them complete project proposals, and then work with them to complete awarded projects.

Program Changes

In CY 2016 Focus on Energy offered a revolving loan fund for residential and nonresidential customers, which provided 0% interest loans for up to 50% of total qualified renewable energy project costs. Focus on Energy did not release RFPs for renewable funding through RECIP in CY 2016, but the PSC allocated $3.5 million of incentives for previously awarded RECIP projects closing in CY 2016. In mid-CY 2016, the PSC evaluated the effectiveness of the loan fund and determined that Focus on Energy would not continue the loan fund in CY 2017 and would instead continue to offer RECIP. Evaluation results of the revolving loan fund are detailed in the Renewable Loan Fund chapter.

Data Management and Reporting

The Program Implementer tracks projects in SPECTRUM using procedures similar to those used to track custom projects. Once received from the participant or the Trade Ally, the Program Implementer uploads customer documents (workbooks, applications, agreements) into SPECTRUM. The Program Administrator reported no changes to or issues with the current data tracking systems and processes for the Program.

During the course of the evaluation, the Evaluation Team learned that the original RFPs for biogas projects were not included in SPECTRUM. The Evaluation Team requested these files from the Program

Administrator. Once reviewed, this documentation provided substantial additional details and context about biogas projects, such as energy savings calculation assumptions and additional background about the project; however, there was not enough information for the Team to evaluate the energy savings from biogas projects. In order to evaluate energy savings, the Evaluation Team required feedback on actual system operating history, downtime, maintenance, feedstock input, and biogas or electrical output from the system. Without these values, it was not possible to thoroughly evaluate each system's performance against pre-installation estimates.

Customer Experience

The Evaluation Team surveyed four PV participants to assess their Program awareness, satisfaction with Program processes, and demographics.

Program Awareness

All four participants reported that their contractors or vendors are the primary driver for project initiation. Participants also said they had heard about the incentives available for a solar PV project through the Focus on Energy website, communications with utility representatives, and previous participation (Table 287).

Table 287. RECIP Participant Awareness

Participant Awareness Source	Count
Focus on Energy website	2
Contact with utility representative	2
Previously participated in Program/received an incentive	2
Contact with Focus on Energy representative through phone, email, or in person	1
Word of mouth (family, friend, or business colleague)	1

Satisfaction with Program Processes

Respondents reported mixed results with the ease of filling out the proposal paperwork. Two respondents said the paperwork was easy, another said it was somewhat challenging, and one did not respond to this question.

All respondents received their incentive check within two months from when the system was fully installed. Three said the check came in less than six weeks, and one said the check came within eight weeks. All but one respondent were satisfied with the amount of time it took to receive the check; the respondent who reported being less than satisfied had also reported receiving the check in six weeks or less.

The Evaluation Team asked respondents if there was anything that Focus on Energy could do to improve their overall Program experience. Two respondents did not have any recommendations, and two requested increasing the incentive amount. Similar to a response in CY 2015, one respondent requested that Focus on Energy provide an approval on the proposal faster.

Participant Demographics

The Evaluation Team asked respondents about the company they work for. One respondent chose not answer demographic questions. Similar to CY 2015 results, three CY 2016 respondents said their company owned the facility served by the renewable energy project. The three CY 2016 respondents represented facilities that ranged from 18 to 165 employees (with a median size of 81 employees), compared to CY 2015 participants who represented facilities that ranged from two to 1,600 employees (with a median of 17 employees). Respondents represented facilities from a variety of industries—one in the construction industry, one in manufacturing, and one in retail.

Program Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 288 lists the CY 2015 and CY 2016 incentive costs for the RECIP Program.

Table 288. RECIP Program Incentive Costs

	CY 2016	CY 2015
Incentive Costs	$2,042,803	$4,122,150

The Evaluation Team found the CY 2016 Program was narrowly not cost-effective (1.00). Table 289 lists the evaluated costs and benefits.

Table 289. RECIP Program Costs and Benefits

Cost and Benefit Category	CY 2016	CY 2015
Costs		
Administration Costs	$2,547	$36,371
Delivery Costs	$10,400	$148,518
Incremental Measure Costs	$17,797,612	$16,911,818
Total Non-Incentive Costs	**$17,810,559**	**$17,096,707**
Benefits		
Electric Benefits	$11,996,471	$19,740,127
Gas Benefits	$3,464,752	$2,890,415
Emissions Benefits	$2,292,591	$3,562,607
Total TRC Benefits	**$17,753,814**	**$26,193,149**
Net TRC Benefits	**($56,745)**	**$9,096,443**
TRC B/C Ratio	**1.00**	**1.53**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Program.

Outcome 1. The Program is providing more savings than expected for PV systems for both demand and energy savings. Of the expected benefits, the solar PV systems funded through RECIP are providing 102% for energy savings and 134% for demand savings.

Recommendation 1. As the *ex ante* and verified gross savings values are similar for electricity generation, the Evaluation Team encourages the Program to continue requiring site-specific energy savings and generation analyses. Given the variability and some notable outliers in the results for peak demand reduction, consider emphasizing the appropriate calculation method for Trade Allies, applicants, and the Program Administrator to use for estimating the peak demand reduction of solar PV systems funded through RECIP.

Outcome 2. Desktop reviews and site visits were a useful method for evaluating solar PV systems. The application files provided suitable detail for analysis and modeling of performance, informed by supplemental data gathered during site visits.

Outcome 3. Biogas projects posed a challenge for evaluation on two points:

- Surveyed customers were not forthcoming with information, or did not have information, regarding key system performance characteristics such as feedstock input rates, electricity generation, or the operational history of their systems.
- Minimal data was available to determine the generation attributable to biogas systems, as the Evaluation Team did not have access to meter readings, feedstock logs, or other engineering details about the systems.

Recommendation 3a. Consider providing biomass and biogas participants who receive RECIP funding with training materials in the operation of their respective systems, including how the efficiency rating affects the overall production of the system and how different feedstocks affect the total kWh production. This training would help participants provide more complete answers to the Evaluation Team's questions about their systems and how they are operating.

Recommendation 3b. Consider requiring that all biomass and biogas participants record which fuels they use, and when, over at least a 12 month period. This information is essential to properly evaluate each site's impact and contribute to a comprehensive evaluation of each project's savings. To simplify this, the Program could work with system owners and industry experts to develop a simple feedstock log. The Program could tie a portion of the incentive payment to submission of a completed log and other relevant data to ensure that suitable data is collected and available for analysis.

Recommendation 3c. Consider requiring data logging on biogas and biomass projects. Post-installation metering of these projects requires substantial resources but adding metering equipment for key parameters at the time of installation can be done at much lower cost. At a minimum, the Program

could require regular collecting and reporting of the useful energy output for biogas and biomass systems (e.g., electricity generation from a coupled reciprocating engine on a biogas project).

Recommendation 3d. Consider requiring that large biomass and biogas sites agree to on-site inspections of their projects. These inspections will improve the quality of the evaluation because the Evaluation Team could interact with Program participants and establish the context of the project, review the system's physical layout, and examine relevant logs and documents. Note, however, that site visits alone would not provide sufficient detail for a thorough evaluation but would be a supplement to metered data, billing analysis, and other methods.

Renewable Energy Loan Fund

Focus on Energy designed the Renewable Energy Loan Fund (the Fund) to reduce the cost of installing renewable systems, make it easier for customers to obtain financing, and help the financial sector gain experience and become more comfortable with offering loans for renewable installations. Focus on Energy used the Fund to support financing by private sector lenders (Partner Lenders) for eligible renewable projects. The Partner Lender served as the primary lender and retained the direct relationship with the customer but could offer improved terms because of a zero-interest cost loan from Focus on Energy. The Fund was open to all customers of Focus on Energy participating utilities. Participants could choose to work with any lender in the state.

The Renewable Energy Loan Fund was launched in January 2016, and implemented by CleanTech Partners. In October 2016, the Wisconsin Public Service Commission ordered that no funds beyond those already reserved should be reallocated from the Fund to other Focus on Energy programs.[204] The Fund Implementer accepted no new applications after October 2016; however, it continued to process and fund the applications already approved through December of 2016.

In CY 2016, the Fund supported 28 projects for 25 participants. Of these, 23 projects also received a rebate from the Renewable Rewards Program (a sub-component of the Home Performance with ENERGY STAR Program). RECIP also offered rebates for renewables projects, but its funding was exhausted at the end of CY 2015, so no RECIP projects received Fund support. Five projects received no rebate.

The Fund had no formal savings targets. The Evaluation Team credited all savings for Fund projects that also received a rebate from the Renewable Rewards Program. However, as part of the Fund evaluation, the Evaluation Team assessed the degree to which these financing and rebate projects' savings resulted from the Fund's financing support compared to the rebate (to assess the hypothetical allocation of savings between the two programs). This exercise was for illustrative purposes only and savings from these projects were not applied to the Fund.

For the five projects that did not receive a rebate, the Evaluation Team credited savings to the Fund because these savings could not be claimed through any other program.

[204] The Wisconsin Public Service Commission decided to discontinue the Fund during an open meeting on October 20, 2016. (See minutes in REF#293810 in Docket 5-FE-100.) The Public Service Commission provided further detail on the process to end the Fund and repurpose the remaining funds in Order REF# 294032.

Table 290 lists the actual Fund spending, allocated savings, participation, and hypothetical cost-effectiveness based on hypothetical allocated and overall net savings.[205] Incentive spending and participation include all Fund projects. Verified gross lifecycle savings and net annual savings (and therefore the verified gross realization rate and annual net-to-gross ratio) represent only the projects whose savings were not claimed in any other Focus on Energy program.

Table 290. Renewable Energy Loan Fund Summary

Item	Units	CY 2016
Loan Funds Disbursed[1, 2]	$	$1,025,908
Participation	Number of Participants	25
Verified Gross Lifecycle Savings[3]	kWh	19,513,902
	kW	391
	therms	0
Verified Gross Lifecycle Realization Rate[3]	% (MMBtu)	104%
Net Annual Savings[3]	kWh	764,945
	kW	383
	therms	0
Annual Net-to-Gross Ratio[3]	% (MMBtu)	98%
Cost-Effectiveness (Hypothetical Net Savings - Allocated)[4]	Total Resource Cost Test: Benefit/Cost ratio	0.69
Cost-Effectiveness (Hypothetical Net Savings - Overall)[4]		0.54

[1] Disbursed loan funds will be repaid to Focus on Energy by borrowers.
[2] Incentive spending and participation include all Fund projects, including those for which savings were allocated to the Renewable Rewards Program.
[3]Verified gross lifecycle savings and net annual savings (and therefore the verified gross realization rate and annual net-to-gross ratio) represent only the projects whose savings were not claimed in any other Focus on Energy program.
[4]The cost-effectiveness results here are hypothetical, and based on hypothetical net savings credited to the Fund. Actual net savings for 23 of the Fund's 28 projects are credited to the Renewable Rewards Program.

[205] The hypothetical cost-effectiveness analysis considers two scenarios. The first considers cost-effectiveness of the Fund based on allocated net savings only, excluding the portion of net savings from financing and rebate projects that would be allocated to the Renewable Rewards Program. The second scenario considers all net savings from all Fund projects.

Evaluation, Measurement, and Verification Approach

The Evaluation Team conducted impact and process evaluations for the Renewable Energy Loan Fund in CY 2016. The Evaluation Team designed its EM&V approach to integrate multiple perspectives in assessing performance. Table 291 lists the specific data collection activities and sample sizes used in the evaluations.

Table 291. Renewable Energy Loan Fund Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Fund Actor Interviews	2
Participating Lender Interviews	7
Nonparticipating Lender Interviews	5
Participant Survey	8

Fund Actor Interviews

In September 2016, the Evaluation Team interviewed the Fund Administrator (CB&I) and Fund Implementer (CleanTech Partners) to learn about the current status of the Fund and to gain insight into its successes and challenges. Interview topics covered the Fund's background and design, goals, marketing approach, and feedback from participants and lenders.

Lender Interviews

The Evaluation Team interviewed seven Partner Lenders and five lenders who had engaged with the Fund to some degree but ultimately did not complete any loans through the Fund. Interviews collected information on lenders' motivation to participate, any obstacles lenders faced when trying to partner with the Fund, and lenders' suggestions for improving the Fund. In addition, the Evaluation Team asked lenders about their perceptions of the market for renewable energy financing, what barriers exist for customers, and what level of demand lenders have seen for financing renewable energy projects.

Participant Survey

The Evaluation Team contacted a census of CY 2016 participants in the Fund, completing surveys with eight of the 25 participants. The survey engaged participants on topics such as awareness, engagement, satisfaction, and motivation and included questions to inform the savings allocation between the loan and the rebate. Table 292 shows the breakdown of survey respondents by sector and type of equipment installed (ground source heat pump or solar PV).

Table 292. Renewable Energy Loan Fund Participant Survey Respondents by Sector and Equipment Type

Sector	GSHP	Solar PV	Total
Residential	1	4	5
Small Business/ Large Commercial	0	3	3
Total	**1**	**7**	**8**

Impact Evaluation

For the impact evaluation, the Evaluation Team divided Fund projects into two groups—financing and rebate projects (projects that received Fund loan support *and* a rebate through the Renewable Rewards Program) and financing-only projects (projects that did not receive a rebate through any other Focus on Energy program).

For the 23 financing and rebate projects, the Evaluation Team credited 100% of the savings to the rebate program and relied on the Renewable Rewards Program's evaluation to determine the verified gross savings for each project. The Fund evaluation determined the net savings for these projects (separate from the Renewable Rewards evaluation) but for illustrative purposes only, as part of the assessment of the percentage allocation to each program.

For the five financing-only projects, the Evaluation Team assessed verified gross and net savings and credited savings to the Fund. As with the financing and rebate projects, the Evaluation Team relied on the evaluation results from other programs (see the Home Performance with ENERGY STAR chapter for residential and small business projects, and the RECIP chapter for the large commercial projects) to assess verified gross savings for the financing-only projects. The Evaluation Team used the Fund participant survey to assess net savings. Because no other program influenced these participants, there was no need for an allocation assessment for these projects.

Fund Gross Savings

CY 2016 Verified Gross Savings Results – Financing-Only Projects

The five financing-only projects accounted for 58% of total funds ($594,683 of $1,025,908). The tracking data indicated that the initial capacity estimate for the five projects totaled 667.9 KW.

The Evaluation Team did not conduct a gross savings analysis for these projects. Instead, the Team applied the verified gross results (realization rates) from the Renewable Rewards solar PV impact evaluation or the RECIP evaluation, as appropriate for each Fund project's sector (residential, small business, or commercial).

As shown in Table 293, the average realization rate, weighted by total (MMBtu) energy savings, was 104% for the Renewable Energy Loan Fund.[206] For a more detailed discussion of the realization rates applied to individual Fund projects, see the Home Performance with ENERGY STAR Program and RECIP chapters.

[206] The Evaluation Team calculated realization rates by dividing annual verified gross savings by annual *ex ante* savings.

Table 293. CY 2016 Renewable Energy Loan Fund Annual and Lifecycle Realization Rates by Measure Type – Financing-Only Projects

Measure	Annual Realization Rate				Lifecycle Realization Rate			
	kWh	kW	therms	MMBtu	kWh	kW	therms	MMBtu
Solar PV	104%	130%	n/a	104%	104%	130%	n/a	104%
Total	**104%**	**130%**	**n/a**	**104%**	**104%**	**130%**	**n/a**	**104%**

Table 294 lists the ex ante and verified annual gross savings for the Renewable Energy Loan Fund for CY 2016.

Table 294. CY 2016 Renewable Energy Loan Fund Annual Gross Savings Summary by Measure Type – Financing-Only Projects

Measure	*Ex Ante* Gross Annual			Verified Gross Annual		
	kWh	kW	therms	kWh	kW	therms
Solar PV	749,086	301	0	780,556	391	0
Total Annual	**749,086**	**301**	**0**	**780,556**	**391**	**0**

Table 295 lists the ex ante and verified gross lifecycle savings by measure type for the Renewable Energy Loan Fund in CY 2016.

Table 295. CY 2016 Renewable Energy Loan Fund Lifecycle Gross Savings Summary by Measure Type – Financing-Only Projects

Measure	*Ex Ante* Gross Lifecycle			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Solar PV	18,727,147	301	0	19,513,902	391	0
Total Lifecycle	**18,727,147**	**301**	**0**	**19,513,902**	**391**	**0**

Gross Savings for Financing and Rebate Projects

As previously explained, the Renewable Energy Loan Fund did not claim savings for the 23 financing and rebate projects (projects that used Fund loan support and also received a rebate through the Renewable Rewards Program). Table 296 shows the total verified gross savings for energy, demand, and natural gas resulting from these projects, based on the results of the Renewable Rewards Program evaluation.[207]

Table 296. Renewable Rewards Program Verified Gross Savings for Financing and Rebate Fund Projects

Measure	Annual Verified Gross Savings			
	kWh	kW	therms	MMBtu
Residential				
Solar PV	145,646	53	n/a	497
Ground Source Heat Pump	9,424	2	n/a	32
Small Business/ Large Commercial				
Solar PV	1,157,844	403	n/a	3,951
Total	**1,312,913**	**458**	**n/a**	**4,480**

Evaluation of Net Savings

For the Fund, the net to gross ratio was defined as:

$$NTG = 1 - FR$$

In which FR = freeridership.

The Evaluation Team used the participant survey to determine the overall freeridership rate for all 28 Fund projects. The participant survey included a battery of questions, similar to those used for other programs, to assess the degree to which incentives motivated each participant's decision to complete the project. In this case, the counterfactual situation presented by the battery was one in which neither the loan nor any Focus on Energy rebates were available. This was the primary difference in the freeridership savings analysis conducted as part of the Fund evaluation, and the freeridership savings analysis conducted as part of the Renewable Rewards Program evaluation. Additional detail on the

[207] Tracking data noted "claim-only" savings from projects completed by customers who initially indicated interest in the Fund, and received information and assistance from the Fund, but did not ultimately use the Fund-supported financing (these customers were defined as drop-outs). The Fund Implementer considered that the information and technical support provided by the Fund contributed to the project ultimately moving forward, even though the drop-out customer did not use the Fund financing. The Evaluation Team, however, found that several lenders in the private market were willing to provide financing for renewable systems as long as the customer had sufficient collateral to secure the loan. Since these drop-out customers did not receive the Fund benefit of reducing the amount of collateral needed, and they were able to fund their projects regardless of the Fund incentives, the Evaluation Team did not consider these savings to be allocable to the Fund.

freeridership methodology is available in Appendix I. The Evaluation Team assessed the freeridership rate as the percentage of gross savings that would have occurred without either of the Focus on Energy incentives (a rebate, where applicable, or Fund financing support).

The Evaluation Team received eight valid responses to the freeridership questions: seven from financing and rebate participants, and one from a financing-only participant who received only a loan and did not receive a rebate. Table 297 presents the NTG rate and net savings results by respondent, sector, and for the Fund overall.

Table 297. Fund NTG Rate by Participant Survey Respondent

Respondent	NTG	Net Annual Energy Savings (kWh)
Residential		
Ground Source Heat Pump Respondent 1	25%	1,000
Solar PV Respondent 1	100%	20,582
Solar PV Respondent 2	50%	3,783
Solar PV Respondent 3	100%	6,502
Solar PV Respondent 4	100%	6,961
Subtotal (Weighted by Net Annual Energy Savings)	**93%**	
Small Business/Large Commercial		
Solar PV Respondent 1	100%	21,568
Solar PV Respondent 2	50%	23,704
Solar PV Respondent 2	100%	739,300
Subtotal (Weighted by Net Annual Energy Savings)	**98%**	
Overall Fund NTG, Weighted by Net Annual Energy Savings	**98%**	

CY 2016 Verified Net Savings Results – Financing-Only Projects

The Evaluation Team applied the 98% NTG ratio (shown in Table 297) to the verified gross savings for the five financing-only projects to determine the net savings claimed by the Fund. Table 298 shows the annual net energy impacts (kWh, kW, and therms) by measure for financing-only projects. The Evaluation Team credited these net savings to the Fund.

Table 298. CY 2016 Renewable Energy Loan Fund Annual Net Savings – Financing-Only Projects

Measure	Annual Net		
	kWh	kW	therms
Solar PV	764,945	383	0
Total Annual	**764,945**	**383**	**0**

Table 299 shows the lifecycle net energy impacts (kWh, kW, and therms) by measure for financing-only Fund projects.

Table 299. CY 2016 Renewable Energy Loan Fund Lifecycle Net Savings – Financing-Only Projects

Measure	Lifecycle Net		
	kWh	kW	therms
Solar PV	19,123,624	383	0
Total Lifecycle	**19,123,624**	**383**	**0**

Hypothetical Net Savings for Financing and Rebate Projects

Although the Fund did not claim any savings for financing and rebate projects, the Evaluation Team calculated the hypothetical net savings from these projects, using results from the Fund participant survey, to inform the allocation exercise described in the next section. The Evaluation Team applied the weighted Fund NTG (98%) to the verified gross savings from the 23 financing and rebate projects. Table 300 shows the total net savings for energy, demand, and natural gas resulting from these projects. These savings are referred to as "hypothetical" because the actual net savings for these projects is calculated and reported in the Home Performance with ENERGY STAR Program chapter, and attributed to that program.

Table 300. Hypothetical Net Savings for Financing and Rebate Fund Projects

Measure	Hypothetical Annual Net Savings[1]			
	kWh	kW	therms	MMBtu
Residential				
Solar PV	115,714	46	n/a	395
Ground Source Heat Pump	7,857	2	n/a	27
Small Business/ Large Commercial				
Solar PV	235,149	78	-	802
Total	**358,720**	**126**	**n/a**	**1,224**

[1]Net savings are hypothetical in that they are not claimed as a savings contribution by the Fund. Actual net savings for these projects were calculated in the Home Performance with ENERGY STAR Program chapter as part of the Renewable Rewards evaluation, and credited to that program.

Evaluation of Savings Allocation

To evaluate the relative influence on customers of the two incentives, financing support and the rebate, the Evaluation Team used the self-report data to calculate the percentage of net savings contributed by each incentive, and therefore allocable to each program.

In the participant survey, respondents answered two batteries of allocation questions, which were structured to present a counterfactual scenario in which one incentive was available but the other was not. These were the three questions in each battery:

1. **Likelihood:** How likely is it that you would have installed the renewable system without the Focus on Energy [REBATE/FINANCING SUPPORT]? Remember, you can assume the [OTHER

INCENTIVE] was still available. (Respond *not at all likely*, *not too likely*, *somewhat likely*, or *very likely*.)

[If response≠ "not at all likely"]

2. **System size:** Without the [REBATE/FINANCING SUPPORT], would you have installed a system larger, the same size, or smaller than the one you installed, or would you have installed no system at all?

[If response ≠ "not at all likely" AND if response ≠ no system at all]

3. **Timing:** If the [REBATE/FINANCING SUPPORT] had not been available for your system, when would you have installed the system? (*Respond sooner, at the same time, later but within 1 year, later but within 1-2 years*, or *never*.)

For each battery of questions, the participant's responses were scored to determine the rate of freeridership specific to each incentive. Table 301 shows the project cost, rebate amount, financed amount, and rebate-specific and financing-specific freeridership scores for each respondent. (The project cost and incentive amounts are included to give some sense of the relative financial impact of the financing and the incentive, which is likely a driver for the relative importance of each to the respondent's decision to move forward.)

Table 301. Allocation Scoring by Respondent (n=7)

Respondent	Project Cost	Rebate Amount	Fund Loan Amount	Rebate Freeridership Score	Financing Freeridership Score
Residential					
GSHP Respondent 1	$11,400	$650	$5,700	50%	75%
Solar PV Respondent 1	$33,915	$2,400	$16,957	75%	100%
Solar PV Respondent 2	$17,809	$2,400	$8,905	100%	100%
Solar PV Respondent 3	$17,864	$2,400	$8,932	50%	0%
Solar PV Respondent 4	$20,184	$2,400	$1,092	50%	100%
Small Business/Large Commercial					
Solar PV Respondent 1	$68,247	$2,400	$33,904	50%	0%
Solar PV Respondent 2	$100,000	$2,400	$50,000	25%	0%

To determine the percentage of net savings allocable to the financing support, the Evaluation Team applied the equation shown below. The remaining percentage was allocated to the rebate.

$$\%\ Allocation\ to\ Financing = \frac{(\sum\ 1 - Financing\ FR\ Score * Net\ kWh)}{(\sum\ 1 - Financing\ FR\ Score * Net\ kWh) + (\sum\ 1 - Rebate\ FR\ Score * Net\ kWh)}$$

The Evaluation Team averaged the incentive-specific net scores and weighted the results by net energy savings. The financing support received an average incentive-specific freeridership score of 38% while the rebate achieved an incentive-specific freeridership score of 51%. Average freeridership scores did not sum to 100% because some participants were dependent on both incentives, and some participants were freeriding on both incentives.

The Evaluation Team calculated the average net score for each incentive as:

$$Net\ Score_x = 1 - FR_x$$

Where:

FR = Freeridership score

X = incentive (financing support or rebate)

The Evaluation Team then determined the percentage of net savings allocable to the financing incentive by dividing the average financing net score by the sum of the average financing net score and the average rebate net score. The results indicate that 56% of total net savings from financing and rebate projects was allocable to the Fund financing support and the remaining 44% was allocable to the rebate.

Table 302 summarizes the results from the analysis.

Table 302. Allocation Results by Incentive and Customer Type

Incentive Type	Average Net Score (Weighted by Net Energy Savings)	Net Savings Allocation by Incentive
Rebated Projects (n=7)		
Financing	62%	56%
Rebate	49%	44%
Residential (n=5)		
Financing	17%	35%
Rebate	32%	65%
Small Business/Large Commercial (n=2)		
Financing	100%	61%
Rebate	63%	39%

By customer type, the results show that residential respondents, on average, indicated the rebate was more influential than the financing support, contributing 65% of residential savings. Among commercial respondents, the reverse was true: financing support contributed 61% of savings.

The Evaluation Team applied the financing savings allocation percentage to hypothetical net savings from all the financing and rebate projects to determine the portion of hypothetical net savings allocable to the Fund (Table 303).

Table 303. Hypothetical Annual Net Savings from Financing and Rebate Projects Allocable to the Renewable Energy Loan Fund

Measure	Allocated Annual Net Savings			
	kWh	kW	therms	MMBtu
Residential				
Solar PV	64,756	26	n/a	221
Ground Source Heat Pump	4,397	1	n/a	15
Small Business/Large Commercial				
Solar PV	131,594	43	n/a	449
Total	**200,747**	**70**	**n/a**	**685**

Process Evaluation

The Evaluation Team focused its process evaluation on these key topics for the Renewable Energy Loan Fund:

- Fund performance and KPIs
- Effectiveness of Fund design and market response
- Fund tracking processes and coordination among the Fund Administrator and Fund Implementer
- Partner and customer awareness, satisfaction, and motivation to participate

Fund Design, Delivery, and Goals

Fund Design

Launched in January of 2016, the Renewable Energy Loan Fund provided financing support that improved the terms—interest rate, loan duration, and required security[208]—available for loans for renewable energy systems. Focus on Energy drew on a revolving loan fund to participate in a Partner Lender's loan, providing 50% of the loan capital. As participants repaid their loans, the Fund was replenished to support new loans for additional projects.

Focus on Energy provided capital at 0% interest, with no security required. In addition, Focus on Energy accepted a subordinate position on the loan, meaning in the event of any default, the Partner Lender would be compensated in full before Focus on Energy. In return, the Partner Lender underwrote the loan and agreed to collect payments for the life of the loan (remitting half of each payment back to Focus on Energy). This multi-lender financing arrangement, in which a secondary lender contributes part of the loan capital, is known as a "participation loan." The Fund allowed participants to receive financing from any regulated lender in the state. Hedge funds and other higher-risk, unregulated lenders and investors were not eligible to partner with the Fund. The lender became a Partner Lender when it signed the participation agreement with Focus on Energy.

[208] "Security" is an asset (typically real estate or equipment) that the borrower provides as collateral for the loan. If the borrower defaults on the loan, the lender can seize the security as compensation for the loss.

The Fund served three markets—large commercial customers, small business customers, and residential customers. As shown in Table 304, residential and small business participants could use the Fund for solar PV or ground source heat pumps (GSHPs), while large commercial customers could select from a wider range of eligible measures. Small business and residential projects could receive both Fund support and rebates through the Renewable Rewards Program.[209] The Fund used eligibility for the renewable rebate to identify small business participants, with all non-eligible commercial participants categorized as large commercial participants. The category "large commercial" was loosely defined and included all businesses not categorized as small commercial, including industrial and agricultural businesses. Large commercial Fund participants were not eligible for any rebates from Focus on Energy since the program that provided rebates for renewable installations for this market, RECIP, had no remaining funds in 2016.

Table 304. Eligible Projects by Market Segment

Measure	Large Commercial	Small Business/Residential
Solar PV	✓	✓
GSHP	✓	✓
Wind	✓	-
Biomass	✓	-
Biogas	✓	-
Solar Thermal	✓	-

Fund Management and Implementation Process

Focus on Energy delivered the Renewable Energy Loan Fund through the Fund Administrator (CB&I) and the Fund Implementer (CleanTech Partners). The Fund Administrator designed the Fund according to the PSC's direction, oversaw the Fund Implementer, and promoted the Fund. The Fund Implementer served as the liaison to Partner Lenders, prepared and executed financing agreements, issued funds to Partner Lenders, and monitored repayments to Focus on Energy.

The Fund Implementer worked closely with customers and lenders to facilitate the application and funding process. According to the Fund Implementer, a typical customer first selected an installer, then identified a project. The customer worked with the installer to submit a rebate application to Focus on Energy to reserve rebate funds, where applicable.

[209] In total, five Fund participants did not receive a Focus on Energy rebate. Renewable Rewards Program funds for residential customers were exhausted in December 2016. Two residential customers who received Fund support in December were too late to receive Renewable Rewards rebates. Renewable Rewards funds for small businesses were exhausted by mid-year 2016. One small business participant in the Fund completed a project in December of 2016 and did not receive a rebate. Two large commercial customers participated in the Fund and were ineligible for rebates.

If the customer identified a lender on the rebate application, then the rebate application submittal triggered the process to participate in the Renewable Energy Loan Fund. Rebate application approval, which took one to eight days depending on the complexity of the project, constituted the technical approval needed for Fund financing support. For projects that did not receive a rebate, the Renewable Rewards Program Implementer reviewed the project design to grant approval for the financing support, and the Fund Implementer contacted the customer to identify the target lender.

After the project was approved, the Fund Implementer contacted the lender to explain the details and requirements of the Fund, and worked with the lender to execute the participation agreement between Focus on Energy as part of the loan closing process. Once the lender signed the participation agreement, that lender became a Partner Lender.

The Fund Implementer reported that most residential loans closed in 60 to 90 days. Commercial loans that were not secured through property equity closed more quickly—in some cases within 24 hours—because the lender did not have to get an appraisal or review title insurance. Lenders reported that the Fund Implementer was able to answer questions and supply the participation agreement in an efficient manner. However, four of seven lenders reported that the participation structure required lenders to go through additional steps internally to close the loans, which added time and labor to the origination process.

Fund Goals and Performance

The Fund did not have formal savings or participation targets, but the Fund Administrator and the Fund Implementer did track participation and certain project details. In addition, the Fund Administrator assigned the Implementer five KPIs as part of the implementation contract.

Key Performance Indicators

The Fund Administrator selected the KPIs to measure the Fund Implementer's general responsiveness to lenders, ensuring that lenders received the best experience possible when participating in the Fund. The Fund Administrator reported that the Fund Implementer met or exceeded all of its KPIs, with the exception of the requirement to develop a method to measure cost-effectiveness. After the contract with the Fund Implementer was in place, the Fund Administrator decided to retain responsibility for measuring cost-effectiveness and instructed the Fund Implementer not to pursue it. Specific KPI results, as reported by the Fund Administrator, are presented in Table 305.

Table 305. Renewable Energy Loan Fund CY 2016 Key Performance Indicators

KPI	CY 2016 Goal	CY 2016 Result	Results Source
Disburse loans accurately	Less than 0.2% error rate	100% of loans were disbursed accurately	Fund Administrator
Disburse loan funds within 30 days of Participation Agreement signature	100%	100%	
Respond to all lender inquiries	Average two business days	Average response time two business days	
Promote Fund to industry groups	n/a	58 meetings were conducted with lenders/lender groups	
Develop method to measure cost-effectiveness	n/a	The Fund Administrator directed the Implementer not to complete this activity, and instead the Evaluation Team developed this methodology.	

Participation

The Fund supported 28 projects in CY 2016. The majority of projects (18 of 28) were residential, but the Fund spent the most funding (85%) on nonresidential (small business and large commercial) projects. Nearly all projects (16 of 18 residential projects, and all 10 nonresidential projects) were solar PV installations, though the Fund also funded two residential ground source heat pump installations. Although other measures were eligible for large commercial participants, the Fund did not receive applications for any other measure types. Table 306 shows total funding by sector and equipment type and notes the maximum and minimum amounts funded in each subgroup.

Table 306. Participation and Allocation of Renewable Energy Loan Fund Disbursements[1]

Measure	Number of Allocations	Total Funding Allocated	Minimum Funded Amount	Maximum Funded Amount
Residential				
Solar PV	16	$141,779	$2,050	$25,000
GSHP	2	$16,200	$5,700	$10,500
Small Business				
Solar PV	8	$315,579	$10,805	$124,750
Large Commercial				
Solar PV	2	$552,350	$75,000	$477,350
Total	**28**	**$1,025,908**		

[1]Columns may not equal totals due to rounding.

The Fund Administrator and Fund Implementer reported they were satisfied with the level of participation in the Fund, considering it was implemented for less than one year and that the rate of applications increased rapidly as the year progressed. According to the Fund tracking data, the Fund

approved a total of 76 applications from January through October, with 40 of these submitted in August or later. Table 307 shows the final status of all approved applications.

Table 307. Renewable Energy Loan Fund Projects Funded

Status	Number of Applications	Fund Portion of Loan Amount
Disbursed	**28**	**$1,025,908**
Withdrawn – Other Financing	40	$506,669
Withdrawn – Project Cancelled	8	$150,107
Total Approved Applications	**76**	**$1,682,683**

The Fund Implementer reported that 40 applicants who withdrew their application did complete their project and used financing that did not rely on Fund support. Eight applicants cancelled their projects. One applicant cancelled the project because he or she was unable to find a lender willing to participate in the Fund. The remaining seven decided to cancel for personal or unknown reasons.

Interest Rate Reduction

In interviews, seven Partner Lenders provided sufficient information to identify the percentage points that the participant received off the lender's base interest rate. Participants' blended rates (incorporating the Fund allocation) varied from 2.50% to 5.25%, with an average of 3.55%. The difference between the base rate and the blended rate ranged from 0.38 percentage points to 3.50 percentage points, with an average of 1.62 percentage points.

All Partner Lenders reported that the loan capital contribution from Focus on Energy allowed them to offer a blended interest rate below their standard rate. However, although the Fund provided half of the loan capital at 0% interest, the Fund contribution typically did not result in a blended interest rate that was half the standard rate. This was because lenders actually increased the interest rate they required for their own portion of the loan capital to offset the risk of the long-term relationship with Focus on Energy and to cover the added time and labor to manage the participation structure. As a result, the reduction in the interest rate was typically much less than 50%.

Measuring the impact on interest rates was further complicated because lenders often negotiated the interest rate they offered customers, so the standard interest rate was not necessarily the rate the lender would have offered without the Fund. For example, one lender reported that although the blended rate he offered one customer was below his standard rate, he would have been willing to offer that rate even without the Fund because the customer had excellent credit.

Transformation in the Financing Market

The Fund's secondary objective was to encourage more lenders to offer financing for renewable projects and therefore to build lender experience in this market. However, many lenders reported that they were already willing to finance renewable projects with minimal informational requirements and no technical review. In interviews, the Evaluation Team asked seven Partner Lenders and five nonparticipating lenders if they had offered loans for renewable projects outside the Fund in the past, and whether they

considered renewable lending to be a potential source of growth for their organization going forward (assuming the Fund would be available).

Table 308 presents the results, which provide some indication that the Fund successfully engaged lenders that would not otherwise have financed renewable projects but also that some nonparticipating lenders already serve this market as part of their regular business, or would like to. One nonparticipating lender said his bank had previously offered its own special residential financing for solar PV, but it had very little uptake. Partner Lenders were less likely to see the renewable market as a source of growth, reporting they did not perceive much demand for that type of lending.

Table 308. Lender Experience and Perspective on Market for Renewable Financing

	Partner Lenders (n=7)	Nonparticipating Lenders (n=5)
Yes, have I financed renewables outside Fund	2	4
Yes, I see renewable financing as a growth area	0	5

Data Management and Reporting

The Fund Administrator worked with the Fund Implementer to develop Excel-based workbooks to track Fund participation. This approach, which relied on manual data entry, was nevertheless manageable given the Fund's level of participation, and it satisfied the data and reporting needs of both parties.

The Fund Implementer tracked measure participation and accounted for payment allocations to lenders and repayments from participants. For each loan, the Fund Implementer received a copy of the note from the Partner Lender as proof that the loan was funded, with the details of the loan and the customer's signature as part of the participation agreement. However, the loan terms were not tracked in the Fund database since that data was not needed for daily Fund management. The Fund Implementer did not receive any of the underwriting details, and as a result it could not track demographic details of participants, such as their average credit score or the amount or type of security offered.

Marketing and Outreach

The Fund Administrator reported there was minimal budget allocated to marketing and outreach for the Fund. The Fund Administrator retained most of the responsibility for coordinating outreach efforts and took on the role of facilitating presentations to industry trade organizations, designing the website, and creating a frequently asked questions (FAQ) flyer for participants. The Fund Implementer supported these efforts by contributing content for outreach materials and participating in outreach events. The Fund Implementer also promoted the Fund through one-on-one outreach, both over the phone and in person, to any lender interested in the Fund. The Fund Administrator reported there were 58 lender outreach sessions in 2016.

In addition, the Fund Administrator worked with the Renewable Rewards Program Implementer to educate renewable Trade Allies about the Fund. The Fund Administrator did not receive formal feedback from Trade Allies about the Fund but said anecdotally that some had a very positive response to the Fund. According to the Fund Administrator, these Trade Allies took a more entrepreneurial approach to the Fund and developed a relationship in advance with a lender willing to participate. These Trade Allies were then able to refer customers to a lender with more confidence.

However, the Fund Administrator also reported that some Trade Allies found the complex design of the Fund difficult to communicate to customers. Interviews with the Fund Implementer and both participating and nonparticipating lenders supported this statement. The Fund Implementer said that lenders reported that Trade Allies occasionally misreported the details of the Fund to customers. According to one nonparticipating lender, one Trade Ally told a potential borrower that the Fund offered 0% interest, and another told a potential borrower that the Fund required the lender to offer an interest rate that was half the lender's typical rate. In addition, two of five Partner Lenders said the Trade Allies caused a bottleneck by not providing the documentation lenders needed to close the loan. The Fund Implementer said this was a common concern among lenders.

Customer Experience

The Evaluation Team surveyed a census of Fund participants to understand how they learned about the Fund, their motivation for participating, and their overall satisfaction. Eight participants responded to the survey: five residential participants and 3 nonresidential participants.

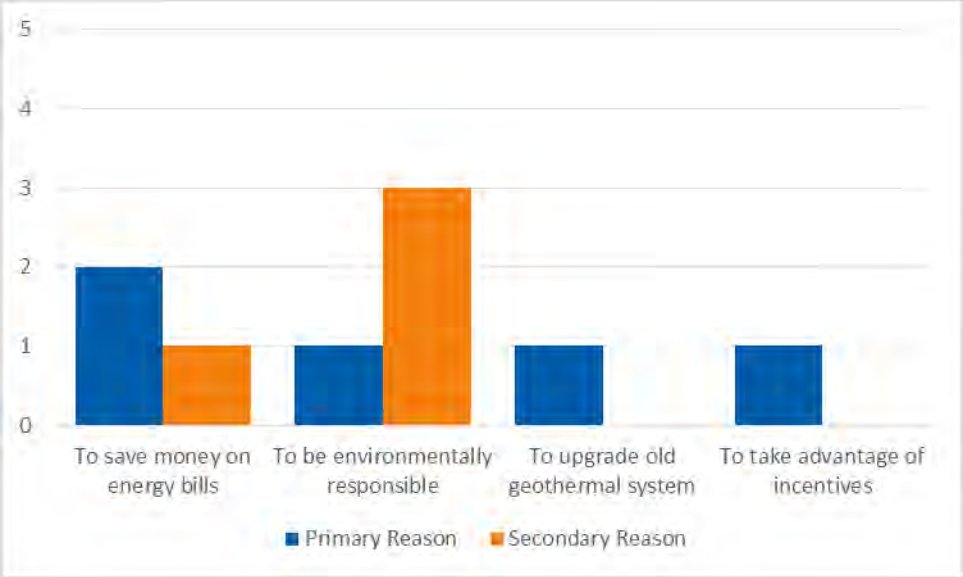
Awareness

Installers were the primary delivery channel for the Fund. All three nonresidential participants and three of five residential participants heard about the Renewable Energy Loan Fund from their contractor or installer. A fourth residential participant who learned about the Fund through an online search said they also later consulted their installer about financing options.

Motivation and Barriers

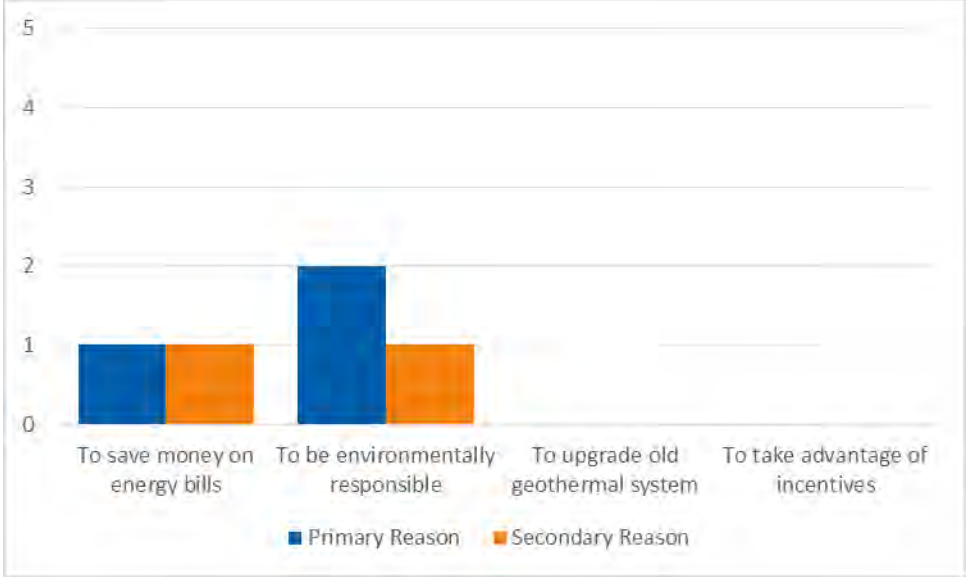
Through the participant survey, the Evaluation Team asked respondents why they decided to install renewable equipment. Figure 242 and Figure 243 show the results by residential and nonresidential respondents. The figures present a respondent's first answer as the primary motivation, and any second answer as a secondary motivation. Among residential respondents, saving money on bills was the most common primary response, while two of three nonresidential participants said environmental responsibility was their primary motivation.

Figure 242. Residential Motivations for Installing Renewable Equipment



Source: Renewable Energy Loan Fund Participant Survey Question B1.
"Why did you decide to purchase a [EQUIPMENT] system?" (n=5, multiple responses allowed)

Figure 243. Nonresidential Motivations for Installing Renewable Equipment



Source: Renewable Energy Loan Fund Participant Survey Question B1:
"Why did you decide to purchase a [EQUIPMENT] system?" (n=3, multiple responses allowed)

The survey then asked respondents to state their primary motivation for participating in the Fund. All three nonresidential respondents and four of five residential respondents said the reduced interest rate was their primary motivation to participate in the Renewable Energy Loan Fund. One residential respondent said the extended term was their primary motivation. Two nonresidential respondents also

offered secondary motivations. The first said simply that this loan was "obtainable," and the second said he was able to qualify for the loan because of the reduced security requirement.

To understand how the Fund did or did not address market barriers, the Evaluation Team also asked participating and nonparticipating lenders about the barriers facing customers interested in financing renewable projects. According to two Partner Lenders and one nonparticipating lender, having sufficient collateral was the biggest obstacle to securing financing for most customers interested in renewables. Three nonparticipating lenders said that the biggest obstacle was simply the overall cost. These lenders said that customers who thought they could afford the system typically had substantial financial resources and therefore had no significant obstacles to financing. Other lenders did not have an opinion.

Satisfaction

Two of three nonresidential participants and four of five residential participants were *very satisfied* with the lending institution they chose. Overall, participants considered that participation in the Fund caused no significant obstacles to their loan closing process. One participant commented that the bank processed their loan quickly and efficiently, while another mentioned some paperwork redundancies that they described as "irritating but not too strenuous."

Participants were also satisfied with the installers they hired to install the renewable equipment. Six participants said they were *very satisfied*. Two participants, both residential, said they were *somewhat satisfied* and cited small issues during the installation. For example, one participant said the installer initially required a $1,000 down payment thinking it was a Fund requirement, but the installer later realized the error and withdrew the requirement.

Two nonresidential participants and four residential participants said they were *very satisfied* with the support and information they received from the Fund Implementer. One residential participant said there were technical issues during the information session, and therefore said they were *somewhat satisfied*. One participant did not respond.

Lender Experience

The Evaluation Team interviewed seven Partner Lenders and five nonparticipating lenders to capture their feedback on Fund design and implementation, customer response, and the overall market for renewable financing.

Motivation and Barriers

The Fund Administrator reported that most lenders participated in the Fund only to satisfy customer's requests. All seven Partner Lenders confirmed this was their primary motivation. Five said they engaged with the Fund because of a request from an existing customer. Two Partner Lenders agreed to participate in the Fund to establish a relationship with a new customer. In two cases, Partner Lenders were also able to use the Fund to attract the participant's other financial business. For example, one lender required that a particular participant first refinance the primary mortgage through the lender

then take out a second mortgage to finance the renewable project. The Fund allocation supported the second mortgage.

Six of seven Partner Lenders reported some secondary benefits from the Fund, but generally they indicated these benefits would not be enough reason to promote the Fund to other customers. Two Partner Lenders perceived that collateral was a significant barrier to residential customers and saw the participation structure as a way to mitigate that barrier. However, one reported having to nevertheless deny one residential customer because of insufficient collateral. Six of the seven Partner Lenders said that having the senior position in the participation structure did mitigate some risk,[210] but three also said this was a secondary or nonessential benefit.

Finally, the Fund Administrator reported that some of the more mission-driven lenders, such as a credit union looking for new ways to support their members or a community bank trying to build a reputation for "green" lending, saw the Fund as aligned with their goals. One of the Partner Lenders confirmed this was part of the reason they participated.

Both the Fund Administrator and the Fund Implementer reported that convincing lenders to participate was a challenge. According to the Fund Administrator, lenders did not have difficulty finding sufficient capital to fund loans of the size typically supported through the Fund. Since the Fund design was intended to alleviate capital constraints, the Fund offered lender little benefit. In interviews, most Partner Lenders confirmed that the Fund did little to overcome any barriers that they face. Lenders that engage in participation loan structures as part of their regular business typically do so for loans of over $100,000 dollars and most commonly for loans of a million dollars or more. None of the Partner Lenders reported that funding the projects would have been difficult without the Fund's support.

In addition, the Fund design posed the following obstacles for lenders:

- The participation structure, and the expectation for servicing over longer loan terms, added complexity to small loans that lenders expected to require very little labor.
- Participating in the Fund reduced the amount of capital the lender could invest in the project, which reduced their revenue.
- The participation structure was outside of normal business practice for some lenders, so lenders did not have the appropriate paperwork or data management systems to process the loan.

The Fund Implementer reported that one lender said the technical review provided by the Fund was a valuable input to the underwriting process. However, during the interview both participating and nonparticipating lenders said technical review was generally not seen as a significant benefit. Partner

[210] Having the senior position in the participation structure means the Partner Lender is paid first as the customer repays the loan. In other words, if a customer makes a partial payment, the Partner Lender's portion is paid off completely before the Fund receives any payment. In the event of default, any available assets must be used to repay the Partner Lender's outstanding balance in full before Focus on Energy receives any funding.

Lenders reported that for any loan secured with property equity (as most of the Fund projects were), they typically did very little technical review of the project to be financed, whether the project was for a home renovation, a renewable installation, or some other purpose. One Partner Lender reported that his organization considered it in the installer's best interest to provide a quality experience for the customer and therefore thought no oversight was needed.

Finally, nonparticipating lenders said that although they could have accommodated the participation structure (such as by purchasing software to manage participation lending), they ultimately decided the investment was not worth the limited number of small loans they were likely to attract as a result.

Lender Satisfaction

All Partner Lenders reported they were satisfied with the Fund overall. Even though it resulted in extra work, Partner Lenders described the process to participate in the Fund as "seamless" and "painless." Three lenders specifically cited the Fund Implementer, who had a background in banking, as key to facilitating the lender's involvement. One Partner Lender noted "[The Fund Implementer's] having been a banker, this went pretty seamlessly. He talked me into it by offering to lead me through it—otherwise we wouldn't have done it."

As noted above, several lenders thought the Fund design was not well suited to their business model. They suggested alternative models, including these:

- Offering a full or partial loan guarantee where Focus on Energy repaid any loan in which a customer defaults
- Offering an interest rate buy-down, where Focus on Energy repaid a portion of the interest revenue as an upfront payment, leaving the participant with a lower or zero interest rate
- Having Focus on Energy issue loans independently and sell them to private lenders

Fund Cost-Effectiveness

The Fund did not have formal savings targets and was not formally credited with any energy savings from 23 of its 28 projects. Therefore, a traditional cost-benefit analysis as conducted for other Focus on Energy programs was not appropriate for the Fund. However, for illustrative purposes, the Evaluation Team conducted a hypothetical cost-effectiveness evaluation under the following scenarios:

- **Net Savings.** Cost-effectiveness of the Fund based on the net savings from all projects that received a Fund-supported loan, for which the Evaluation Team had savings data (23 of 28 total projects.)
- **Allocated Net Savings.** Cost-effectiveness of the Fund based on the allocated net savings from all projects that received a Fund-supported loan, for which the Evaluation Team had savings data (23 of 28 total projects.)

The Evaluation Team applied the modified version of the TRC test that is the standard test for cost-effectiveness in Wisconsin. Appendix F includes a description of the modified TRC test. Table 309 lists the loan funds issued through the Fund.

Table 309. Renewable Energy Loan Fund Incentive Costs

	CY 2016
Loan Funds Issued	$1,025,908

The Evaluation Team found the CY 2016 Fund was not cost-effective under the net savings scenario, and was also cost-effective under the allocated net savings scenario. Table 310 and Table 311 list the evaluated costs and benefits for each scenario.[211]

Table 310. Renewable Energy Loan Fund Costs and Benefits (Net Savings)

Cost and Benefit Category	CY 2016
Costs	
Administration Costs	$99,967
Delivery Costs	$94,846
Incremental Measure Costs	$582,789
Total Non-Incentive Costs	**$777,601**
Benefits	
Electric Benefits	$383,081
Gas Benefits	$0
Emissions Benefits	$40,492
Total TRC Benefits	**$423,573**
Net TRC Benefits	**($354,029)**
TRC B/C Ratio	**0.54**

[211] The Evaluation Team did not have data to assess two additional costs—the default rate and the cost of capital—that would typically be assessed for a financing program. However, the Evaluation Team considered that the exclusion of the default rate, which could be expected to be less than 2% over the duration of the loans, would not have a meaningful impact on the results of the analysis. The Evaluation Team did not include any proxy cost of capital for the Fund in order to treat the loan funds in the same manner as rebate funds.

Table 311. Renewable Energy Loan Fund Costs and Benefits (Allocated Net Savings)

Cost and Benefit Category	CY 2016
Costs	
Administration Costs	$99,967
Delivery Costs	$94,846
Incremental Measure Costs	$1,005,390
Total Non-Incentive Costs	**$1,200,202**
Benefits	
Electric Benefits	$740,511
Gas Benefits	$0
Emissions Benefits	$92,571
Total TRC Benefits	**$833,082**
Net TRC Benefits	**($367,121)**
TRC B/C Ratio	**0.69**

Evaluation Outcomes

The Evaluation Team identified the following outcomes and recommendations to improve the Fund.

Outcome 1. Survey results are anecdotal but indicated the Fund had a meaningful impact on customer decision-making, separate from the rebate incentive. The allocation analysis indicated that the Fund was responsible for approximately 56% of participation by customers who received both a loan and a rebate and for 100% of participation by customers who received only the financing support. The impact appeared to be more substantial for nonresidential projects. This may be because nonresidential projects tended to be larger, making the rebate a smaller percentage of the overall cost and requiring the borrower to provide a larger amount of collateral and pay interest on a larger sum.

Outcome 2. The Fund Implementer met all established KPIs. Fund KPIs were mostly oriented toward providing support for Partner Lenders. All Partner Lenders confirmed the Fund Implementer was helpful, informed, and streamlined the paperwork process as much as possible. Several Partner Lenders reported the Fund Implementer's background in banking made communication easier.

Outcome 3. The Fund design provided some benefit to participants, but did not effectively address widespread market barriers and presented obstacles. Three lenders said the Fund reduced the security required to finance a renewable project. However, only two participants said this was a motivation for them to participate in the Fund. Three other lenders said the primary barrier to installing a renewable system was cost; as a result, only those customers who were financially secure and unlikely to have difficulty finding financing would be interested in installing renewables.

The Evaluation Team noted the following flaws in the Fund design:

- The principal benefit of the participation structure was to alleviate any capital constraint for lenders. This worked best for very large loans issued by small community banks, where there

may have been a capital constraint. However, this Fund was targeted to residential and small business loans and smaller commercial loans, for which available capital was not a market barrier.

- The Fund participation structure created a significant barrier for lenders, especially for residential loans. Although Fund allocation did reduce the cost of capital for the lender, the increased labor needed to service the loan added to the lender's cost. As a result, the net decrease in the interest rate to the borrower was typically much less than 50%.
- The Fund benefited participants by reducing interest costs and reducing the amount of equity needed to secure loans. However, given the wide variation in the interest rate reductions that participants received (from 0.38 percentage points to 3.50 percentage points), the Evaluation Team considered it unlikely that participants were able to easily and clearly understand the Fund's financial value and to compare Fund-supported financing with other options.

Recommendation 3: The Evaluation Team recommends the following steps be incorporated into the initial design of any financing program in the future:

- Conduct research to identify market barriers as a first step in program design.
- Vet program design with all potential stakeholders, including installers and lenders, prior to finalizing the design.
- Consider incorporating these aspects of this program that worked well—strong Fund Implementer outreach and support for Partner Lenders, the ability for participants to work with any local lender, integration with cash incentives, and delivery through a dedicated Trade Ally network.

Pilot Programs

This chapter summarizes pilot programs that are unaffiliated with other residential or nonresidential programs. For CY 2016, these programs were the Manufactured Homes Pilot, the Seasonal Savings Pilot, and the On Demand Savings Pilot. Although the Manufactured Homes Pilot ran in CY 2015, verified savings were reported in CY 2016 because evaluation methods required collecting substantial post-installation usage data.

The following sections provide pilot descriptions, *ex ante* and *ex post* verified gross savings, and describe completed evaluation activities. Table 312 lists the *ex ante* annual and lifecycle gross savings for the new programs and pilots for CY 2016. Consistent with similar programs that are "free" to the customer, Cadmus assumed a NTG of 1.0 for Manufactured Home and Seasonal Savings Pilots. Cadmus did not evaluate On Demand Pilot savings and therefore did not conclude a NTG value.

Table 312. CY 2016 Pilots and New Programs Annual and Lifecycle *Ex Ante* Gross Savings Summary

Program	*Ex Ante* Gross Annual			*Ex Ante* Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Manufactured Homes	141,806	41	6,640	1,858,323	41	127,173
Seasonal Savings	392,779	-	48,281	392,779	-	48,281
On Demand Savings	-	2,847	-	-	2,847	-
Total	**534,585**	**2,888**	**54,921**	**2,251,102**	**2,888**	**175,454**

Table 313 lists the *ex post* annual and lifecycle verified gross savings for the new pilots for CY 2016.

Table 313. CY 2016 Pilots and New Programs Annual and Lifecycle Verified Gross Savings Summary

Program	*Ex Post* Verified Gross Annual			*Ex Post* Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Manufactured Homes	39,706	12	1,660	516,172	12	34,859
Seasonal Savings	441,188	-	48,764	441,188	-	48,764
On Demand Savings[1]	-	-	-	-	-	-
Total	**480,893**	**12**	**50,424**	**957,360**	**12**	**83,623**

[1] On Demand Savings Pilot *ex post* savings were reviewed but were not evaluated.

Manufactured Homes Pilot

The Manufactured Homes Pilot, implemented by WECC in partnership with Northern States Power Company-Wisconsin (NSPW), was offered from September to December 2015. It delivered direct installation of energy efficiency measures and duct sealing to customers who own manufactured homes in La Crosse County. Its objectives were to generate energy savings results that could be evaluated for cost-effectiveness and to assess the potential for a larger, ongoing program exclusively for manufactured homes. The Pilot Implementer, along with the Trade Ally, retrofitted 79 homes, exceeding the contractual goal of 75 homes.

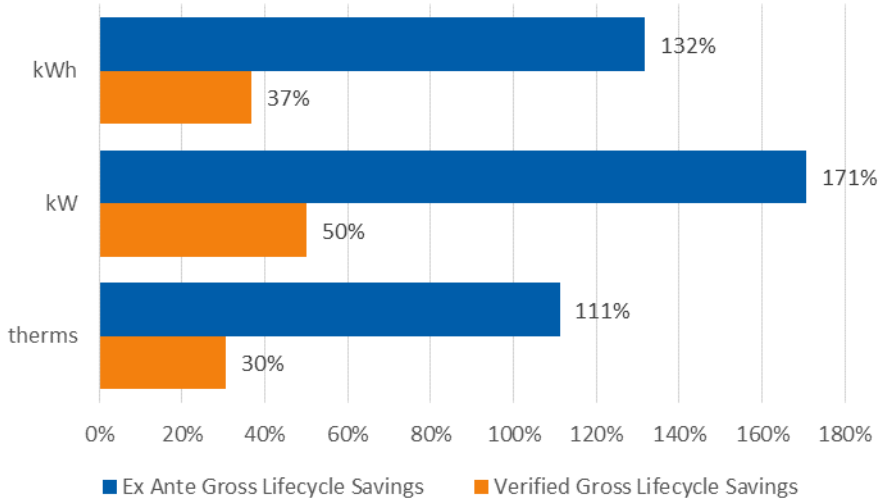
Table 314 lists the actual spending, savings, participation, and cost-effectiveness for the Manufactured Homes Pilot in CY 2015.

Table 314. Manufactured Homes Pilot Summary

Item	Units	CY 2015
Incentive Spending	$	$118,641
Participation	Number of Participants	79
Verified Gross Lifecycle Savings	kWh	516,172
	kW	12
	therms	34,859
Verified Gross Lifecycle Realization Rate	% (MMBtu)	26%
Net Annual Savings	kWh	39,706
	kW	12
	therms	1,660
Annual Net-to-Gross Ratio	% (MMBtu)	100%
Cost-Effectiveness	TRC Benefit/Cost Ratio	0.73

Figure 244 shows the percentage of gross lifecycle savings goals achieved by the Manufactured Homes Pilot in CY 2015. The Pilot met its CY 2015 goals for *ex ante* savings, but it did not meet its CY 2015 goals for verified gross savings.

Figure 244. Manufactured Homes Pilot Percentage of CY 2015 Gross Lifecycle Savings Goals Achieved[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Manufactured Homes Pilot implementation contract goals for CY 2015.

The Manufactured Homes Pilot exhibited low verified gross lifecycle savings compared to its goals. However, this large difference may be more of factor of how the goals were set rather than an inability of the Pilot approach to capture savings in manufactured homes. These factors may have contributed to this result:

- *Ex ante* savings estimates for air sealing and duct sealing were added together, which likely overestimated the actual combined savings, because the measures are known to interact.
- TRM savings for air sealing were based on larger homes and, therefore, represented a much higher overall percentage of manufactured home baseline energy use. For example, on average, the *ex ante* gas savings claimed from air sealing plus major duct sealing represented nearly 40% of the total baseline gas use for these homes. (The possibility that TRM entries may not be accurate for manufactured homes was anticipated by the Pilot Implementer.)
- Electric savings appeared to be overestimated for the external LED 60W equivalent replacement measure, where the Program Implementer reported annual savings of 534 kWh per bulb. This savings is greater than the energy used by one 60W bulb over a year. The Program Implementer reported this issue to CB&I in the summer of 2016.

EM&V Approach

The Evaluation Team conducted impact and process evaluations of the Manufactured Homes Pilot. Customer satisfaction surveys were provided to all 79 participants, and 27 participants responded. For the impact analysis, the team conducted a pre-/post installation billing analysis. Table 315 lists the specific data collection activities and sample sizes used in these evaluations.

Table 315. Manufactured Homes Pilot Data Collection Activities and Sample Sizes

Activity	CY 2015 Sample Size (n)
Pilot Actor Interviews	2
Tracking Database Review	Census
Electric Billing Analysis	Census
Gas Billing Analysis	Census

Pilot Actor Interviews

The Evaluation Team interviewed the Pilot Administrator and the Pilot Implementer in August 2016 to assess the success of the Pilot. Interview topics included pilot performance, Trade Ally engagement, and plans to offer the pilot in the future.

Tracking Database Review

The Evaluation Team conducted a review of the census of the Manufactured Homes Pilot's SPECTRUM tracking data, which involved these tasks:

- Thoroughly reviewed data to ensure that SPECTRUM totals matched the totals the Pilot Administrator reported
- Checked for complete and consistent application of data fields (measure names, application of first-year savings, application of effective useful lives, etc.)

Electric and Gas Billing Analysis

The Evaluation Team conducted billing analyses to estimate the Manufactured Homes Pilot's gross savings for both electric and gas use. The Evaluation Team submitted a request to Xcel Energy in December 2016 for all billing data from January 2014 to December 2016 for all Manufactured Homes Pilot participants. The Evaluation Team received billing data from Xcel Energy for 78 total customers; one participant was found to live outside of their service territory.

The Evaluation Team's billing analysis was based on billing data from a sample of 60 participant electric accounts and 55 participant gas accounts (see attrition tables in Appendix H). The impact of the Manufactured Homes Pilot was assessed by comparing the participants' energy usage before and after measures were installed.

Impact Evaluation

In CY 2015, the Pilot Implementer enlisted 79 participants in the Manufactured Homes Pilot. Measures were selected to achieve a minimum of 10% reduction in energy usage, mainly through a base package of duct sealing and direct-install measures. All 79 participants received Measure Package 1 (Table 316)

during the initial energy audit. More than half of the homes (45 of 79) also received Measure Package 2, which added air sealing if the blower door and pressure pan pre-test determined it was needed.[212]

Table 316. Manufactured Homes Pilot Measure Package 1

Measure	Quantity
Indoor CFL and LED Bulbs	Up to 15
Exterior LED Bulbs	Up to 4
Low Flow Showerhead	1
Kitchen Aerator	1
Bath Aerator	Up to 2
Duct Sealing	1
Water Heater Temperature Setback	1
Carbon Monoxide Detector[1]	1

[1] This measure was installed for safety purposes; no energy savings were reported.

The add-on measures in Table 317 were delivered to homes that had the largest potential to benefit from those measures.[213] Homes that received these measures were determined from results of the blower door and pressure pan tests and the age and operating condition of water heaters and refrigerators. Further, if after testing a home warranted little air sealing, incentives for the home were redirected toward the add-on measures with the biggest energy savings opportunities. Add-on measures were also determined by the field contractor through on-site observations and customer interaction to determine which measures would be most appropriate for individual home conditions.

Table 317. Add-On Measures

Measure	Quantity
Pipe Wrap	Up to 6 feet
Belly Insulation Repair/Touch-Up	n/a
Clothes Dryer Duct Kit	1
Water Heater Replacement	1
HVAC Motor Replacement (to ECM)	1
Refrigerator Replacement	1

212 WECC. *Final Report Manufactured Homes Efficiency Pilot.* March, 2016. Available online: https://projects.cadmusgroup.com/sites/6559-P01/Shared%20Documents/Residential/Pilots/Manufactured%20Homes/Process/Manufactured%20Homes%20Pilot%20FINAL%20Report(Cover).pdf

213 WECC. *Final Report Manufactured Homes Efficiency Pilot.* March, 2016. Available online: https://projects.cadmusgroup.com/sites/6559-P01/Shared%20Documents/Residential/Pilots/Manufactured%20Homes/Process/Manufactured%20Homes%20Pilot%20FINAL%20Report(Cover).pdf

For the impact evaluation, the Evaluation Team conducted a tracking database review and electric and gas billing analyses to verify gross savings.

Evaluation of Gross Savings

The Evaluation Team assessed gross savings for the Manufactured Homes Pilot through the tracking database review and pre-/post-billing analysis.

Tracking Database Review

The Evaluation Team reviewed the census of the CY 2015 Manufactured Homes Pilot data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EUL in adherence to the Wisconsin TRM or other deemed savings sources. The Evaluation Team found no outstanding issues with the tracking database.

Manufactured Homes Pilot Verified Gross Savings

Savings verification for the Manufactured Homes Pilot occurred in early 2017 because evaluation methods required collecting substantial post-installation usage data.

Billing Analysis

To conduct the billing analysis, the Evaluation Team used regression models to measure the impact of energy efficiency measures installed on energy consumption. Specifically, the Evaluation Team evaluated pre- and post-installation energy consumption, accounting for variables such as weather, to measure the impact of the Manufactured Homes Pilot on participant consumption.

The Evaluation Team conducted two separate billing analyses to evaluate *ex post* gross savings for the Manufactured Homes Pilot. Table 318 lists realization rates and precision achieved for each analysis.

Table 318. Manufactured Homes Pilot Billing Analysis Results

Savings Type	Realization Rate	Precision at 90% Confidence
Electricity	28%	38%
Gas	25%	56%
MMBtu	**26%**	**n/a**

The following sections describe the results for each billing analysis the Evaluation Team conducted. Appendix H contains additional details on the methodology and results for these analyses.

Billing Analysis for Electric and Gas Savings

The Evaluation Team used PRInceton Scorekeeping Method (PRISM) models to estimate energy savings and the standard errors around the savings estimates. Table 319 shows the *ex ante* and *ex post* electric and gas gross energy savings as well as realization rates. The PRENAC variable in the table represents the pre-installation weather-normalized usage.

Table 319. Manufactured Homes Pilot Electric Gross Energy Savings from Billing Analysis

Type	*Ex Ante* Savings Per Participant	Net Model Savings (kWh or therms)	Realization Rate	PRENAC	*Ex Ante* Expected Savings Per Customer	*Ex Post* Savings Per Customer
Electric	1,826	513	28%	7,842	23.3%	6.5%
Gas	95	24	25%	649	14.7%	3.7%

On average, participants saved 513 kWh. Compared to the *ex ante* savings estimate of 1,826 kWh, this represents a realization rate of 28%. With an average pre-installation period usage of 7,842 kWh, the savings represent an approximate 6.5% reduction in electrical usage.

On average, participants saved 24 therms. Compared to the *ex ante* savings of estimate of 95 therms, this represents a realization rate of 25%. With an average pre-installation period usage of 649 therms, the savings represent approximately 4% reduction in usage.

Realization Rates

Table 320 lists the realization rates (kWh, kW, and therms) the Evaluation Team calculated from the billing analyses. The Evaluation Team estimated a Manufactured Homes Pilot-level realization rate of 28% for electric energy savings and 25% for natural gas savings, resulting in an overall MMBtu-weighted realization rate of 26%. The realization rates indicate that the reported (*ex ante*) values overestimated both gas and electric savings.

Table 320. Manufactured Homes Pilot Annual Realization Rates

Annual Realization Rate			
kWh	kW[1]	therms	MMBtu
28%	28%	25%	26%

[1] Realization rates for kWh are also applied to kW savings.

Verified Gross Savings Results

Applying the realization rates from the billing analysis to the *ex ante* savings from the tracking database review, the Evaluation Team developed the *ex post* verified gross savings for the Manufactured Homes Pilot. Table 321 lists the *ex ante* and verified annual gross savings (kWh, kW, and therms) for the Manufactured Homes Pilot.

Table 321. Manufactured Homes Pilot Annual Gross Savings Summary

Ex Ante Gross Annual			Verified Gross Annual		
kWh	kW	therms	kWh	kW	therms
141,806	41	6,640	39,706	12	1,660

Table 322 lists the *ex ante* and verified gross lifecycle savings for the Pilot in CY 2016.

Table 322. Manufactured Homes Pilot Lifecycle Gross Savings Summary

Ex Ante Gross Lifecycle			Verified Gross Lifecycle		
kWh	kW	therms	kWh	kW	therms
1,858,323	41	127,173	516,172	12	34,859

Table 323 shows combined annual *ex ante* savings and annual gross verified savings as well as the overall Pilot realization rate.

Table 323. Manufactured Homes Pilot Annual Gross Savings and Realization Rate

Total Annual *Ex Ante* Gross Savings	Total Annual Gross Verified Savings	Realization Rate
1,148	301	26%

Evaluation of Net Savings

In adherence with similar Focus on Energy programs where the customer received the benefits at no cost to them, the Evaluation Team applied a NTG ratio of 1.0 to the Manufactured Homes Pilot. Applying this NTG rate to the gross savings from the billing analysis, the Evaluation Team calculated the evaluated net savings for the Pilot. Table 324 shows the annual net energy impacts (kWh, kW, and therms) for the Pilot.

Table 324. Manufactured Homes Pilot Annual Net Savings Results

Verified Net Annual		
kWh	kW	therms
39,706	12	1,660

Table 325 shows the lifecycle net energy impacts (kWh, kW, and therms) for the Pilot.

Table 325. Manufactured Homes Pilot Lifecycle Net Savings Results

Verified Net Lifecycle		
kWh	kW	therms
516,172	12	34,859

Process Evaluation

Marketing, Outreach, and Engagement

The Manufactured Homes Pilot was delivered to 11 manufactured home communities in La Crosse County. The Pilot focused marketing in this area because of a limited budget and timeframe and for ease of recruitment. Marketing and outreach occurred in October 2015 via direct mail to customers, park managers, and community service organizations providing low-income housing services. In addition, a

vanity link was added to the Focus on Energy website with Manufactured Homes Pilot details. Recruitment efforts sparked interest from 121 customers (which was more than the Pilot was able to serve because of budget and time restraints). The Pilot served customers on a first-come, first-serve basis.

To be eligible for the Pilot, customers had to receive both gas and electric service from a participating Focus on Energy utility and own or rent a manufactured/mobile home. In addition, the Pilot intended to serve customers with annual incomes of 60% to 80% of Wisconsin's state median income (SMI) level. The targeted income range was a guideline for the Manufactured Homes Pilot and not a rigid requirement. Customers contacted the Pilot Implementer's call center to sign up. Once the customer was considered eligible, the Pilot Implementer shared the customer's contact information with the Trade Ally, who scheduled an assessment. Customers signed a participation agreement and utility data release form before any work was done. While at the home, the Trade Ally provided an educational book, a Manufactured Homes Pilot flyer, cross-promotional Focus on Energy flyer, and a customer satisfaction survey. In addition, the Trade Ally provided customer education on thermostat settings, changing furnace filters, and the usage of high electric-consuming items.

Participant Satisfaction

The Pilot Implementer fielded satisfaction surveys to measure the success of the Pilot. All 79 participants received satisfaction surveys, and 27 (34%) responded. Respondents were asked to rate their experience with Focus on Energy, the appointment scheduler, and the Trade Ally who visited their home. On a scale of 1 to 10, with 10 being the highest score, participants rated their satisfaction with the Manufactured Homes Pilot very highly:

- Eighteen out of 25 respondents rated their overall satisfaction with Focus on Energy as a 10 out of 10, and another five gave Focus on Energy an 8 or 9.
- Nineteen out of 27 respondents were fully satisfied (10 out of 10) with the individual who scheduled their appointment, and another six rated them an 8 or 9.
- The highest satisfaction scores were given to the Trade Ally who visited customers' homes. Twenty-two out of 27 rated their satisfaction as 10 out of 10 with the Trade Ally, and an additional five gave a rating of an 8 or 9.[214]

Participant Demographics

In 1993, the U.S. Department of Housing and Urban Development significantly updated the codes related to manufactured homes, and the Manufactured Homes Pilot sought to identify energy savings

[214] WECC. *Final Report Manufactured Homes Efficiency Pilot.* March, 2016. Available online: https://projects.cadmusgroup.com/sites/6559-P01/Shared%20Documents/Residential/Pilots/Manufactured%20Homes/Process/Manufactured%20Homes%20Pilot%20FINAL%20Report(Cover).pdf

opportunities for manufactured homes constructed before and after the change in code. Of the 79 participating homes, 53 (67%) were built after 1993, and 26 (33%) were built before 1993.

Nearly all participants' homes were heated by natural gas, with 78 out of 79 participating homes identified as using natural gas as their primary heat source. Pilot participants had a greater proportion of natural gas furnaces compared to the rest of Wisconsin (99% versus 70%, respectively). Almost one quarter (24%) of participating manufactured homes had gas water heaters (19 homes), and roughly three quarters had electric water heaters (60 homes, or 76%). No participant homes had water heaters fueled by propane or other fuels. Sixty-five homes (82%) had central air conditioning.

The Manufactured Homes Pilot targeted occupants of manufactured homes with annual income levels between 60% and 80% of Wisconsin's SMI levels so that the Pilot would not overlap with current state weatherization programs available to families under 60% of the SMI level. Of the Pilot's participants, 41% fell within the SMI target and 58% were below the target. However, because the Pilot Implementer's subcontractor served a limited number of natural gas heated manufactured homes in the federal weatherization program in La Crosse County while the Manufactured Homes Pilot was in operation, the Pilot Implementer decided to offer the Pilot to customers with incomes below 60% of Wisconsin's SMI and to not leave those customers unserved. Excluding that population would have put the Pilot at risk of not hitting its participation target in the two-month timeframe it was being offered.

The majority of the heads of households (44 out of 79) participating in the Manufactured Homes Pilot had a high school education, and another 19 had technical degrees. An additional 16 attended some college or obtained degrees. The participant population represents a mix of age groups, with 75 out of the 106 (71%) home occupants over 40 years old and 37 (35%) of those over 60 years old.[215]

Pilot Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 326 lists the incentive costs for the Manufactured Homes Pilot for CY 2016.

Table 326. Manufactured Homes Pilot Incentive Costs

	CY 2015
Incentive Costs	$118,641

[215] WECC. *Final Report Manufactured Homes Efficiency Pilot.* March, 2016. Available online: https://projects.cadmusgroup.com/sites/6559-P01/Shared%20Documents/Residential/Pilots/Manufactured%20Homes/Process/Manufactured%20Homes%20Pilot%20FINAL%20Report(Cover).pdf

The Evaluation Team found the CY 2015 Pilot was not cost-effective (0.73). Table 327 lists the evaluated costs and benefits.

Table 327. Manufactured Homes Pilot Costs and Benefits

Cost and Benefit Category	CY 2015
Costs	
Administration Costs	$5,266
Delivery Costs	$109,254
Incremental Measure Costs	$0[1]
Total Non-Incentive Costs	**$114,520**
Benefits	
Electric Benefits	$54,014
Gas Benefits	$20,160
Emissions Benefits	$9,622
Total TRC Benefits	**$83,796**
Net TRC Benefits	**($30,724)**
TRC B/C Ratio	**0.73**

[1]Incremental measure costs were not evaluated for the Manufactured Homes Pilot; were they included, the cost effectiveness of the Pilot would further decrease.

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Manufactured Homes Pilot.

Outcome 1. The billing analysis found that the Manufactured Homes Pilot had overestimated its electric savings and gas savings. The Evaluation Team found that both electric and gas savings were overestimated for the Manufactured Homes Pilot. As mentioned in this chapter, a number of factors appear to contribute to this overestimation. The two largest were the use of air and duct sealing TRM measures that were based on larger homes and the apparent misidentification of external lighting LED savings.

Recommendation 1. Any future offerings informed by this Pilot should try to minimize known interactive effects in their planning estimations, and ensure that deemed measures are aligned with the right participant group (e.g., air sealing and duct sealing savings estimates that are based on manufactured home specific data and/or engineering calculations).

Outcome 2. The billing analysis found higher gas savings for older homes and higher energy users. The Evaluation Team noted that higher gas savings were achieved when measures were applied to older homes (built pre-1993) or homes with greater baseline gas use (in the top two quartiles).

Recommendation 2. Any future offerings informed by this Pilot should target homes built before 1993 and/or homes with higher baseline energy use to maximize energy savings.

Seasonal Savings Pilot

The Seasonal Savings Pilot, implemented by Nest Labs, was offered in both winter and summer 2016. It used an algorithm to make small, energy-saving adjustments to thermostat setpoints during peak summer and/or winter months in qualifying homes with Nest thermostats. Its objective was to generate kWh and therms savings through these minor setpoint changes without affecting homeowner comfort. The Pilot Implementer enlisted 6,746 customers for the winter program and 9,822 customers for the summer program. The Program Administrator did not enroll customers that received an incentive through the Smart Thermostat Pilot offering. This was done to ensure the savings being detected through the Smart Thermostat Pilot did not include savings from Nest Labs algorithm adjustments.

Other than zip code, no customer information was collected during the Seasonal Savings Pilot. Nest algorithms used customer temperature setpoints and schedules, along with additional information gathered from Nest thermostats, to determine eligibility for the Seasonal Savings Pilot. Qualifying participants can opt in to the Seasonal Savings Pilot through their Nest thermostat. An algorithm is then applied remotely over a period of three weeks and adjusts temperature settings slightly up or down during the winter and summer seasons.

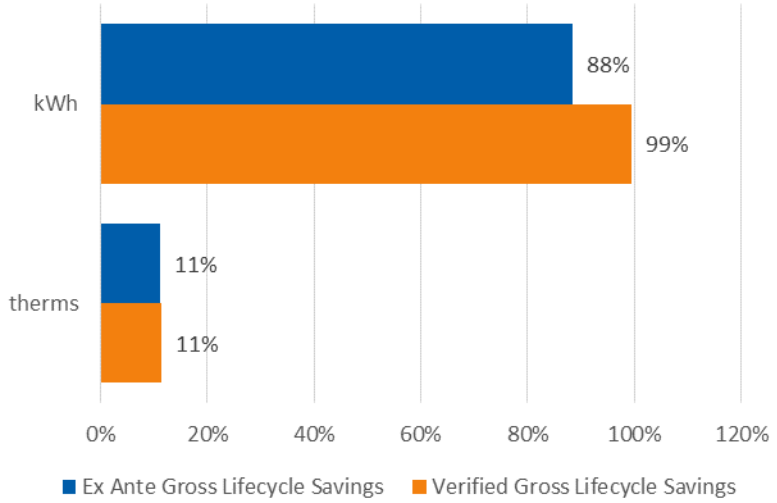
Table 328 lists the spending, savings, participation, and cost-effectiveness for the Seasonal Savings Pilot. No demand savings were claimed for the Seasonal Savings Pilot.

Table 328. CY 2016 Seasonal Savings Pilot Summary

Item	Units	Winter 2016	Summer 2016
Incentive Spending	$	-	-
Participation	Number of Participants	6,746	9,822
Verified Gross Lifecycle Savings	kWh	54,426	386,762
	kW	-	-
	therms	48,764	-
Verified Gross Lifecycle Realization Rate	% (MMBtu)	102%	108%
Net Annual Savings	kWh	54,426	386,762
	kW	-	-
	therms	48,764	-
Annual Net-to-Gross Ratio	% (MMBtu)	100%	100%
Cost-Effectiveness	TRC Benefit/Cost Ratio		0.63

Figure 245 shows the percentage of gross lifecycle savings goals achieved by the Seasonal Savings Pilot in CY 2016. The Pilot was very close to meeting its electric savings goals for CY 2016, but did not meet its therms savings goals.

Figure 245. Seasonal Savings Pilot Percentage of CY 2016 Gross Lifecycle Savings Goals Achieved[1]



[1] For *ex ante* gross lifecycle savings, 100% reflects the Seasonal Savings Pilot Implementation contract goals for CY 2016.

The Seasonal Savings Pilot's low therms savings performance resulted from lower than expected participation during the Pilot's initial winter deployment and because the winter algorithm was not optimized correctly. Nest identified the issue with the algorithm and made adjustments that will be applied in future winter periods.

EM&V Approach

The Evaluation Team conducted an impact evaluation of the Seasonal Savings Pilot. For the impact analysis, the Evaluation Team used a combination of thermostat data review and billing analysis to verify implementer savings estimates. Table 329 lists the specific data collection activities and sample sizes used in these evaluations.

Table 329. CY 2016 Seasonal Savings Pilot Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Tracking Database Review	Census
Thermostat Data Review	Census
Electric Billing Analysis (Smart Thermostats Pilot Data)	1,610
Gas Billing Analysis (Smart Thermostats Pilot Data)	1,842

Tracking Database Review

The Evaluation Team conducted a review of the census of the Seasonal Savings Pilot's SPECTRUM tracking data, which included these tasks:

- Thorough review of data to ensure the SPECTRUM totals matched the totals that the Seasonal Savings Pilot Administrator reported
- Check for complete and consistent application of data fields (application of first-year savings, application of effective useful lives, etc.)

Thermostat Data Review

The Evaluation Team conducted a review of Nest thermostat participant data to verify Pilot Implementer's percentage savings estimates. In December 2016, the Evaluation Team submitted a request to Nest for hourly thermostat data for all Seasonal Savings Pilot participants and for a control group of Smart Thermostat Pilot participants that use Nest thermostats. The Evaluation Team requested data over the period from January 6, 2015, to December 9, 2016.

The Evaluation Team received daily thermostat data from Nest for the periods during which the Seasonal Savings Pilot was in effect (December 2015 to April 2016 for the winter deployment and June 2016 to October 2016 for the summer) for 6,746 winter and 9,822 summer participants. The requested control group data were provided for the summer deployment, but not the winter deployment. The control group provided by Nest for the winter deployment was taken from Nest thermostats in neighboring states with similar climates (e.g., Illinois).

Electric and Gas Billing Analysis

The Evaluation Team utilized billing data from Smart Thermostat Pilot participants to evaluate Seasonal Savings Pilot Implementer's furnace consumption estimates (which were originally derived from the TRM). The Evaluation Team used billing data received from We Energies and Wisconsin Public Service for the Smart Thermostat Pilot, including only those participants that installed Nest thermostats.

The Evaluation Team's billing analysis was based on billing data from a sample of 1,610 Smart Thermostat Pilot participant electric accounts and 1,842 Smart Thermostat Pilot participant gas accounts; each of these Smart Thermostat Pilot participants had Nest thermostats. The impact of the Seasonal Savings Pilot was assessed by applying verified Seasonal Savings Pilot implementer savings percentages to billing-data-derived electric and gas HVAC use.

Impact Evaluation

The Pilot Implementer calculated *ex ante* savings based on changes in scheduled heating/cooling setpoints from algorithm launch until the end of the season (e.g., April for winter deployment). It then converted these overall setpoint differences to energy savings by two main factors—there was a 4.5% (9.2%) reduction in heating (cooling) run time per degree change in setpoint, and the gas and electricity use per hour of run time was derived from Wisconsin TRM assumptions. The Evaluation Team used the

provided thermostat data with Smart Thermostat Pilot billing data to confirm the overall Pilot Implementer setpoint changes and evaluate both of these conversion factors.

In CY 2016, the Seasonal Savings Pilot enlisted 6,746 participants in the winter portion of the program and 9,822 participants in the summer portion of the program. For the impact evaluation, the Evaluation Team conducted a tracking database review, thermostat data review, and electric and gas billing analyses to verify gross savings.

Evaluation of Gross Savings

The Evaluation Team assessed gross savings for the Seasonal Savings Pilot through the tracking database review, thermostat data review, and complimentary billing analysis.

Tracking Database Review

The Evaluation Team reviewed the census of the CY 2015 Seasonal Savings Pilot data contained in SPECTRUM for appropriate and consistent application of unit-level savings and EUL in adherence to the TRM or other deemed savings sources. The Evaluation Team found no outstanding issues with the tracking database.

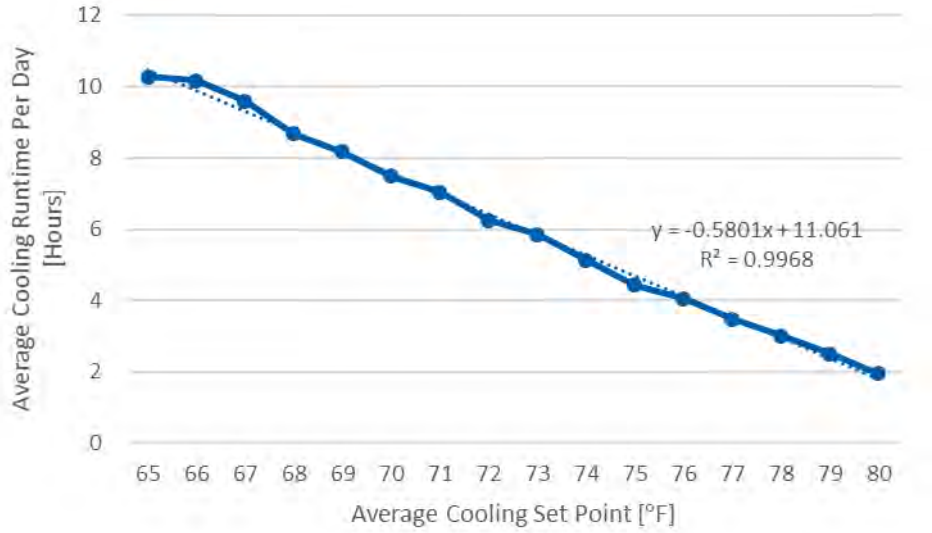
Seasonal Savings Pilot CY 2016 Verified Gross Savings

Thermostat Data Review

The Evaluation Team conducted a review of participant thermostat data that began with a simple confirmation of overall setpoint changes attributable to the program for both winter and summer seasons. The Evaluation Team further used this data to correlate furnace runtime to setpoint temperature for both winter and summer seasons.

Simple linear relationships were fit between runtime and setpoint temperature for each season (e.g., Figure 246). The results of these analyses showed savings of 5.7% per degree setpoint in winter and 10% per degree setpoint in summer. This suggests that Seasonal Savings Pilot Implementer estimates of 4.5% savings per degree of setpoint change in winter and 9.2% savings per degree of setpoint change in summer are reasonable (and possibly slightly conservative) estimates. Appendix H contains additional details regarding this portion of the analysis.

Figure 246. Seasonal Savings Participant Summer Cooling Run Time by Thermostat Cooling Setpoint



Billing Analysis

The Evaluation Team used Smart Thermostat billing data to determine electric and gas realization rates for the Seasonal Savings Pilot. Specifically, the Evaluation Team used PRISM models to isolate HVAC energy use over winter and summer seasons for Smart Thermostat Pilot participants using Nest thermostats.

The resulting overall winter and summer HVAC use was then adjusted by the fraction of total HDD and CDD contained in the Seasonal Savings Pilot period of interest. Percentage savings (derived from measured setpoint changes attributable to the program) were applied to this baseline HVAC use.

The Evaluation Team conducted two separate billing analyses to evaluate *ex post* gross savings for the Seasonal Savings Pilot. Table 330 lists realization and precision rates achieved for each analysis. It should be noted that this precision specifically applies to the estimate of overall HVAC energy use by Nest thermostat customers participating in the Smart Thermostat Pilot.

Table 330. CY 2016 Seasonal Savings Pilot Program Billing Analysis Results

Season	Savings Type	Realization Rate	Precision at 90% Confidence[1]
Winter	Electricity	157%	31%
	Gas	101%	9%
Summer	Electricity	108%	9%
Total MMBtu		**103%**	**n/a**

[1] The reported precision specifically applies to the estimate of overall HVAC energy use by Nest thermostat customers participating in the Smart Thermostat Pilot.

The following sections describe the results for each billing analysis the Evaluation Team conducted. Appendix H contains additional details on the methodology and results for these analyses.

Billing Analysis for Electric Savings

The Evaluation Team used PRISM models to estimate realization rates (via estimation of HVAC use). Table 331 shows the *ex ante* and *ex post* electric gross energy savings as well as realization rates.

Table 331. CY 2016 Seasonal Savings Pilot Electric Gross Energy Savings from Billing Analysis

Season	*Ex Ante* Savings per Participant	Net Model Savings (kWh)	Realization Rate	Energy Usage – Deployment Period (kWh)	*Ex Ante* Expected Savings Per Customer	*Ex Post* Savings Per Customer
Winter	5.3	8.3	157%	444	1.2%	1.9%
Summer	37	40	108%	1,143	3.2%	3.5%

On average, residents that participated in both winter and summer Seasonal Savings Pilot deployments saved approximately 48 kWh. Using total *ex ante* savings estimates, overall kWh realization rates are 112%, with typical HVAC kWh use reductions of approximately 3%.

Billing Analysis for Gas Savings

The Evaluation Team used PRISM models to estimate realization rates (via estimation of HVAC use). Table 332 shows the *ex ante* and *ex post* gas gross energy savings as well as the realization rates.

Table 332. CY 2016 Seasonal Savings Pilot Evaluated Gas Gross Energy Savings from Billing Analysis

Ex Ante Savings per Participant	Net Model Savings (therms)	Realization Rate	Energy Usage – Deployment Period (therms)	*Ex Ante* Expected Savings Per Customer	*Ex Post* Savings Per Customer
7.2	7.3	101%	389	1.9%	1.9%

On average, participants saved 7 therms, which is consistent with ex ante savings estimates and a gas realization rate of 101%. With an average HVAC deployment-period usage of 389 therms, the savings represent approximately a 2% reduction in HVAC usage.

Realization Rates

Table 333 lists the realization rates (kWh, kW, and therms) the Evaluation Team calculated from the billing analyses. The Evaluation Team estimated a Seasonal Savings Pilot-level realization rate of 112% for electric energy savings and 101% for natural gas savings, resulting in an overall MMBtu-weighted realization rate of 103%. The realization rates indicate that the reported (*ex ante*) values were good estimates of both gas and electric savings (and, by association, that TRM furnace energy use estimates are a good approximation of the building stock represented by the Smart Thermostat Pilot subsample).

Table 333. CY 2016 Seasonal Savings Pilot Annual Realization Rates

Annual Realization Rate			
kWh	kW	therms	MMBtu
112%	-	101%	103%

Verified Gross Savings Results

Applying the realization rates from the billing analysis to the *ex ante* savings from the tracking database review, the Evaluation Team developed the *ex post* verified gross savings for the Seasonal Savings Pilot. Table 334 lists the *ex ante* and verified annual and lifecycle gross savings (kWh, kW, and therms) for the Seasonal Savings Pilot. Lifecycle savings are the same as annual savings because savings are assumed to only accrue during the Seasonal Savings Pilot period.

Table 334. CY 2016 Seasonal Savings Pilot Annual and Lifecycle Gross Savings Summary

Ex Ante Gross			Verified Gross		
kWh	kW	therms	kWh	kW	therms
392,779	-	48,281	441,188	-	48,764

Table 335 shows combined annual *ex ante* savings and annual gross verified savings as well as the overall Seasonal Savings Pilot realization rate.

Table 335. CY 2016 Seasonal Savings Pilot Annual Gross Savings and Realization Rate

Total Annual *Ex Ante* Gross Savings	Total Annual Gross Verified Savings	Realization Rate
6,168	6,382	103%

Evaluation of Net Savings

The Evaluation Team applied a NTG ratio of 1.0 to the Seasonal Savings Pilot. The PSC approved use of this NTG ratio because Nest already based their savings estimates off of a control population, and the Seasonal Savings offering was not available to all customers, so the likelihood of freeridership is low. Applying this NTG rate to the gross savings from the billing analysis, the Evaluation Team calculated the evaluated net savings for the Pilot. Table 336 shows the annual and lifecycle net energy impacts (kWh, kW, and therms) for the Pilot.

Table 336. CY 2016 Seasonal Savings Pilot Annual and Lifecycle Net Savings Results

Verified Net Annual		
kWh	kW	therms
441,188	-	48,764

Pilot Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management program. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix F includes a description of the TRC test.

Table 337 lists the incentive costs for the Seasonal Savings Pilot for CY 2016.

Table 337. Seasonal Savings Pilot Incentive Costs

	CY 2016
Incentive Costs	$0

The Evaluation Team found the CY 2016 Pilot was not cost-effective (0.63). Table 338 lists the evaluated costs and benefits.

Table 338. Seasonal Savings Pilot Costs and Benefits

Cost and Benefit Category	CY 2016
Costs	
Administration Costs	$28,944
Delivery Costs	$66,006
Incremental Measure Costs	$0
Total Non-Incentive Costs	**$94,951**
Benefits	
Electric Benefits	$15,553
Gas Benefits	$33,696
Emissions Benefits	$10,143
Total TRC Benefits	**$59,391**
Net TRC Benefits	**($35,559)**
TRC B/C Ratio	**0.63**

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the Seasonal Savings Pilot.

Outcome 1. Direct evaluation is challenging without access to customer billing data. The independence and reliability of evaluation could be enhanced by providing participant information.

Recommendation 1. CB&I and Nest should explore the feasibility of obtaining participant data in future contracts.

On Demand Savings Pilot

Focus on Energy funded the On Demand Savings Pilot, a program for select commercial and industrial customers of Madison Gas and Electric (MGE). The On Demand Savings Pilot operated from June 1, 2015, through December 31, 2016. The Pilot sought to test how a rate change to higher monthly charges, lower energy charge per kWh, and higher demand charges per kW would affect business customer behavior. The Pilot offered customers incentives to limit on-peak electrical demand in their facility. The Pilot offered incentives for measurable kW reductions during MGE peak usage times of 10:00 a.m. to 9:00 p.m., Monday through Friday, during the months of June through September, excluding holidays.

By participating in the On Demand Savings Pilot, customers learned about their specific building's demand profile and identified both manual and automated load management strategies to reduce their peak electrical demand. The Pilot provided customers with access to an energy dashboard called MyMeter that allowed them to view their building's electrical demand in near real time at monthly, daily, hourly, or 15-minute intervals. This visibility into their electrical demand allowed customers to define, implement, and refine demand reduction strategies specific to their facilities.

The On Demand Savings Pilot Administrator did not formally claim savings from the program. PSC directed the Evaluation Team to solely undertake a process evaluation of the On Demand Savings Pilot for CY 2016. The Evaluation Team did not conduct an impact evaluation to verify gross or net savings for CY 2016 nor calculate program cost-effectiveness. Table 339 lists the *ex ante* savings reported by the program, the final On Demand Savings Pilot spending, and the number of participants.

Table 339. On Demand Savings Pilot Summary

Item	Units	CY 2016
Incentive Spending	$	$335,852
Participation	Number of Participants	33
Ex Ante Annual Savings	kWh	0
	kW[1]	2,847
	therms	0

[1] kW reductions are based on the peak period defined in the paragraph above, which differs from the peak period for kW reductions for other Focus on Energy programs.

EM&V Approach

The Evaluation Team conducted a process evaluation for the On Demand Savings Pilot in CY 2016. The Evaluation Team designed its evaluation approach to integrate multiple perspectives in assessing the On Demand Savings Pilot performance. Table 340 lists the specific data collection activities and sample sizes used in the evaluation.

Table 340. On Demand Savings Data Collection Activities and Sample Sizes

Activity	CY 2016 Sample Size (n)
Pilot Actor Interviews	2
Tracking Database Review	Census
Round 1 Participant Interviews	11
Round 2 Participant Interviews	17

Pilot Actor Interviews

In March 2016, the Evaluation Team interviewed staff from the On Demand Savings Pilot Administrator (CB&I) and the Pilot Implementer (Franklin Energy) to learn about the status of the Pilot at that time. The interviews covered topics such as Pilot design and goals, marketing strategies, and the MyMeter platform to gain a better understanding of high-level changes, successes, and concerns.

Round 1 Participant Interviews

The Evaluation Team conducted telephone interviews with 11 customers who participated in the early stages of the On Demand Savings Pilot, from June through December of 2015. These interviews focused on the participants' experience during the early stages of the Pilot to identify opportunities for improvement.

The survey covered the participants' introduction to the On Demand Savings Pilot, experiences with the recruitment and onboarding processes, and satisfaction with the MyMeter energy dashboard. The interviews also evaluated the types of demand reduction strategies offered through the Pilot and the degree to which participants implemented these strategies to reduce their peak demand. Finally, the survey included questions to determine whether the Pilot had influenced customers' behavior related to managing their electrical demand.

Round 2 Participant Interviews

In January 2017, the Evaluation Team conducted a second round of participant interviews after the conclusion of the On Demand Savings Pilot. The Evaluation Team set a target of 10 interviews with Round 1 interview participants and 10 participants not previously interviewed. The Evaluation Team interviewed five participants from Round 1 and 12 participants not previously interviewed. The Round 2 interviews covered the same topics as the Round 1 interviews, with additional questions about Pilot outcomes and participant satisfaction.

Process Evaluation

In CY 2016, the Evaluation Team conducted interviews as part of the process evaluation activities. The Evaluation Team focused the process evaluation on these key topics for the On Demand Savings Pilot:

- Participant engagement and satisfaction with various On Demand Savings Pilot components
- Experience with the MyMeter energy dashboard and MyMeter training
- Understanding and effectiveness of demand reduction strategies

On Demand Savings Pilot Design, Delivery, and Goals

The On Demand Savings Pilot offered incentives to participants and their associated Trade Allies to reduce peak demand during the program's peak hours. The On Demand Savings Pilot Administrator and Implementer worked together to deliver the Pilot.

On Demand Savings Pilot Design

Focus on Energy created the On Demand Savings Pilot to augment existing efficiency programs. The Pilot engages customers and prompts them to identify and implement peak demand management strategies within their facilities. One of the Pilot's main goals is to educate participants about the importance of managing their peak electrical demand during MGE peak hours. The Pilot Implementer established a unique demand profile for each customer. The Pilot Implementer then collaborated with each participant to develop workable strategies that reduce peak period demand while minimizing disruptions to operations or occupant comfort.

The On Demand Savings Pilot targeted business customers in MGE's service territory with a monthly demand of 20 kW or greater who were willing to install a pulse meter relay contact at their billing meters and connect it to their energy management systems (EMS).[216] Either the Trade Ally or the participant's facility staff programmed the EMS to respond automatically to the demand by executing demand reduction routines (e.g., adjust HVAC equipment schedules or setpoints, process load limiting, or initiate changes to lighting). While most participants had an EMS, the On Demand Savings Pilot also served a few customers who met the monthly demand threshold, but did not have an EMS or only had a limited system. The customers without an EMS or limited system participated by manually implementing demand reduction strategies.

The On Demand Savings Pilot offered incentives to the participants and their affiliated EMS Trade Allies. Table 341 lists the various Pilot incentives.

Table 341. On Demand Savings Pilot Incentives

Incentive Item	Incentive Rate
kW (average peak demand between 10:00 p.m. and 9:00 p.m. weekdays during June through September)	$10/kW (monthly, June – September)
Pulse meter reimbursement to customer	$500/meter
EMS meter connection co-pay	Up to $1,500/site
MyMeter energy dashboard (implementation budget)	FREE
Trade Ally performance incentive	$100/kW implemented (average annual)
Efficiency bonus for existing business program participation	10% bonus on total incentive of measures with kW savings

[216] An EMS is a system of computer-aided tools used by building operators to monitor, control, and optimize the performance of building systems such as HVAC, manufacturing processes, and lighting. In this instance, the goal is to utilize the EMS to reduce electric demand during the utility peak demand periods.

On Demand Savings Pilot Management and Delivery Structure

In CY 2016, the On Demand Savings Pilot Implementer and its subcontractors (EnerNex and Accelerated Innovations) were responsible for managing and administering the Pilot. The Pilot Administrator managed the overall Pilot, whereas the Pilot Implementer designed the pilot elements, recruited, trained and managed customers and Trade Allies, executed the day-to-day operations such as data management, incentives processing, and participant experience (including fielding customer complaints).

EnerNex was responsible for designing a holistic baseline approach for the On Demand Savings Pilot; and working with participants to identify and implement demand limiting strategies that reduce on-peak demand.

Accelerated Innovations was responsible for integrating the MyMeter energy engagement platform into various data management systems provided by MGE and training all On Demand Savings Pilot staff and participants on MyMeter capabilities.

The Trade Allies consisted of organizations that provide products, installation services, and operational services for EMS. The Trade Allies worked under the direction of the customer to install the required hardware, identify demand reduction strategies, and make programming changes to implement the demand reduction strategies.

On Demand Savings Pilot Goals

The On Demand Savings Pilot established a CY 2016 goal of 2,500 kW reduction in demand across the participating customers. This goal was supported by establishing a minimum 10% demand reduction for each participating customer for each peak participation month as compared to their baseline electrical demand. The Pilot Implementer established a baseline demand for each customer by determining the maximum peak demand for each month during the defined peak period using two years of billing data. The MGE defined *peak period* as 10:00am to 9:00pm, Monday through Friday, June through September, excluding holidays. The On Demand Savings Pilot defined *monthly demand savings* as the historical baseline month peak minus the participation month peak.

According to *Focus on Energy On Demand Savings Final Pilot Report* published in January 2017, the On Demand Savings Pilot achieved an average monthly demand reduction of 2,813 kW, or 112.5% of the CY 2016 goal.

Additionally, the On Demand Savings Pilot sought to achieve demand savings while ensuring customer satisfaction through high-touch relationships. The Pilot Implementer nurtured relationships through a series of monthly meetings to review progress and discuss additional demand reduction strategies. Participant surveys showed favorable findings for this approach, with high satisfaction ratings for communication and the Pilot overall.

Table 342 lists the On Demand Savings Pilot KPIs and the associated results.

Table 342. On Demand Savings Pilot CY 2016 Key Performance Indicators

KPI	Goal	CY 2016 Result	CY 2016 Result Source
Customer Participation	Enroll 40 MGE customers in the On Demand Savings Pilot	Exceeded goal: enrolled 42 customers	Received participant tracking spreadsheet from the On Demand Savings Pilot Implementer on December 11, 2016
Trade Ally Participation	Enroll five Trade Allies by March 2016	Exceeded goal: enrolled 16 Trade Allies by March 2016	Interviewed On Demand Savings Pilot Implementer
Customer satisfaction	Achieve average customer satisfaction ratings of 8.5 out of 10	Exceeded goal: overall On Demand Savings Pilot satisfaction rating of 9.2 out of 10	Interviewed participants in two rounds

Data Management and Reporting

In CY 2016, the On Demand Savings Pilot Implementer managed data and had the ability to generate reports through SPECTRUM. The Administrator and Implementer effectively tracked customer data, the approval process, Trade Ally data, incentive payments, and project documents.

Marketing and Outreach

The On Demand Savings Pilot Implementer and MGE recruited participants from MGE's large commercial and industrial electric customers who were likely to be able to reduce or shift loads during on-peak periods. Either MGE or the Pilot Implementer's account managers recruited by telephone. Recruiters prioritized customers with high summertime demand, a pulse output isolation relay already connected to their electric meter,[217] and a functioning EMS in place.

Interviewed participants all reported they were contacted by either MGE or the On Demand Savings Pilot Implementer.

Customer Experience

In CY 2016, the Evaluation Team conducted telephone interviews with 23 unique participants. The interviews allowed the Evaluation Team to assess customer participation experience and satisfaction.

Recruitment Meeting

The On Demand Savings Pilot Implementer organized meetings with existing MGE customers to provide an overview of the Pilot. Sixteen out of 23 respondents said that the Pilot representatives presented the scope and intent of the program very effectively. Five out of 23 respondents said the Pilot Implementer presented the scope and intent of the Pilot somewhat effectively. Two respondents reported that they

[217] The pulse output isolation relay is connected to the customer's billing meter and sends contact closures (pulses) to the EMS. Where customers did not have this already, Focus on Energy provided an incentive to install it under the On Demand Savings Pilot.

did not attend a formal recruitment meeting because they joined late in the On Demand Savings Pilot period. Seven out of 21 respondents who attended recruitment meetings said the Pilot Implementer could have provided more clarity about certain information. When asked what the representatives could have provided more clarity on, respondents most commonly said they would like additional information about the demand rate structure and the Pilot incentives.

Onboarding Meeting

After customers enrolled in the On Demand Savings Pilot, the Pilot Implementer held an onboarding meeting with the customer and the Trade Ally to discuss the hardware implementation, the customer's historical baseline demand, and the existing building equipment list. The customer, Pilot Implementer, and Trade Ally collaborated to develop a prioritized list of potential demand reduction opportunities and strategies to reduce the customer's peak demand.

Twenty-one out of 23 respondents reported that the appropriate people attended the meetings. The typical attendees included the customer's facility staff, IT staff, EMS Trade Ally, and other contractors. One respondent would have preferred that the EMS contractor's programmer had attended the meeting (rather than the contractor's salesperson) because the programmer was the one who would perform the work. A second respondent would have liked the chiller maintenance company to attend because the chiller optimization would be a large part of the demand reduction.

Twenty out of 23 respondents reported that the historical baseline demand presented for their buildings was easy to understand; three said they initially had trouble understanding the baseline, but it became clearer as they moved along in the On Demand Savings Pilot.

During the onboarding meeting, 18 out of 23 interviewed participants reported that the recommended demand reduction strategies were appropriate for their building. The remaining five customers said the strategies were not too appropriate; this was largely because the demand at these facilities was driven by factors the participants could not mitigate during peak hours (e.g., guest room activity and theater performances). One participant said the suggestion to curtail elevator use during peak periods would not work at a hospital facility. Two facilities did not have an EMS and, therefore, the participants could only implement manual strategies.

When asked about suggestions to improve the onboarding process, most respondents said the process went very well and did not offer any improvement suggestions. One respondent suggested focusing more on how the demand rates are structured because he did not have a thorough understanding of how the rates impact the facility's utility bills.

Monthly Review Meetings

During the On Demand Savings Pilot's peak months, the Pilot Implementer held review meetings with participants to evaluate savings, goal performance, and demand reduction strategies implemented to date. The Evaluation Team incorporated questions into the Round 2 interview guide to assess participants' reactions to the meetings occurring later in the Pilot process.

All respondents attended the monthly review meetings. Fifteen out of 17 participants interviewed in Round 2 were satisfied with the information they received and had no further suggestions for improving the monthly meetings. One respondent would have liked to have started the On Demand Savings Pilot earlier in the year to allow for more time to prepare before the peak demand months. One respondent suggested that the monthly meeting would be a good time to discuss other On Demand Savings Pilot offerings and incentives available from Focus on Energy.

MyMeter Dashboard

The On Demand Savings Pilot Implementer provided access to the MyMeter energy dashboard to Pilot participants. MyMeter is a web-based software platform that provides visualization and other tools to help customers manage their peak electrical demand. The Pilot Implementer loaded MyMeter with two years of historical data and, in most cases, connected it to the participants' billing meters via their EMS and IT network to allow for near real-time collection of data for the dashboard. Participants could create text or e-mail alerts that notified them when the building's demand exceeded certain thresholds.

Two participants reported difficulty with installing the billing meter hardware and setting the pulse multiplier to correctly reflect the building demand in the EMS.

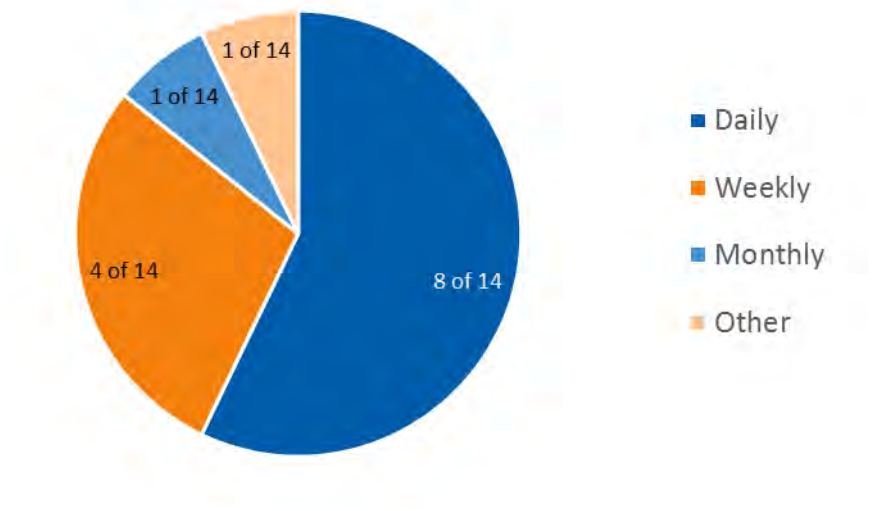
Some participants (three out of 23) had difficulty implementing the MyMeter platform from an IT perspective. They cited their IT department's security concerns about using their network to connect the building to the cloud-based MyMeter platform. Facility staff were not always able to articulate the IT requirements, which led to a delay in getting the dashboard functioning.

Four out of 23 interviewed participants reported periods of platform outages where demand data were not available. Other than reducing downtime, respondents offered the following individual suggestions to improve the MyMeter platform:

- Improve the frequency of the updates as 15 minutes was too long
- Add e-mail or text reminders to change the alert setpoints each month
- Make it easier to switch between multiple enrolled buildings

When asked about the frequency of use of MyMeter in Round 2 interviews, 12 out of 14 respondents reported using the platform from several times per week to several times per day. One respondent reported using the EMS primarily for demand management and not using MyMeter. The frequency of use reported in the Round 2 interviews was a significant improvement over the use reported in Round 1 interviews, where only one interviewed respondent was using the platform on a regular basis. This was primarily because many of the Round 1 interviewees were onboarded late in the 2015 peak period or after the peak season was over.

Figure 247. MyMeter Frequency of Use



Source: CY 2016 ODS Round 2 survey. Question F2. How frequently would you say you use the dashboard? (n=14)

Surveyed participants reported high satisfaction with MyMeter, as shown in Table 343. All of the 13 respondents using MyMeter rated their overall satisfaction at 7 or higher on a scale of 0 to 10, where 0 is *not at all satisfied* and 10 is *extremely satisfied.* These same respondents rated MyMeter's ease of use at 6 or higher on the same scale. Only one respondent used the MyMeter mobile application on their telephone or tablet and reported a rating of 10.

Table 343. Participant Satisfaction with MyMeter

MyMeter Satisfaction Categories	n	Mean Rating
Overall MyMeter satisfaction	13	8.2
MyMeter ease of use	13	8.3
Satisfaction with MyMeter mobile application	1	10

The On Demand Savings Pilot Implementer also provided in-person training on the MyMeter platform to participants, supplemented by links to tutorial videos available on the Focus on Energy website.[218] Twelve out of 13 respondents rated the in-person training as effective. One respondent rated the in-person training as not too effective. This respondent said there was only so much training that could be provided and it was up to them to try and use the MyMeter platform more frequently. With respect to the tutorial videos, 11 out of 13 respondents did not use the videos. The two respondents that used the videos rated them as very effective.

The MyMeter platform has a web services integration to ENERGY STAR® Portfolio Manager for benchmarking buildings. Only one respondent reported being aware of this integration, but no

[218] Focus on Energy's tutorial videos available online: https://focusonenergy.com/business/on-demand-savings

respondents used the integration. The On Demand Savings Pilot Implementer said that while this was a feature of the software platform, it was not promoted extensively.

Demand Reduction Strategies

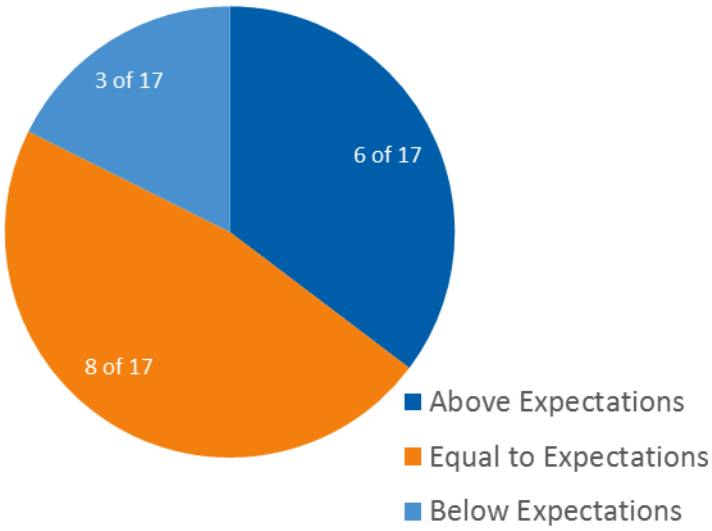
A key component of the On Demand Savings Pilot was to provide education on how electric demand impacts the customer's utility costs. Nineteen out of 23 respondents say that, since participating in the Pilot, they have a better understanding of how their utility costs are impacted by demand charges.

The Pilot Implementer and participants collaborated to develop strategies to reduce customers' peak electrical demand. Twenty-two out of 23 respondents reported having a better understanding of strategies to reduce peak demand since starting the Pilot. Thirteen of 23 respondents had not implemented any demand reduction strategies prior to participating in the Pilot.

The On Demand Savings Pilot operations manual set a goal of a 10% demand reduction for each participant each month compared to their baseline demand. Fifteen out of 17 respondents interviewed in Round 2 cited the ability to quantify demand reduction compared to their historical billing.

When asked how the savings compared to their expectations, 14 out of 17 respondents said they were equal to or exceeded their expectations. Three out of 17 respondents said the savings were below their expectations. Those with lower-than-expected savings were aware of the challenges they faced in achieving savings targets. For example, participants in the hospitality and entertainment industries found it difficult to implement many strategies because their demand is driven by guest use and high-use events that happen during peak periods.

Figure 248. Participant Savings Compared to Expectations



Source: CY 2016 ODS Round 2 Survey. Question G4. How did you find the savings compared to your expectations? (n=17)

Participants implemented demand reductions primarily using their EMS, but some participants also implemented demand reduction strategies manually based on feedback from the MyMeter platform. For participants with an EMS, 15 out of 23 reported increasing use of their EMS for managing energy.

Participants deployed various automated or manual demand reductions during the On Demand Savings Pilot's peak periods; Table 344 shows the strategies implemented by Round 1 and Round 2 survey respondents.

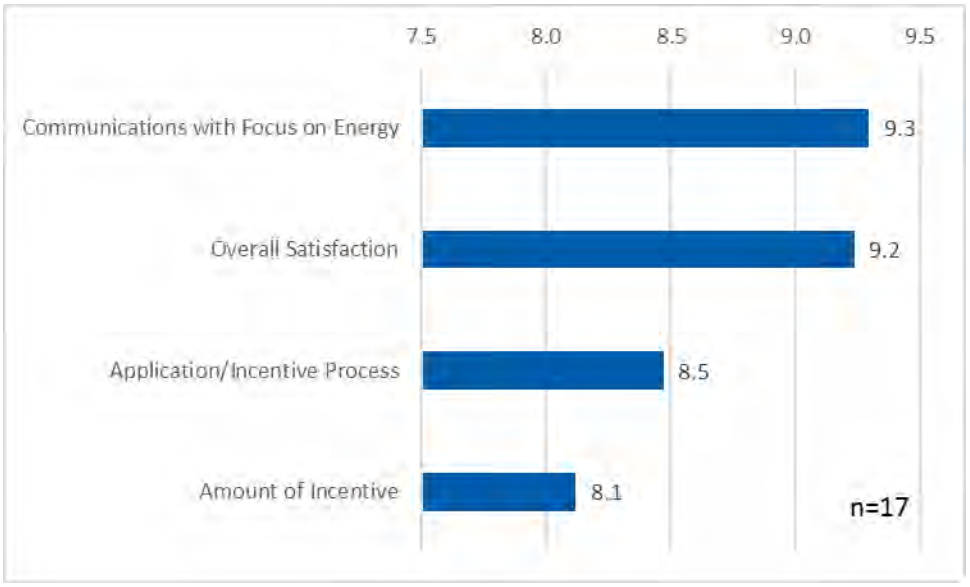
Table 344. Demand Reduction Strategies Implemented

Strategy	Round 1 Quantity Implemented (n=6)	Round 2 Quantity Implemented (n=12)
Added or upgraded EMS	0	2
Air handler unit reset	0	2
Building precooling	2	4
Chilled water reset	0	3
Compressed air changes	0	2
Condenser water reset	1	0
Defrost cycle schedule changes	0	2
Fan powered Variable Air Volume box fan shutoff	1	0
Fuel switching	0	1
Lighting curtailment	0	3
Lighting upgrades	2	1
Limit second stage of cooling	1	0
Pumping reduction	0	1
Reducing airflow rates in labs	1	0
Scheduling changes	2	3
Setpoint changes	3	7
Shifted work off peak	1	0
Space heater curtailment	0	2
Static pressure reduction during demand period	1	0
Widening deadbands	1	0
Total Strategies Implemented	**16**	**33**

Customer Satisfaction

The Evaluation Team's Round 2 interviews consisted of asking participants about their overall satisfaction with the On Demand Savings Pilot, communication with Focus on Energy, the application and incentive processes, and the financial incentive amount. Participants measured their satisfaction level using a 10-point scale, with 0 being *not at all satisfied* and 10 being *extremely satisfied*. Participants reported high satisfaction in all four areas, with a mean satisfaction rating falling between 8.1 and 9.3 for each area (Figure 249).

Figure 249. Mean Customer Satisfaction



Source: CY 2016 ODS Round2 Survey. Question H1. How satisfied are you with the level of communication that you received from Focus on Energy? (n=17) Question H2. How satisfied are you with the processes, such as the application process and rebate processing, of the Focus on Energy pilot? (n=17) Question H3. How satisfied are you with the rebate amount for the On Demand Savings Pilot? (n=17) Question H4. On a scale of 0 to 10, where 0 means "not at all satisfied" and 10 means "extremely satisfied," overall, how satisfied are you with the pilot? (n=17)

The overall satisfaction rating for the incentive amount was relatively high at a mean value of 8.1. Two of the respondents reported that the incentive for the Trade Ally was too high and should be allocated to the customer. These participants said the Trade Ally was "double dipping" by charging their hourly rate for isolation relay installation and programming services and then collecting the incentive.

The Evaluation Team interviewed participants about the likelihood they would continue with the On Demand Savings Pilot if it were available to them in the future. The participants rated the likelihood on a 10-point scale, where 0 is *not likely at all* and 10 is *extremely likely*. All 17 respondents rated their likelihood to continue at an 8 or higher, with a mean response of 9.7.

The Evaluation Team also asked interviewed participants about the likelihood they would recommend the Pilot to another facility. Using the same scale, all 17 respondents rated their likelihood to recommend the Pilot to others at an 8 or higher, with a mean response of 9.8.

Throughout the On Demand Savings Pilot, participants interacted with both MGE and the Pilot Implementer. The Evaluation Team asked interviewees how, if at all, their perception of these entities changed. All respondents (n=17) showed a positive opinion of MGE, with seven out of 17 respondents stating that the relationship had strengthened or improved. All respondents (n=17) showed a positive opinion of Focus on Energy, with nine out of 17 respondents stating that the relationship had

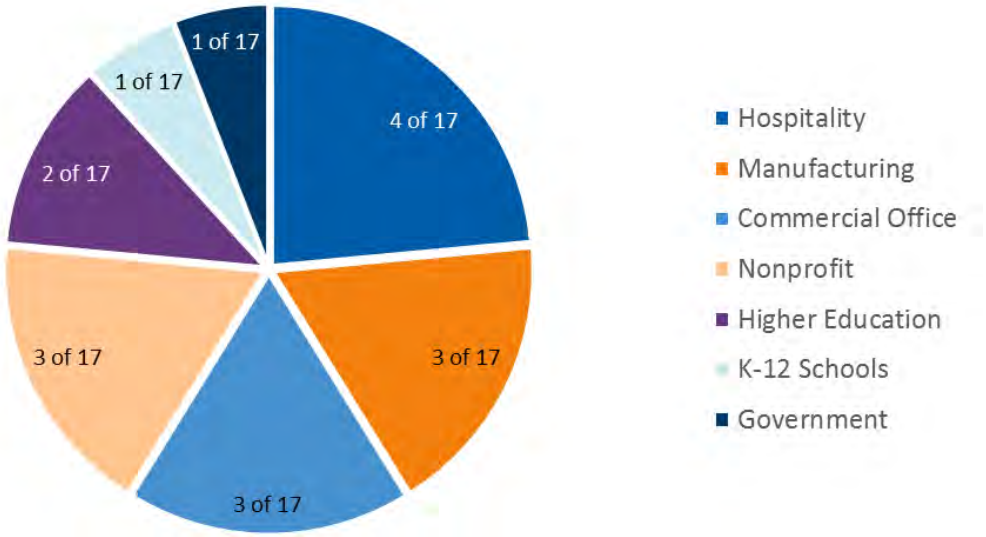
strengthened or improved. Those who said their perception of MGE or Focus on Energy had not changed provided the following statements reinforcing their already positive opinions:

- "They have always been a great partner; they are very helpful."
- "Without them I couldn't do half of what we are doing. It is easier for me to get the green light from management."
- "I see them as a partner; they seem to want to help us."
- "No change, I have always loved them. They have been very helpful to us. I could not say anything bad about them."

Participant Demographics

For the CY 2016 evaluation, the On Demand Savings Pilot Implementer provided information regarding participants' facility types. The Evaluation Team categorized the facilities into seven industry types as detailed in Figure 250.

Figure 250. Participant Demographics



Source: On Demand Savings Pilot participant tracking spreadsheet.

Evaluation Outcomes and Recommendations

The Evaluation Team identified the following outcomes and recommendations to improve the On Demand Savings Pilot.

Outcome 1. Some participants had difficulty completing the billing meter to EMS integration. On Demand Savings Pilot participants reported that they and their Trade Allies had difficulty implementing

the isolation relay to EMS. Concerns centered on greater-than-expected installation difficulty and establishing the correct pulse multiplier in the EMS.

Recommendation 1. Engage the EMS provider as early as possible to clarify roles and responsibilities. Develop a simple best practices installation guide for participants and Trade Allies that details the requirements for the pulse isolation relay installation. The guide should contain an overview of the installation, installation schematics, examples of pulse factor implementation, and common issues participants are likely to encounter and how to overcome them.

Outcome 2. Some participants had difficulty or experienced delays in implementing the data connection to the MyMeter cloud-based server. Participants' IT departments raised security concerns about using their network to transmit data to the cloud-based MyMeter application. Facility staff were not always able to articulate the requirements to the IT department.

Recommendation 2. Encourage early participation of the participants' IT staff in the process**.** Develop an IT manager's guide for implementing the MyMeter solution. The guide should address security, encryption technology, bandwidth requirements, and a hardware installation guide.

Outcome 3. The MyMeter platform was not always available and the data were not always accurate. Thirty-one percent of interviewed participants reported that they experienced multiple instances of the MyMeter platform being down or not accurately reporting data. This caused frustration and, in some cases, the inability to manage their demand during peak hours.

Recommendation 3. Identify and correct the root causes of the MyMeter platform downtime.

Outcome 4. Some participants said the demand reduction strategies did not apply to their facilities. While most participants reported that the demand reduction strategies were appropriate for their facilities, some expressed concern that the On Demand Savings Pilot Implementer did not understand their facilities or operations and, therefore, lacked strategies to reduce their demand. In particular, hospitality and event-driven organizations struggled to identify demand reduction strategies.

Recommendation 4. Continue to assist participants with developing customized strategies specific to their facilities. Formalize all implemented strategies and publish a list of demand reduction strategies most likely to be utilized by industry sector, building type, and by equipment type. Evaluate the effectiveness of targeting hospitality and event-driven organizations or whether they should be targeted differently.

Outcome 5. Most participants did not use the training videos, but those who did rated them as very effective. Some participants were not aware of the existence of the videos and others chose not to use them. Only two out of 19 respondents reported using the videos and both rated the videos as very effective.

Recommendation 5. Place more emphasis on the videos, beginning with the onboarding meeting and continuing throughout the process.

Outcome 6. Some participants had concerns about the amount of customer and Trade Ally incentives. Some participants reported that the customer incentives were too low. Some participants said that the Trade Ally incentive was too high or, in some cases, that they should not receive an incentive at all. These participants said the Trade Ally was being paid twice for their services by billing the customer and receiving the incentive.

Recommendation 6. Re-evaluate the Trade Ally incentive amount and effectiveness.

Outcome 7. Participants were highly satisfied with the Pilot and its components. Nearly all participants reported high levels of satisfaction with the On Demand Savings Pilot. All participants said they would be very likely to continue with the Pilot if it were offered in the future and they were very likely to recommend the Pilot to others.

Recommendation 7. If deemed cost-effective, consider expanding beyond MGE's service territory. If it is determined to be worth continuing and/or expanding the On Demand Savings Pilot, utilize case studies to present the Pilot's successes in future recruiting.