

Focus on Energy
Economic Impacts
2011–2014

December 2015

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Glossary of Terms

Term	Definition
Avoided Utility Costs	Avoided utility expenditures on fuel, purchased power, and infrastructure due to reduced demand for utility energy resources from Focus on Energy activities and resulting energy savings.
Baseline Energy Payments	Electric and gas ratepayer spending on energy and supply chain resources that otherwise would have been saved through Focus on Energy programs.
Bill Reductions	The estimated decrease in participant spending on utility bills resulting from Focus on Energy programs. Reductions are viewed as cost savings by participants and lost revenues by utilities.
Direct Effects	Impacts that result from changes in demand that are attributable to Focus on Energy, such as program- and project-level investments or reduced demand for energy resources.
Employment	The net number of jobs created. All employment impacts in this analysis are presented as job-years. A job-year is defined as one full-time equivalent (FTE) job for one year (i.e., 2,080 hours). In other words, a job-year equals one full-time job lasting one year; two half-time jobs lasting one year each; two full-time jobs lasting a half year each; and so on.
Incentives	Focus on Energy program funds spent on direct financial and service-based incentives that encourage investments in energy-saving technologies and behaviors.
Indirect Effects	Impacts that are generated in supply chains when directly affected industries purchase factor inputs from supporting industries.
Induced Effects	Impacts that result when participating households that save money on energy bills and employees in the directly and indirectly affected industries spend their new personal income on goods and services in the regional economy, some of which come from outside Wisconsin.
Net Economic Impacts	The difference between economic impacts from Focus on Energy cash flows and impacts from a hypothetical scenario in which Focus on Energy does not exist and equal funds are instead spent on other goods and services.
Participant Payments	Participant payments for project goods and services, which represent the combination of financial incentives received and participant co-funding.
Personal Income	The net change in money available to Wisconsin consumers for purchasing goods and services, savings, and paying taxes. Personal income is incorporated into value added impacts, along with profits and taxes, but is presented separately to show impacts specific to Wisconsin households.
Program Payments	Funding for Focus on Energy originates from participating utilities' revenues, which are collected from Wisconsin ratepayers.
Program Spending	Focus on Energy funds are spent on program delivery, marketing, evaluation, and administrative activities and services.
Sales Generated	Total industry output, or production, including all intermediate goods purchased, employee compensation, and profits. It includes purchases of intermediate goods and is thus greater than value added.
Value Added (Economic Benefits)	The net contribution of each private industry and of government to Wisconsin's gross state product. It describes the total net economic benefit to Wisconsin, including wages, profits (minus intermediate goods purchased), and taxes (minus subsidies). All value-added impacts in this analysis are presented as "economic benefits" and refer to marginal (i.e., net) impacts on Wisconsin's gross state product.

Executive Summary

This report describes the net statewide economic development impacts of Focus on Energy's 2011–2014 energy efficiency and renewable energy programs. Cadmus analyzed these economic impacts using Regional Economic Models, Inc.'s Policy Insight+ model (REMI PI+), an economic forecasting tool that models the annual and long-term effects of different spending choices on multiple components of the state economy.

Cadmus used Focus on Energy spending and energy-savings data to model the programs' net economic impacts in REMI PI+. To determine Focus on Energy's unique effects on the Wisconsin economy, Cadmus calculated net economic impacts as the difference between Focus on Energy spending and savings impacts and the impacts that would have occurred if ratepayers instead spent the same amount of funds on other goods and services, including electricity and natural gas expenditures that would have been necessary if they had not saved energy through program participation. Focus on Energy achieves positive net economic impacts by affecting the flow of money through the Wisconsin economy and regional economies in three ways:

- ***Direct economic effects*** represent increases in employment, income, and economic activity among industries directly involved with Focus on Energy, such as firms that manufacture, sell, and install energy technologies or firms that provide project services.
- ***Indirect economic effects*** account for increases in employment, income, and economic activity among industries in the energy efficiency and renewable energy supply chains, such as firms that supply raw manufacturing inputs to directly affected industries.
- ***Induced economic effects*** lead to additional increases in employment, income, and economic activity among other industries as Focus on Energy participants and employees of directly and indirectly affected industries spend money in the Wisconsin economy.

Focus on Energy has positive net economic impacts largely because it increases in-state spending. Utilities import fuel and power from other states, so a significant share of Wisconsin ratepayer funds are spent outside of the state economy. Focus on Energy reduces those electricity and natural gas purchases, instead promoting spending on Wisconsin's own energy efficiency and renewable energy industries and providing long-term savings that continue to support increased in-state spending on other local goods and services.

Summary of Study Findings

Table ES-1 summarizes the employment and economic benefit impacts attributable to each program year and to all four years combined. Employment impacts are presented in job-years; one job-year represents a full-time equivalent (FTE) job lasting one year. Economic benefit impacts describe net effects on Wisconsin's gross state product.



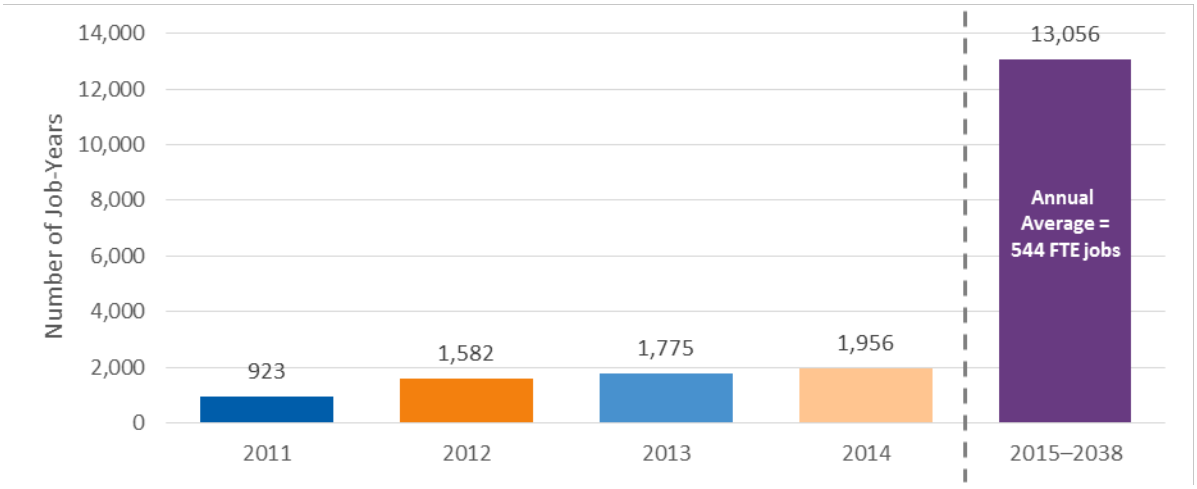
Table ES-1. Summary of Cumulative Economic Development Impacts by Program Calendar Year(s)

Economic Development Impact	Program Calendar Year(s)				
	2011	2012	2013	2014	Quadrennial* (2011–2014)
Employment (job-years)	4,631	5,911	4,606	4,618	19,291
Economic Benefit (millions of 2015 dollars)	$571	$826	$685	$756	$2,854

*Program calendar year impacts do not sum to quadrennial impacts due to dynamic factors in the REMI model.

Figure ES-1 illustrates Focus on Energy's positive net employment impacts. The program portfolio created FTE jobs at an annually increasing rate during the quadrennial period. Annual net job growth is projected to continue at lower levels—approximately 544 FTE jobs per year—thereafter. These findings of positive employment impacts are consistent with the results from a 2015 survey of energy efficiency and renewable energy contractors participating in Focus on Energy. Nearly 25% of survey respondents reported that they had hired more staff as a direct result of increased business activity from the programs.

Figure ES-1. Program Year and Future Year Employment Impacts, Quadrennial

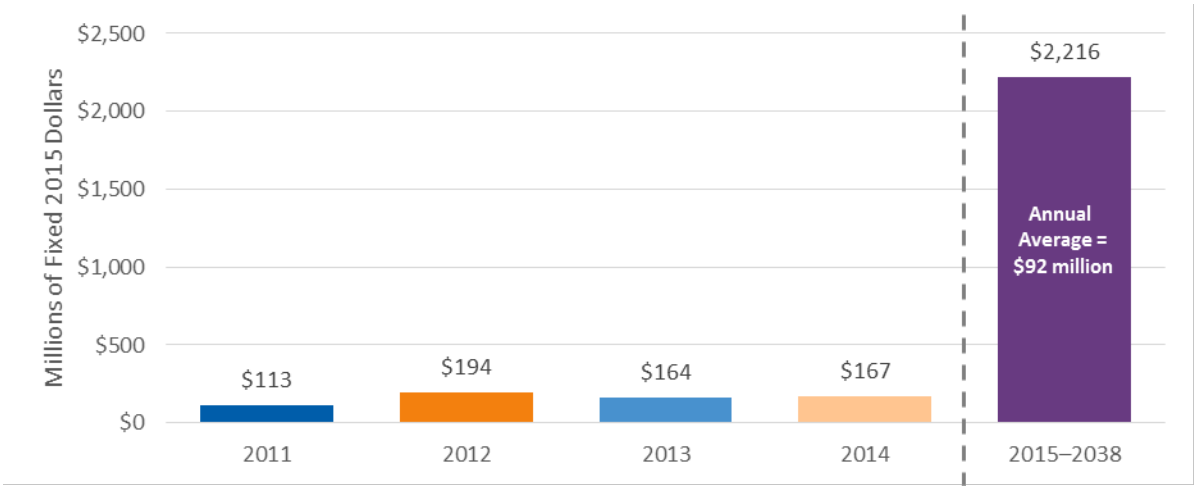


The largest program year employment increases occurred in the manufacturing sector. Because of increased purchases of energy efficiency and renewable energy technologies, Focus on Energy created more than 3,000 manufacturing jobs between 2011 and 2014. Other private sector industries that experienced significant job growth include:

- Professional, scientific, and technical services;
- Management of companies and enterprises;
- Administrative and waste management services; and
- Wholesale trade.

Figure ES-2 illustrates Focus on Energy's positive net economic benefits, which totaled more than $600 million through 2014 and will total more than $2.8 billion through 2038. These findings are consistent with reports from contractors involved with Focus on Energy. Approximately 59% of contractors responding to the 2015 program survey reported that their business activity had increased since their involvement with Focus on Energy.

Figure ES-2. Program Year and Future Year Economic Benefit Impacts, Quadrennial



When economic benefits are counted, cost-effectiveness findings suggest that Focus on Energy provided $6.49 in benefits for every $1.00 invested during the 2011–2014 quadrennial program period. Cadmus also analyzed the influence of economic benefits on Focus on Energy's cost-effectiveness. Table ES-2 summarizes the benefit-cost ratios previously reported for Focus on Energy,[1] which did not include economic benefits, and identifies the revised benefit-cost ratios achieved when economic impacts are included among program benefits.

Table ES-2. Focus on Energy Benefit-Cost Ratios With and Without Economic Benefits

Program Calendar Year(s)	Without Economic Benefits	With Economic Benefits
2011	2.46	5.75
2012	2.89	6.75
2013	3.41	6.58
2014	3.33	6.66
Quadrennial (2011–2014)	**3.06**	**6.49**

[1] "Focus on Energy Calendar Year 2014 Evaluation Report, Volume 1" May 2015, available online: https://focusonenergy.com/sites/default/files/Evaluation%20Report%202014%20-%20Volume%20I.pdf



Introduction

Focus on Energy is Wisconsin's statewide energy efficiency and renewable-resource program. As required under Wisconsin Statute §196.374(2)(a), Focus on Energy is funded by the state's investor-owned energy utilities and participating municipal utilities and electric cooperatives. CB&I (Chicago Bridge & Iron Company, formerly Shaw Environmental & Infrastructure, Inc.) serves as the Program Administrator and is responsible for designing, managing, and coordinating all of Focus on Energy's programs. The Public Service Commission of Wisconsin (PSC) provides oversight of Focus on Energy. In 2011 the PSC contracted with a team of energy consulting and market research firms to verify Focus on Energy savings and evaluate the program during the quadrennial period (2011–2014). These firms, referred to as the Evaluation Team, are Cadmus; Nexant, Inc.; and St. Norbert College Strategic Research Institute. Cadmus, in partnership with Regional Economic Models, Inc. (REMI), assesses net statewide economic impacts attributable to Focus on Energy every two years.

Focus on Energy provides information, technical support, and financial incentives to eligible Wisconsin residents and businesses. Focus on Energy participants implement energy projects they otherwise would not have been able to complete, or they complete projects ahead of schedule. Focus on Energy thus helps Wisconsin residents and businesses manage rising energy costs, protect the environment, and promote in-state economic development, while controlling the growing demand for electricity and natural gas.

This report presents the net statewide economic development impacts of Focus on Energy for the quadrennial period and describes the analytical approach used to calculate those impacts. The analysis entailed reviewing the results of the impact evaluations conducted for each program for 2011 through 2014 and then projecting those impacts for the entire program portfolio through the 25-year study period, as summarized in Table 1 below.

Table 1. Study Period by Program Calendar Year

Program Calendar Year(s)	Timeframe Modeled for Economic Impacts
2011	2011–2035
2012	2012–2036
2013	2013–2037
2014	2014–2038
2011–2014 (quadrennial period)	2011–2038

The Focus on Energy program portfolio evolved between 2011 and 2014, including a major redesign in 2012 and more limited adjustments in 2013 and 2014. Appendix D: Focus on Energy Programs by Year lists the programs included in the macroeconomic analysis by market segment and year.

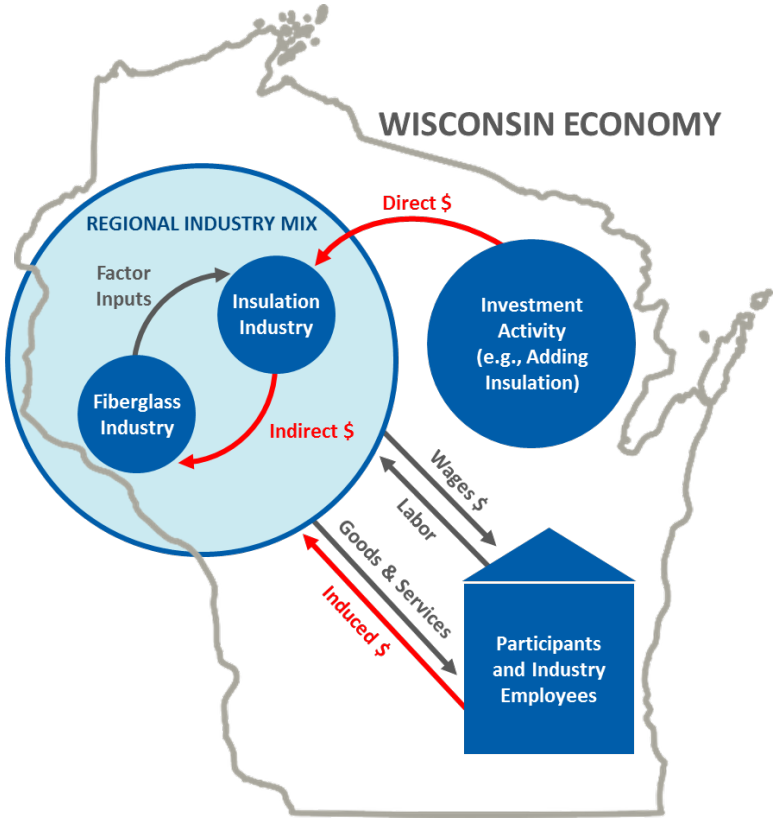
Introduction to Investment and Energy Savings Impacts

Programs offered by Focus on Energy affect the flow of money through the Wisconsin economy and regional economies in multiple ways:

- ***Direct economic effects*** result from changes in demand that are attributable to Focus on Energy, such as program- and project-level investments or reduced demand for energy resources. For example, a participant may spend a combination of program incentives and personal funds on new home insulation, thus directing funds to the insulation industry.
- ***Indirect economic effects*** are generated in supply chains when directly affected industries purchase factor inputs from supporting industries. For example, to meet increased local demand, the insulation industry purchases factor inputs such as fiberglass from the fiberglass industry.
- ***Induced economic effects*** occur when participating households that save money on energy bills and employees in the directly and indirectly affected industries spend their new personal income on goods and services in the regional economy, some of which come from outside Wisconsin. For example, the participant who saves money on energy bills and the employees of the insulation and fiberglass industries spend their new personal income on other goods and services.

The above example of direct, indirect, and induced cash flows attributable to Focus on Energy is illustrated in Figure 1.

Figure 1. Example of Direct, Indirect, and Induced Cash Flows Attributable to Focus on Energy





Although the REMI PI+ model assumes total statewide spending is the same with our without Focus on Energy, the total net economic impacts of Focus are positive because the nature of spending within the Wisconsin economy changes as a result of the program's direct, indirect, and induced effects. In the example shown in Figure 1, the program participant directs funds to the insulation industry, increasing demand for those goods and services, which generates effects that are amplified throughout the economy. These program-induced effects result in positive net statewide economic impacts because funds directed to the insulation industry would otherwise be spent primarily (but not solely) on electricity and fuel, much of which is imported into Wisconsin from other state economies.

In addition to the effects from first-year program and project expenditures, the investments made by Focus on Energy and program participants continue to generate positive net impacts on the Wisconsin economy over time. Persistent energy savings resulting from energy-efficient and renewable-energy measures allow residential and nonresidential participants to spend less money on energy and more on other products and services, many of which have more localized supply chains than those associated with energy. Local utilities can reduce the amount of fuel and power imported into the region, while regional supply for energy-efficient and renewable-energy measures increases to meet demand within Wisconsin.

Participating utilities benefit from reducing their fuel and power purchases, transmission and distribution costs, emission allowance costs, and need to increase capacity. However, since participants purchase less energy after participating in Focus on Energy programs, participating utilities also forego revenues equal to reductions in energy sales. The dollar value of these sales reductions represents a cost to the utilities that the customized REMI PI+ model also takes into account.

Introduction to Economic Impacts Modeled

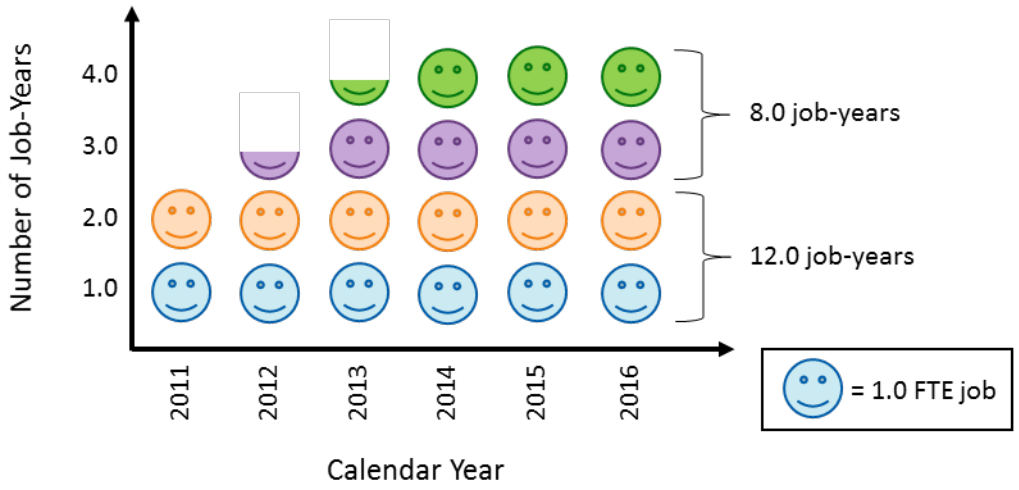
Cadmus used a customized REMI PI+ model to estimate Focus on Energy's annual and cumulative statewide impacts on two key economic indicators: employment and value added (i.e., economic benefits). Cadmus also estimated net impacts on two additional economic indicators: personal income and sales generated. A brief description of each indicator follows:

- ***Employment*** estimates the number of full- and part-time jobs by place of work. All employment impacts in this analysis are presented as job-years. A job-year is defined as one full-time equivalent (FTE) job for one year (i.e., 2,080 hours). In other words, a job-year equals one full-time job lasting one year; two half-time jobs lasting one year each; two full-time jobs lasting a half year each; and so on.

  Figure 2 illustrates the difference between the number of employees and the number of job-years with the following hypothetical example. A firm consists of two core members, and both are full-time employees who work for an entire six-year period. These two full-time employees are measured as 12 job-years. To meet increased demand, the same firm hires one employee to work full time for four and a half years plus another employee to work half time for one year and full time for three years. Together, these additional employees are measured as eight job-

years. In aggregate, these four hypothetical employees contribute a total of 20 job-years over a six-year period.

Figure 2. Determining Job-Year Impacts



A job-year consolidates full- and part-time employment and is a meaningful metric for reporting year-by-year employment impacts for the duration of the study period. Cadmus included employees, sole proprietors, and active partners in the estimated employment impacts, but not unpaid family workers or volunteers.

The REMI PI^{+} model determines employment impacts from estimated changes in output (i.e., total production) and labor productivity (i.e., total production per job). For instance, estimated increases in employment can result from increased output or decreased labor productivity. Conversely, estimated decreases in employment can result from either decreased output or increased labor productivity.

- ***Value added*** measures the net contribution of each private industry and of government to Wisconsin's gross state product. It describes the total net economic benefit to Wisconsin, including wages, profits (minus intermediate goods purchased), and taxes (minus subsidies). All value added impacts in this analysis are presented as economic benefits and refer to marginal (i.e., net) impacts on Wisconsin's gross state product.

  The REMI PI^{+} model determines value added from estimated changes in industry demand and competitiveness. For instance, an increase in demand leads to an increase in value added, while a decrease in demand leads to a decrease in value added.

- ***Personal income*** represents the change in money available to Wisconsin consumers for purchasing goods and services, saving money, and paying taxes. Personal income is incorporated into value added, along with profits and taxes, but it is presented separately to demonstrate impacts specific to Wisconsin households.



The REMI PI+ model calculates personal income as total income received from all sources, including wages and salaries, benefits, proprietor (i.e., owner) income, rental income, investment income, and transfer payments from public entities (e.g., Social Security payments). Estimated increases or decreases in personal income result from changes in any of the sources listed above.

- ***Sales generated*** equals total industry output, or production, including all intermediate goods purchased, employee compensation, and profits. It includes purchases of intermediate goods, and thus it is greater than value added (i.e., net economic benefits).[2]

  The REMI PI+ model determines sales generated from changes in industry demand in all regions across the nation, Wisconsin's share of each national industry, and international exports out of Wisconsin. For example, an increase in sales generated results from an increase in demand, in Wisconsin's market share, or in Wisconsin's international exports.

[2] Intermediate goods are semi-finished products used in the production of other goods. For example, an engine part is a final good sold by a shaped metal manufacturer and an intermediate good used by motorcycle makers. Intermediate goods are counted as part of total sales generated, but are not counted as part of total value added because that would be double-counting from a statewide net economic benefit perspective. Using the motorcycle engine example, the sale of an engine part to a motorcycle maker and the sale of a motorcycle to a consumer would be counted in sales generated. However, only the sale of the final product—the motorcycle—is counted in value added, which represents the net economic benefit to Wisconsin.

Study Findings

Cadmus estimated the net economic development impacts generated from the 2011, 2012, 2013, and 2014 Focus on Energy programs, separately and in aggregate. The aggregate impacts from the quadrennial were estimated with a REMI PI+ model comprising inputs from all four program years. Because of industry interactions, price responses, labor migration, and other dynamic factors in the REMI PI+ model, quadrennial impacts from multiple years of program and project activity are not exactly equal to the sum of the impacts from each program year considered separately. Table 2 summarizes the net economic development impacts attributable to each program calendar year and to the quadrennial.

Table 2. Summary of Cumulative Economic Development Impacts by Program Calendar Year(s)

Economic Development Impact	Program Calendar Year(s)				
	2011	2012	2013	2014	Quadrennial* (2011–2014)
Employment (job-years)	4,631	5,911	4,606	4,618	19,291
Economic Benefit (millions of 2015 dollars)	$571	$826	$685	$756	$2,854

*Program calendar year impacts do not sum to quadrennial impacts due to dynamic factors in the REMI model.

As described in the detailed findings that follow, energy efficiency and renewable energy investments made through Focus on Energy programs lead to initial and long-term net statewide economic benefits that accrue while measures remain installed and operational. Sustained investments in Focus on Energy programs and projects beyond 2014 are not included in this analysis, but are likely to result in additional economic benefits that accrue while future measures remain installed and operational.

Detailed Portfolio Impacts

The following sections provide detailed discussions of the quadrennial portfolio impacts according to four indicators of net statewide economic development: employment, economic benefit, personal income, and sales generated. Detailed discussions of economic impacts from program years 2014 and 2012 are presented in Appendix A: 2014 Program Calendar Year Impacts and Appendix B: 2012 Program Calendar Year Impacts.

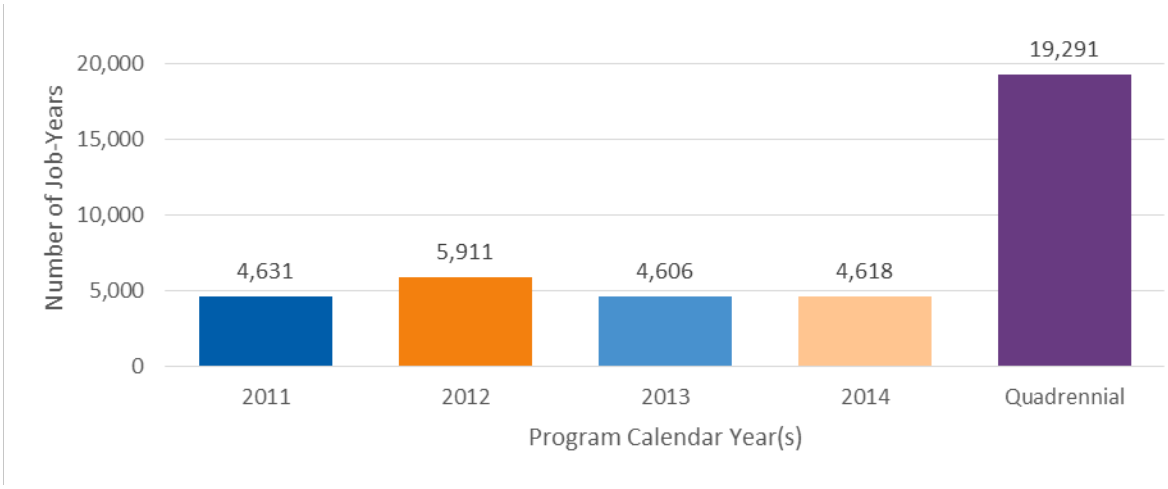
Employment

Focus on Energy activities generate positive net effects on statewide employment. Findings from a 2015 online trade ally survey showed that nearly 25% of program trade allies hired more staff as a direct result of increased business activity from Focus on Energy. Some of these new employees may have been unemployed previously or may have migrated to Wisconsin to gain employment; both cases represent scenarios in which Focus on Energy generates net job growth in Wisconsin.

Figure 3 shows the cumulative study period employment impacts of Focus on Energy's 2011, 2012, 2013, 2014, and quadrennial program portfolios relative to a hypothetical scenario in which Focus on Energy programs did not operate. All cumulative Focus on Energy economic development impacts, including employment, exceed the impacts of the scenario in which Focus on Energy hypothetically did

not exist. For instance, the REMI PI+ model estimates that the entire quadrennial program portfolio will generate 19,291 net job-years between 2011 and 2038.

Figure 3. Cumulative Net Employment Impacts*



*Quadrennial value is an output from a separate model run and does not equal the sum of the four years.

Program Year and Future Year Employment Growth

Table 3 shows the net program year, future year, and cumulative effects on job growth by program calendar year(s). For example, analysis findings suggest that the entire quadrennial program portfolio created 6,235 net job-years from 2011 to 2014 and will generate an additional 13,056 net job-years between 2015 and 2038.

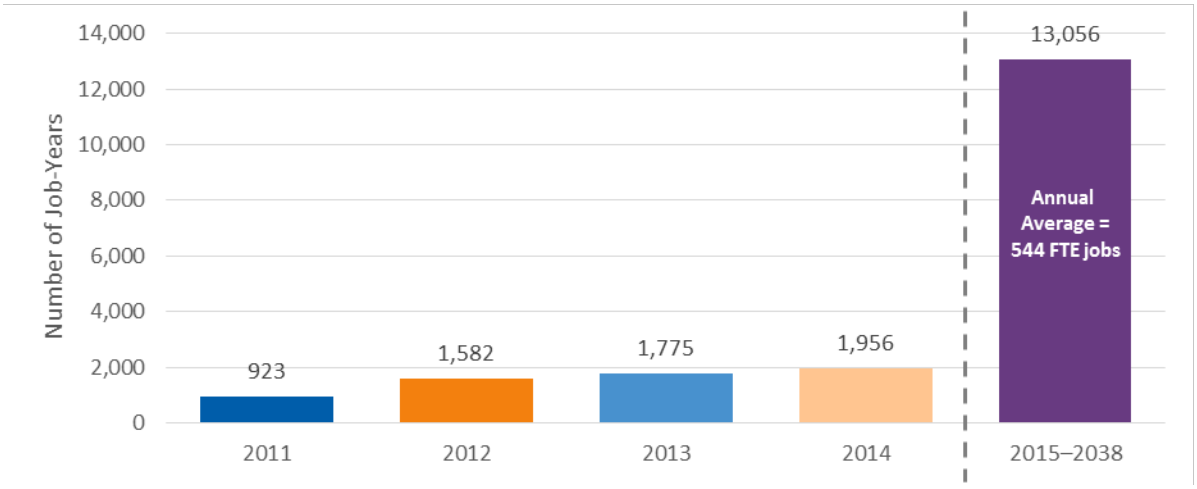
Table 3. Program Year, Future Year, and Cumulative Effects on Job Growth

Employment (Job-Years)	Program Calendar Year(s)				
	2011	2012	2013	2014	Quadrennial* (2011–2014)
Program Year(s)	923	1,366	1,171	1,000	6,235
Future Years	3,709	4,545	3,435	3,618	13,056
Cumulative**	**4,631**	**5,911**	**4,606**	**4,618**	**19,291**

*Quadrennial values are outputs from a separate model run and do not equal the sum of the four years.
**Values may not sum due to rounding.

Figure 4 illustrates the net program year (i.e., 2011 through 2014) and future year (i.e., 2015 through 2038) employment impacts of Focus on Energy's quadrennial program portfolio relative to the hypothetical scenario in which those programs did not operate in 2011–2014.

Figure 4. Program Year and Future Year Effects on Job Growth, Quadrennial



Throughout the quadrennial period, the Focus on Energy program portfolio created FTE jobs at an annually increasing rate, totaling 6,235 net job-years during the four-year span. The quadrennial analysis did not account for sustained program and project investments beyond 2014; therefore, annual job growth continues at a lower rate after the programs' operational period. As shown in Figure 4, the quadrennial portfolio is projected to generate an additional 13,056 net job-years after the programs' operational period, representing an average of approximately 544 FTE jobs annually during the 24-year period.

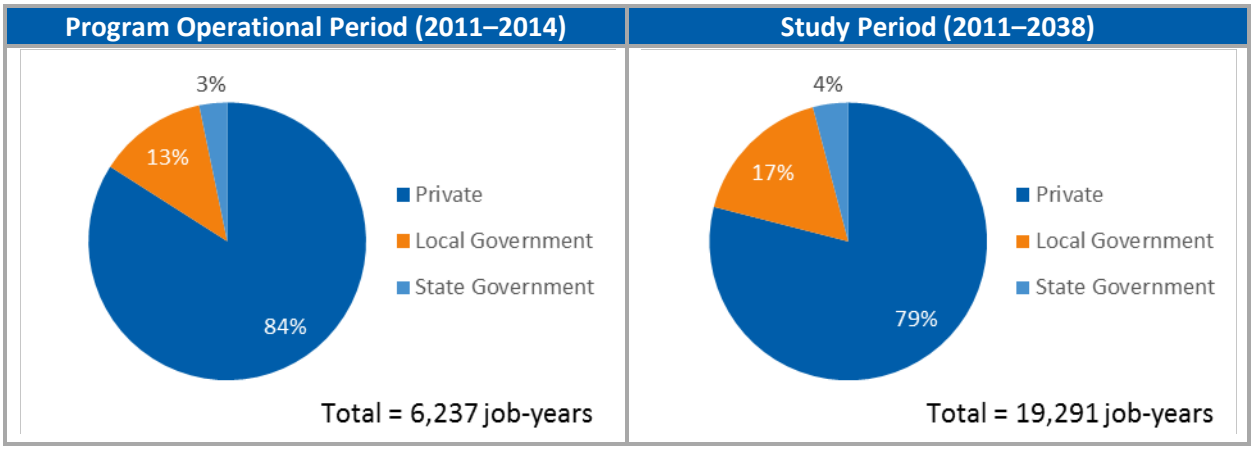
Annual employment growth is most significant while the Focus on Energy programs are operating. REMI PI$^+$ models that analyze multiple years of program activity indicate that annual job growth continues after programs end primarily because energy savings enable consumers to purchase relatively more local goods and services. The REMI PI$^+$ models created for this analysis do not account for sustained Focus on Energy activities, and thus predict annual employment growth to continue at a lower rate after the programs' operational period. Overall, the analysis predicts employment growth cumulatively, in current program years, and in future years that is attributable to each program year and the entire quadrennial.

Net Employment Growth by Market Sector

Cadmus also investigated net employment growth by market sector, including the private sector, local government, and state government. The primary drivers of job growth in the first year and cumulatively over the study period are the direct, indirect, and induced effects of program investment, project spending, and ongoing energy savings. As economic activity related to Focus on Energy increases, so does Wisconsin's labor pool. Private sector jobs increase due to higher overall economic output, which tapers off in the years following the programs' operational period; meanwhile, the increase in overall population sustains the need for public services provided by the state and local governments' employees.

Figure 5 illustrates the relative share of total job growth attributable to the private, local government, and state government sectors during the operational period (i.e., 2011–2014) and during the entire study period (i.e., 2011–2038).

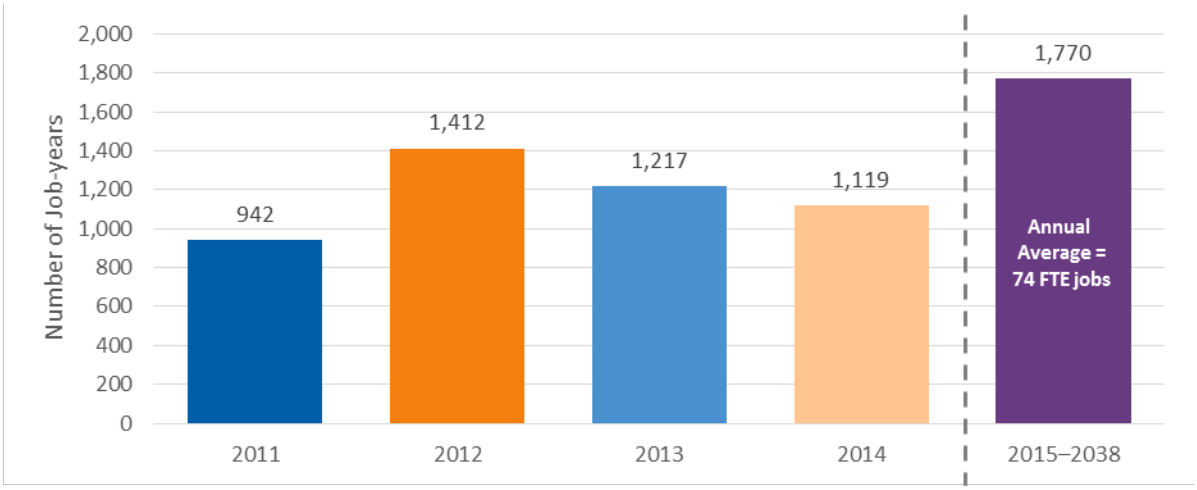
Figure 5. Program Operational Period and Study Period Employment Growth by Sector, Quadrennial



Most of the job growth caused by the Focus on Energy quadrennial portfolio affects organizations in the private sector and, to a lesser extent, in the local government sector. Relative to the private sector, job growth in the public sector is sustained for a longer period of time. As a result, the relative share of public sector employment growth is forecast to increase during the study period.

Figure 6 shows the program year and projected future year employment growth in the five private sector industries that experienced the largest program year FTE job creation as a result of quadrennial program activities.

Figure 6. Program Year and Future Year Employment Growth in the Top Five Private Sector Industries, Quadrennial



The five private sector industries that experienced the largest first-year job growth are ranked in order:

1. Manufacturing;
2. Professional, scientific, and technical services;
3. Management of companies and enterprises;
4. Administrative and waste management services; and
5. Wholesale trade.

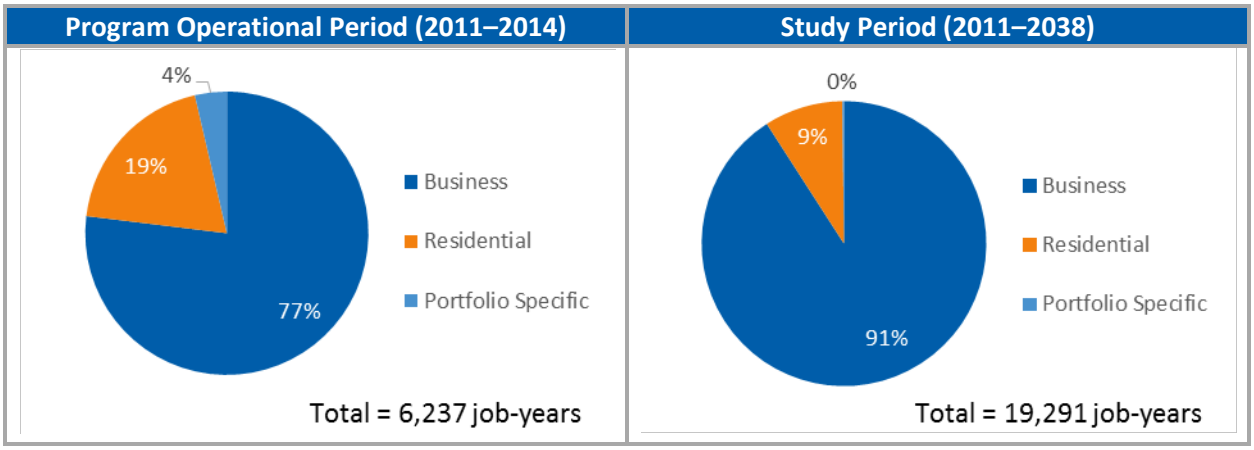
During the operational period (i.e., 2011–2014), purchases of both energy-efficient and renewable-energy equipment induced significant increases in manufacturing industry demand. Program activities between 2011 and 2014 also significantly increased demand for professional, scientific, and technical services such as installation contracting and energy auditing. Active programs required administration services and, in the case of equipment recycling programs, waste management services. Focus on Energy activities expanded opportunities for existing firms and led to in-migration of new firms, thus causing higher demand for management services. Finally, Focus on Energy program and project activities led to increased sales of primary and intermediate goods that involved the wholesale trade sector.

Similar to the analysis of total statewide employment growth, the analysis of the quadrennial portfolio's industry-level employment growth did not account for sustained program investment and project spending beyond 2014. As a result, job growth by industry is projected to continue at lower annual levels from 2015 through 2038; as shown in Figure 6, the quadrennial portfolio is projected to generate 1,770 net job-years across the top five private sector industries between 2015 and 2038, representing an average of approximately 74 FTE jobs annually during the 24-year period.

Net Employment Growth by Market Segment

Cadmus also analyzed job growth by market segment. Administrators and participants invested funds in portfolio-specific, residential, and business program activities. Figure 7 shows the relative share of statewide employment growth attributable to the quadrennial portfolio-specific, residential, and business segments during the operational and study periods.

Figure 7. Program Operational Period and Study Period Employment Growth by Segment, Quadrennial





The largest share of employment growth during the operational period is attributable to the business segment primarily because activities in that segment constitute a large majority of total program investment and project spending. During the study period, the share of employment growth is forecast to decrease for the residential and portfolio-specific segments and increase for the business segment. The share of total study period employment growth attributable to portfolio-specific spending is lower than during the operational period because portfolio-specific spending does not result in ongoing energy savings. The combined share of employment growth attributable to residential and business segment spending is larger in the study period than in the operational period because spending in those segments results in ongoing energy savings; the relative shares between the residential and business segments is forecast to change over time primarily because business projects result in substantially greater energy savings than residential projects.

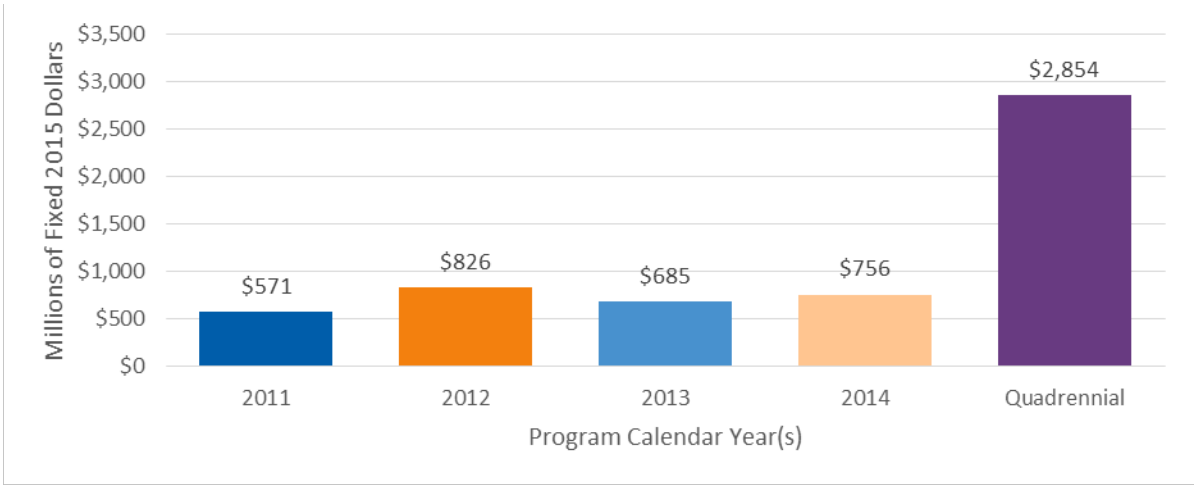
Economic Benefits

Focus on Energy programs and projects generate new demand for energy efficiency and renewable energy technologies and services. Higher demand results in positive impacts on statewide wages, profits, and taxes, which collectively contribute economic benefits to Wisconsin's gross state product. In a 2015 online trade ally survey, 59% of program trade allies reported increased business activity since their involvement with Focus on Energy. Of these, 41% started selling new products and 27% added new services.

"I started my business around the fact that Focus on Energy differentiates me from my competitors."

Figure 8 shows the cumulative study period economic benefits of Focus on Energy's 2011, 2012, 2013, and quadrennial program portfolios relative to a scenario in which the programs did not operate. For instance, model findings indicate that the quadrennial program portfolio will generate a total net economic benefit of $2,854 million between 2011 and 2038.

Figure 8. Cumulative Net Economic Benefit Impacts*



*Quadrennial value is an output from a separate model run and does not equal the sum of the four years.

Program Year and Future Year Economic Benefits

Table 4 shows the program year, future year, and cumulative net economic benefits, which describe marginal impacts on Wisconsin's gross state product, by program year(s). For example, the analysis suggests that the quadrennial program portfolio generated $638 million of economic benefits from 2011 to 2014 and will generate an additional $2,216 million of economic benefits between 2015 and 2038.

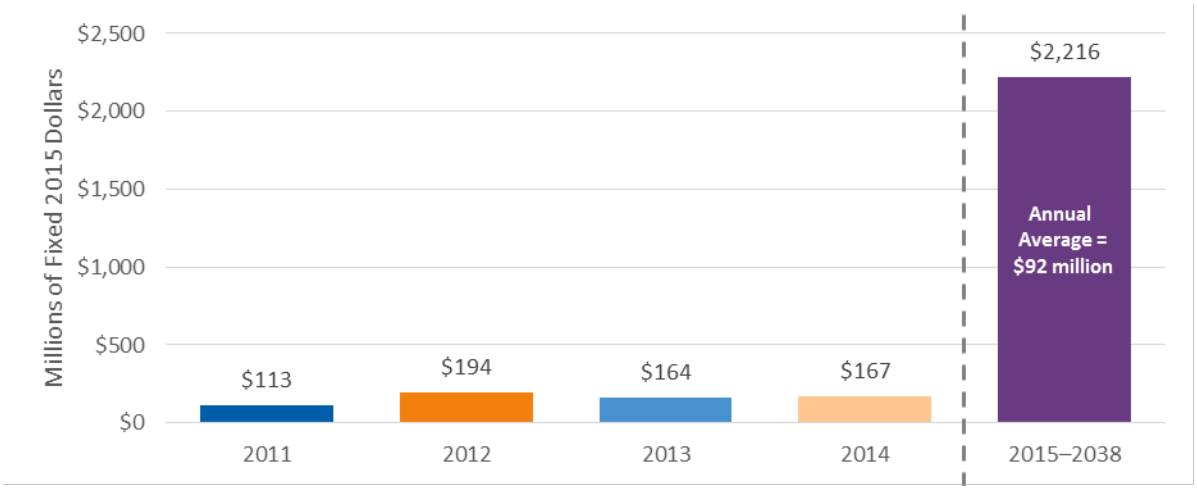
Table 4. Program Year, Future Year, and Cumulative Economic Benefits

Economic Benefit (millions of 2015 dollars)	Program Calendar Year(s)				
	2011	2012	2013	2014	Quadrennial* (2011–2014)
Program Year(s)	$113	$184	$131	$117	$638
Future Years	$458	$642	$554	$640	$2,216
Cumulative**	**$571**	**$826**	**$685**	**$756**	**$2,854**

*Quadrennial values are outputs from a separate model run and do not equal the sum of the four years.
**Values may not sum due to rounding.

Figure 9 illustrates the net program year (i.e., 2011–2014) and future year (i.e., 2015–2038) economic benefits of Focus on Energy's quadrennial program portfolio relative to the hypothetical scenario in which the programs did not operate in 2011–2014.

Figure 9. Program Year and Future Year Economic Benefits, Quadrennial



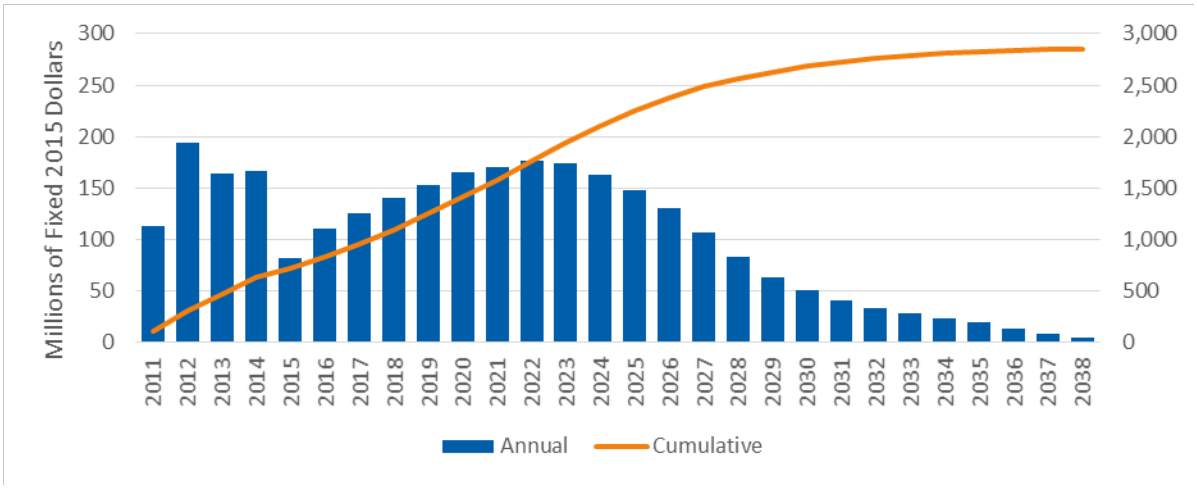
Including a peak in 2012, the quadrennial portfolio generated increasingly higher annual economic benefits while programs operated from 2011 through 2014, resulting in a total of $638 million during that four-year span. The quadrennial analysis did not account for sustained program investment beyond 2014; economic benefits will continue to accrue at lower annual levels after the programs' operational period. As shown in Figure 9, the quadrennial program portfolio is projected to generate an additional $2,216 million of economic benefits after the programs' operational period, representing an average of approximately $92 million annually during the 24-year period.



Annual and Cumulative Economic Benefits

Figure 10 illustrates the net annual and cumulative economic benefits of Focus on Energy's quadrennial program portfolio relative to the scenario in which Focus on Energy programs did not operate. Including a substantial increase in 2012, the quadrennial portfolio generated increasingly greater economic benefits from 2011 through 2014. Although economic benefits will increase annually from 2015 through 2028, they will accrue at lower levels thereafter.

Figure 10. Net Quadrennial Program Portfolio Economic Benefits, 2011–2038



Similar to employment growth, annual economic benefits are most significant while the Focus on Energy programs are operating. REMI PI+ models that analyze multiple years of program activity all indicate that annual statewide economic benefits remain positive throughout the study period because ongoing energy savings allow consumers to spend relatively more on local goods and services. The REMI PI+ models created for this analysis do not account for sustained Focus on Energy program activity, and thus predict annual economic benefits to continue to accrue at lower levels after the programs' operational period. Overall, the analysis predicts net economic benefits cumulatively, in current program years, and in future years that are attributable to each program year and the entire quadrennial.

Economic Benefit Effects on Annual Portfolio Cost-Effectiveness

In other evaluation reports,[3] Cadmus has used the modified Total Resource Cost (TRC) test to measure the net costs of Focus on Energy as a resource option. Results from the modified TRC test represent the balance between costs from direct utility and participant expenditures and benefits from avoided environmental externalities and energy and capacity costs that accrue over time. Although the modified TRC test incorporates a relatively expansive scope of costs and benefits, Cadmus also considered cumulative economic benefits to develop additional TRC tests for each year's program portfolio and the

[3] "Focus on Energy Calendar Year 2014 Evaluation Report, Volume 1" May 2015, available online: https://focusonenergy.com/sites/default/files/Evaluation%20Report%202014%20-%20Volume%20I.pdf

quadrennial portfolio. For all program calendar years, the modified TRC benefit/cost (B/C) ratio was higher when considering the economic benefits attributable to Focus on Energy.

Table 5 lists the results of the modified TRC tests with and without economic benefits for program calendar year 2011.

Table 5. Program Calendar Year 2011 Cost-Effectiveness With and Without Economic Benefits

Test Component	Without Economic Benefits	With Economic Benefits
Administrative Costs	$6,383,321	$6,383,321
Delivery Costs	$21,337,626	$21,337,626
Incremental Measure Costs	$146,205,942	$146,205,942
Total Non-Incentive Costs	**$173,926,889**	**$173,926,889**
Electric Benefits	$181,932,543	$181,932,543
Gas Benefits	$142,705,708	$142,705,708
Emissions Benefits	$103,742,583	$103,742,583
Net Economic Benefits	$0	$571,000,000
Total TRC Benefits	**$428,380,834**	**$999,380,834**
TRC Benefits Minus Costs	**$254,453,945**	**$825,453,945**
TRC Benefit/Cost Ratio	**2.46**	**5.75**

Table 6 lists the results of the modified TRC tests with and without economic benefits for program calendar year 2012.

Table 6. Program Calendar Year 2012 Cost-Effectiveness With and Without Economic Benefits

Test Component	Without Economic Benefits	With Economic Benefits
Administrative Costs	$7,968,649	$7,968,649
Delivery Costs	$24,937,526	$24,937,526
Incremental Measure Costs	$181,394,348	$181,394,348
Total Non-Incentive Costs	**$214,300,523**	**$214,300,523**
Electric Benefits	$294,470,066	$294,470,066
Gas Benefits	$184,779,829	$184,779,829
Emissions Benefits	$141,083,899	$141,083,899
Net Economic Benefits	$0	$825,687,500
Total TRC Benefits	**$620,333,794**	**$1,446,021,294**
TRC Benefits Minus Costs	**$406,033,271**	**$1,231,720,771**
TRC Benefit/Cost Ratio	**2.89**	**6.75**

Table 7 lists the results of the modified TRC tests with and without economic benefits for program calendar year 2013.



Table 7. Program Calendar Year 2013 Cost-Effectiveness With and Without Economic Benefits

Test Component	Without Economic Benefits	With Economic Benefits
Administrative Costs	$9,297,625	$9,297,625
Delivery Costs	$29,240,959	$29,240,959
Incremental Measure Costs	$177,524,201	$177,524,201
Total Non-Incentive Costs	**$216,062,785**	**$216,062,785**
Electric Benefits	$365,319,128	$365,319,128
Gas Benefits	$195,371,281	$195,371,281
Emissions Benefits	$175,250,936	$175,250,936
Net Economic Benefits	$0	$684,843,750
Total TRC Benefits	**$735,941,345**	**$1,420,785,095**
TRC Benefits Minus Costs	**$519,878,560**	**$1,204,722,310**
TRC Benefit/Cost Ratio	**3.41**	**6.58**

Table 8 lists the results of the modified TRC tests with and without economic benefits for program calendar year 2014.

Table 8. Program Calendar Year 2014 Cost-Effectiveness With and Without Economic Benefits

Test Component	Without Economic Benefits	With Economic Benefits
Administrative Costs	$8,737,742	$8,737,742
Delivery Costs	$27,404,563	$27,404,563
Incremental Measure Costs	$191,018,213	$191,018,213
Total Non-Incentive Costs	**$227,160,518**	**$227,160,518**
Electric Benefits	$351,073,399	$351,073,399
Gas Benefits	$231,810,414	$231,810,414
Emissions Benefits	$173,547,203	$173,547,203
Net Economic Benefits	$0	$756,218,750
Total TRC Benefits	**$756,431,016**	**$1,512,649,766**
TRC Benefits Minus Costs	**$529,270,498**	**$1,285,489,248**
TRC Benefit/Cost Ratio	**3.33**	**6.66**

Table 9 lists the results of the modified TRC tests with and without economic benefits for the entire quadrennial program portfolio.

Table 9. Quadrennial Portfolio Cost-Effectiveness With and Without Economic Benefits

Test Component	Without Economic Benefits	With Economic Benefits
Administrative Costs	$32,387,337	$32,387,337
Delivery Costs	$102,920,674	$102,920,674
Incremental Measure Costs	$696,142,704	$696,142,704
Total Non-Incentive Costs	**$831,450,715**	**$831,450,715**
Electric Benefits	$1,192,795,136	$1,192,795,136
Gas Benefits	$754,667,232	$754,667,232
Emissions Benefits	$593,624,621	$593,624,621
Net Economic Benefits	$0	$2,854,000,000
Total TRC Benefits	**$2,541,086,989**	**$5,395,086,989**
TRC Benefits Minus Costs	**$1,709,636,274**	**$4,563,636,274**
TRC Benefit/Cost Ratio	**3.06**	**6.49**

Personal Income

Focus on Energy generates positive effects on net employment, which in turn results in increased statewide income from new wage and salary payments. Projects that offer incentives also result in ongoing energy bill reductions. Employees of directly and indirectly affected industries and program participants who save money on energy experience increases in personal income. Many participants share this sentiment and agree that their energy expenses are lower—sometimes crucially—after participating in a Focus on Energy program.

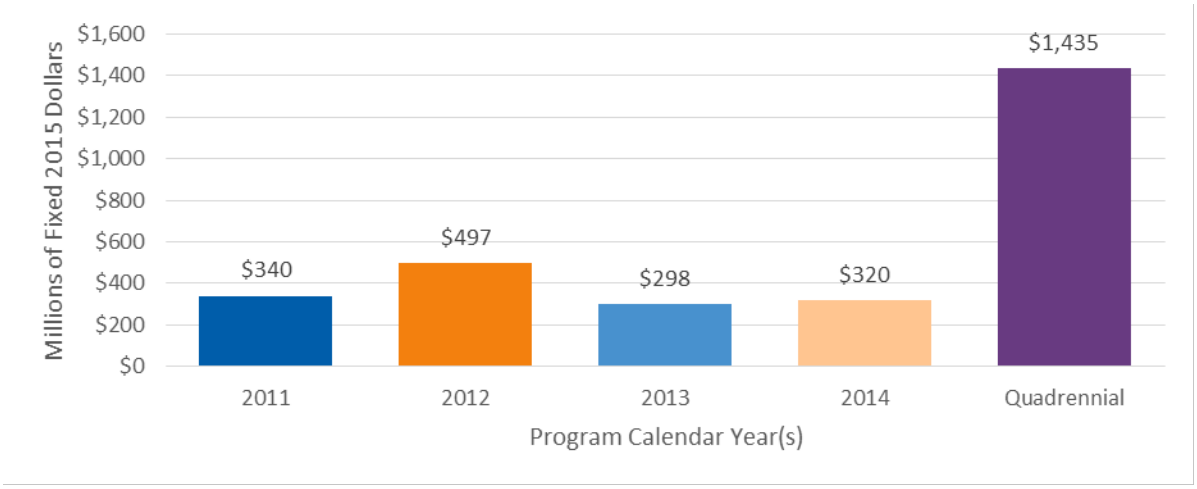
"My home is more efficient. I feel my utility bills are lower than previous years."

"If I didn't have [my new heating system], I think would have to sell the house. I only get Social Security. My husband died at 52 and I was trying to find a job at 40 years old. I could only pick up a minimum wage job, so something like this was a blessing during a difficult time."

Figure 11 shows the cumulative study period impacts on statewide personal income of Focus on Energy's 2011, 2012, 2013, and quadrennial program portfolios relative to a scenario in which those programs did not exist. For example, model findings suggest that the quadrennial program portfolio will generate a total of $1,435 million in net personal income between 2011 and 2038. Generally, differences in cumulative personal income between program calendar years are driven by the variations in employment growth described above.



Figure 11. Cumulative Net Personal Income Increases*



*Quadrennial value is an output from a separate model run and does not equal the sum of the four years.

Program Year and Future Year Personal Income Increases

Table 10 shows the program year, future year, and cumulative statewide personal income increases by program calendar year(s). For instance, the findings indicate that the quadrennial program portfolio generated $382 million of new personal income during the operational period and will generate an additional $1,053 million of net personal income through the end of 2038, which represents an average of about $60 million during each future year.

Table 10. Program Year, Future Year, and Cumulative Personal Income Increases

Personal Income (millions of 2015 dollars)	Program Calendar Year(s)				
	2011	2012	2013	2014	Quadrennial* (2011–2014)
Program Year(s)	$33	$100	$77	$67	$382
Future Years	$306	$397	$221	$252	$1,053
Cumulative**	**$340**	**$497**	**$298**	**$320**	**$1,435**

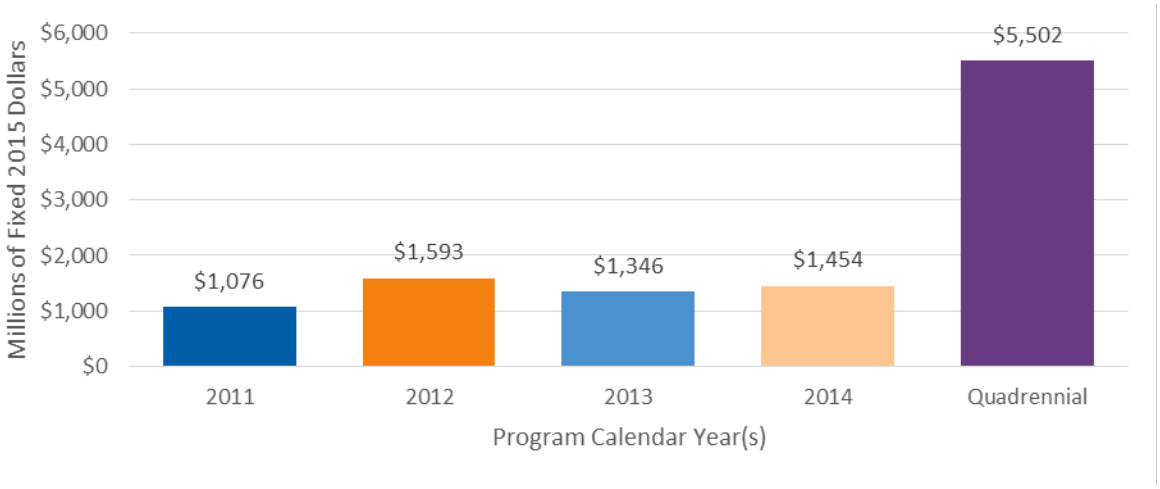
*Quadrennial values are outputs from a separate model run and do not equal the sum of the four years.
**Values may not sum due to rounding.

Because of the strong correlation between statewide employment and personal income, program year and future year personal income increases accrue over time in much the same manner as employment.

Sales Generated

Figure 12 shows the cumulative sales generated from Focus on Energy's 2011, 2012, 2013, and quadrennial program portfolios relative to a scenario in which those programs did not exist. For example, the findings indicate that the quadrennial program portfolio will generate a total of $5,502 million in net sales between 2011 and 2038. Differences in cumulative sales generated between program years are driven primarily by the variations in economic benefits described above.

Figure 12. Cumulative Net Sales Generated*



*Quadrennial value is an output from a separate model run and does not equal the sum of the four years.

Program Year and Future Year Sales Generated

Table 11 shows the program year, future year, and cumulative statewide net sales generated, categorized by program calendar year(s). For instance, the findings suggest that the quadrennial program portfolio generated $1,424 million in net sales during the operational period and will generate an additional $4,078 million through the end of the study period, which represents an average of about $170 million per future year.

Table 11. Program Year, Future Year, and Cumulative Sales Generated

Sales Generated (millions of 2015 dollars)	Program Calendar Year(s)				
	2011	2012	2013	2014	Quadrennial* (2011–2014)
Program Year(s)	$256	$425	$299	$263	$1,424
Future Years	$820	$1,169	$1,048	$1,191	$4,078
Cumulative**	**$1,076**	**$1,593**	**$1,346**	**$1,454**	**$5,502**

*Quadrennial values are outputs from a separate model run and do not equal the sum of the four years.

**Values may not sum due to rounding.

There is a strong correlation between net economic benefits and sales generated; the amount of annual and cumulative sales generated accrues over time in much the same manner as economic benefits.



Analytical Approach

This analysis primarily aims to assess the statewide economic development impacts attributable to the 2014 Focus on Energy programs and the 2011–2014 quadrennial portfolio. Cadmus completed a Focus on Energy economic impact analysis in 2013 to determine the statewide economic development effects of 2012 program activities and the resulting energy savings that could accrue through 2036. Since the previous analysis, federal organizations that track and report on economic production and growth have released updated economic data and forecasts. These data contribute to the foundation of REMI PI^{+} models; therefore, the REMI PI^{+} model used in this analysis is based on different economic production and growth data than the model used in the 2013 study. Cadmus presents a high-level update to the analysis of the 2012 Focus on Energy program portfolio in Appendix B: 2012 Program Calendar Year Impacts, which incorporates the new data in the REMI PI^{+} model used in the present analysis. The updated analysis of 2012 programs incorporates the same base data as the previous study, which consists of evaluated program-specific results and portfolio cost data provided by Focus on Energy.

The update to the analysis completed in 2013 allows for comparisons of year-to-year impacts within this report; however, these changes should not be interpreted as a restating of the 2013 analysis. The earlier analysis is a more appropriate comparison point for assessing the impacts of Focus on Energy investments relative to investments in other programs that were also modeled in 2013. Likewise, this report is a more appropriate reference when making comparisons with other programs that have been, or will be, similarly modeled in 2015.

In addition to updated economic production and growth data incorporated in the REMI PI^{+} model, Cadmus contributed the following incremental improvements to the modeling methodology, which were approved by the Public Service Commission of Wisconsin (PSC) and the PSC's Evaluation Working Group:

- Energy bill savings resulting from the Agriculture Program were modeled as changes to proprietor (i.e., owner) income in the farming sector, whereas they were previously modeled as changes to farm employee compensation; and
- Participant co-funding payments for Agriculture Program projects were modeled as changes to proprietor income in the farming sector, whereas they were previously modeled as changes to production costs in the agriculture and forestry support activities sector.

These improvements and their reasoning are discussed in more detail in Appendix E: Changes Since the 2013 Report.

The following section describes the REMI PI^{+} modeling software and the approach used to determine net economic impacts attributable to Focus on Energy program investments, project spending, and ongoing energy savings. The subsequent section presents the model inputs used in the REMI PI^{+} model framework.

Description of Software and Modeling Approach

Studies that assess the net economic development impacts of energy efficiency and renewable resource programs typically use one of two types of modeling analysis. The first type uses an input-output (IO) matrix to assess interactions between industries under static economic conditions, which is suitable for determining approximate impacts of program-related cash flows that lead to ripple effects throughout the economy. However, an IO assessment does not incorporate future economic changes—such as labor migration, price changes, and general economic equilibrium—that affect the economic impacts of ongoing energy savings. The second type of analysis incorporates dynamic changes in those variables, and thus it is a better option for assessing the near-term and long-term impacts of energy efficiency and renewable resource programs like Focus on Energy.

The REMI PI$^+$ model used for this analysis incorporates features of both types of economic analysis, as described in the following section.

About the REMI PI$^+$ Model

REMI PI$^+$ is a dynamic economic forecasting model and incorporates an IO matrix, general equilibrium, econometrics, and economic geography. Each of these components, with examples that illustrate their applications, are presented below:

- The **IO matrix** is at the core of how the REMI PI$^+$ model captures industry-to-industry interactions within a particular region, in this case the state of Wisconsin.

  For example, buying home insulation directs funds to the insulation industry. REMI PI$^+$ includes a set of spending multipliers that account for how the insulation industry interacts with other industries, for example the fiberglass industry.

- **General equilibrium** captures the long-term stabilization of the economic system as supply and demand become balanced.

  For example, as investments in energy-efficient equipment increase, general equilibrium is established as contractors hire more employees to install and maintain the new energy-efficient equipment in the region. Additionally, commercial and industrial program participants have lower long-term energy costs, improving their competitiveness relative to neighboring states and allowing them to capture more share of the regional market.

- **Econometrics** estimates responses to economic changes and the speed at which they occur.

  For example, as Focus on Energy program participants demand less energy due to using more efficient equipment, utilities increase energy rates to maintain revenue and profits. In this case, the econometric factor of “price elasticity of energy demand” describes how utilities change prices to account for reductions in demand.



- **Economic geography** represents spatial characteristics of the economy, such as productivity and competitiveness, arising from industry clustering and labor market access.

  For example, as investments in energy-efficient equipment increase, clusters of specialized labor and firms related to energy efficiency and renewable energy will develop in Wisconsin. In other words, Focus on Energy helps develop the energy efficiency and renewable energy industries in Wisconsin

Unlike standard IO models, the REMI PI+ model accounts for expected annual changes in the statewide economy over the entire study period. The economic production and growth data underpinning the model are based on real historical and forecasted conditions. As a result, the REMI PI+ model accounts for near-term conditions that affect calculated investment impacts and spending completed during the program operational period, and the model considers long-term conditions that affect calculated impacts from ongoing energy savings.

Modeling Approach

Cadmus used a customized REMI PI+ model for the state of Wisconsin to determine the net effects on employment growth, economic benefits, personal income increases, and sales generated that could be attributed to the 2011, 2012, 2013, 2014, and quadrennial Focus on Energy program portfolios. The analysis determined impacts across 70 industry sectors within Wisconsin, as defined in the REMI PI+ model.

All findings described in this report represent net economic impacts, which means that there has not been a net spending change in the state of Wisconsin as a result of Focus on Energy program activities. For example, the increase in consumer spending on energy-efficient appliances is balanced in the REMI PI+ model by decreases in spending on other goods and services. The result is that total statewide spending remains constant and calculated economic impacts represent the difference between Focus on Energy program-related cash flows and the cash flows that would have occurred in the programs' absence.

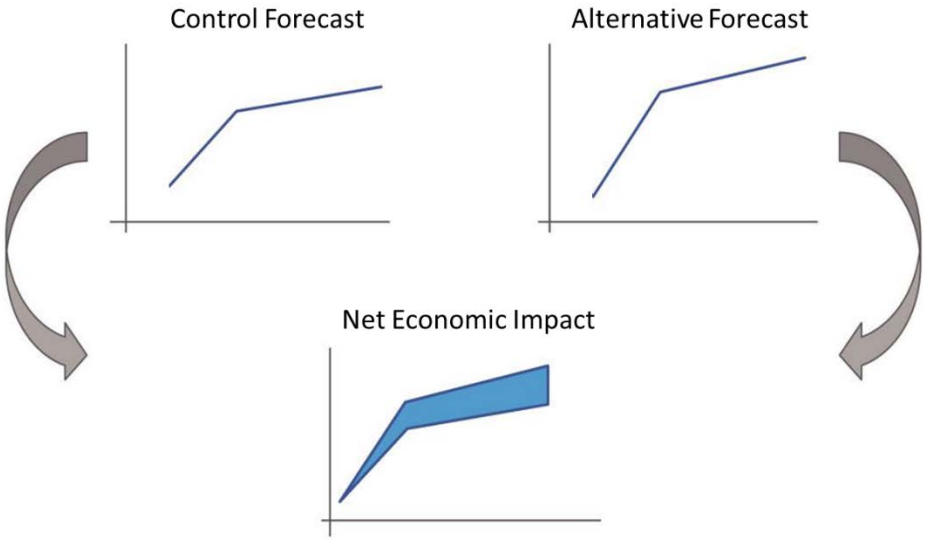
Cadmus used the REMI PI+ model's standard regional control to determine net changes in employment and other economic development variables resulting from program activities. For this study, the model's standard regional control scenario details the impacts of economic activities that would have occurred without Focus on Energy program investments, project spending, and resulting energy savings. These economic activities primarily consist of program participants' fuel and power purchases if they had not received incentives from Focus on Energy to purchase energy-efficient technologies.

The REMI PI+ model calculates a control forecast based on the standard regional control and an alternative forecast derived from model inputs describing all Focus on Energy program-related cash flows between Wisconsin stakeholder groups. The model integrates economic data collected by various federal government agencies. Employment and wage data are from the Bureau of Economic Analysis, Bureau of Labor Statistics (BLS), and County Business Patterns database. Information on fuel wholesale

and retail costs is from the Energy Information Administration (EIA). Data from the Census Bureau form the basis for model assumptions of population growth and migration within and between regions.[4]

As Figure 13 illustrates, the REMI PI+ model compares impacts from the control forecast to impacts from the alternative forecast to determine net economic impacts.

Figure 13. Determining Net Economic Impacts with REMI PI+



The net economic impacts calculated by REMI PI+ represent the difference between the Focus on Energy program-related economic activities (alternative forecast) and the economic activities that would have occurred if the money invested in Focus on Energy had instead been spent on fuel and power purchases (control forecast).

For each model included in this analysis—2011, 2012, 2013, 2014, and the quadrennial—Cadmus customized REMI PI+ so that the alternative forecast modeled program-related cash flows between relevant stakeholder groups. As shown in Figure 14, these cash flows affect the Wisconsin economy in multiple ways:

- **Program Payments.** Funding for Focus on Energy originates from participating utilities' revenues, which are collected from Wisconsin ratepayers.

  In aggregate, program payments equal program spending and are obtained through a charge embedded in utility bills. Cadmus modeled program payments from residential customers as

[4] For a more detailed breakdown of the data sources and estimate procedures included in the REMI PI+ model's forecasts, please reference REMI's user documentation online: http://www.remi.com/download/documentation/pi+/pi+_version_1.4/Data_Sources_and_Estimation_Procedures.pdf



increases in electricity and natural gas prices and modeled program payments from business customers as increases in the amount spent on fuel as an input to production.

- **Program Spending.** Focus on Energy funds are spent on program administration activities and program delivery; marketing; and evaluation, measurement, and verification (EM&V) services provided by program trade allies and partners.

  Program spending on administration, implementation, marketing, and EM&V was modeled as either wage increases or direct spending to specific industry sectors. Programs' different delivery mechanisms, incentive structures, and offered measures contributed to which industry sector received spending on a program-by-program basis.

- **Incentives.** Program funds are also spent on direct financial and service-based incentives that encourage investments in energy saving technologies and behaviors.

  Since incentives offset a portion of the cost of high-efficiency measures, Cadmus generally modeled incentive payments as direct spending to affected industry sectors using the same program-specific categories as program spending. The only exception was the Appliance Recycling Program because the participant bears no cost but still receives an incentive. In that case, Cadmus modeled incentives as a change in statewide household income.

- **Participant Payments.** In addition to receiving incentives from Focus on Energy programs, participants provide their own co-funding to complete payments for project goods and services.

  Cadmus modeled participant co-funding as positive direct spending to the industry supplying a program's goods and services. The amount participants spent was offset with a negative consumption reallocation to reflect the forgone consumption of other goods and services resulting from program participation.

- **Bill Reductions.** Participants save energy as long as the installed measures remain operational, thus benefitting from energy bill reductions, while utilities forego those revenues.

  For the residential program participants, Cadmus modeled energy bill reductions as a positive consumption reallocation, which marks an increase in household consumption on other goods and services (the REMI PI^{+} model accounts for Wisconsin-specific spending profiles by demographic group). To calculate future-year bill reductions, Cadmus used forecasted energy rates and savings by fuel type. Forecasted rates came from East North Central census region data from the EIA website.[5] Future dollar values were also discounted to model base-year values using the consumer price index from the BLS.[6]

  For most of the business program participants, Cadmus modeled energy bill reductions as decreases in the amount spent on fuel as an input to production. The exception to this rule was the Schools and Government Program, whose participants included local schools and government agencies. Unlike commercial or industrial participants, fuel costs are an operating

[5] http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2013&subject=0-AEO2013&table=3-AEO2013&region=1-3&cases=ref2013-d102312a

[6] http://www.seattle.gov/financedepartment/cpi/forecast.htm

expense rather than an input to production. As such, cost savings resulting from efficiency gains result in an increase to local government income; therefore, Cadmus modeled bill reductions from the Schools and Government Program as increases to local government spending.

- **Avoided Utility Costs.** As a result of decreased demand for energy resources, Wisconsin utilities benefit from avoided fuel and capacity costs.

  When utilities generate less energy in reaction to decreased demand, there is a corresponding reduction in fuel purchases, transmission and distribution on the energy grid, the need to increase capacity, and air pollutants. Focus on Energy provided the avoided capacity and fuel prices Cadmus used to calculate the avoided utility costs. Cadmus used a cost inflation factor of 2.5% provided by Focus on Energy to forecast future-year avoided costs.

  Cadmus modeled avoided costs as a positive impact to the utility industry by partially offsetting reductions in utility energy sales, which are negative utility industry impacts equal to the bill reductions described above. To account for the avoided costs and revenue losses from bill reductions, Cadmus modeled a reduction in utility industry sales equal to the difference between participants' bill reductions and the avoided utility costs.

  Utilities may seek to recover lost revenues through their rates, which could result in changes that, all else equal, could increase future rates for all Wisconsin ratepayers. This could increase the future cost of energy for ratepayers that did not participate in Focus on Energy programs and reduce the net bill savings of participating ratepayers (and ratepayers that implemented cost-effective energy efficiency measures without participating). The REMI PI^{+} model is not designed to assess the potential distributional effects of these rate changes on regional economic activity. Therefore, such potential distributional impacts are not included in this study.

- **Baseline Energy Payments.** In the absence of Focus on Energy, Wisconsin ratepayers spend money on energy resources that otherwise would have been saved through the programs. Baseline energy payments were accounted for in the models' control forecasts, and therefore did not require alternative forecast model inputs from Cadmus.

Figure 14. Program and Baseline Scenario Cash Flows

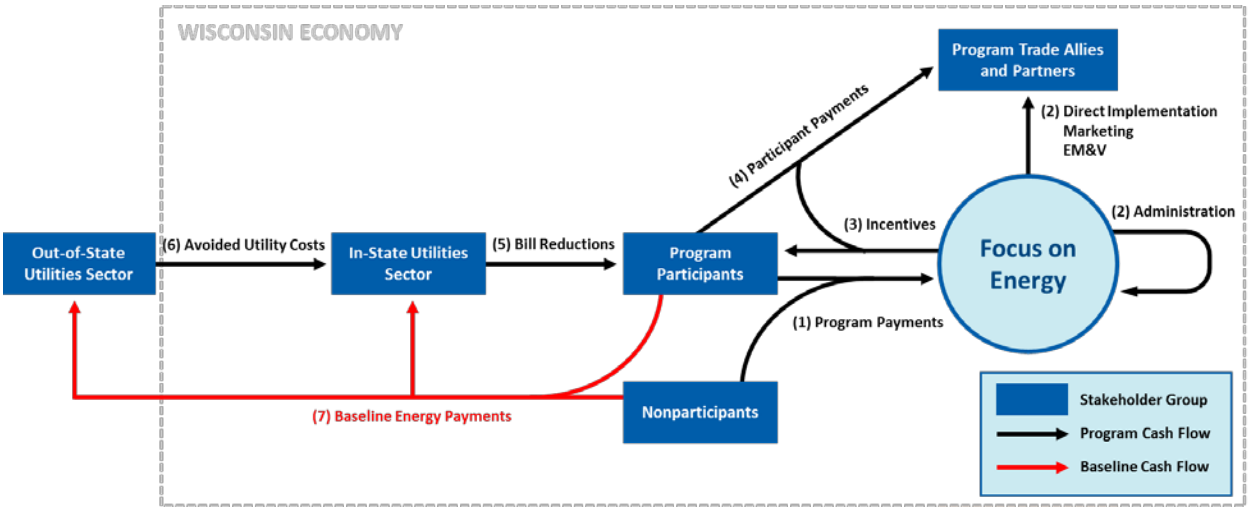




Table 12 specifies the positive and negative model inputs by relevant stakeholder group. Program payments supply funds for program spending and incentives. All other cash flows comprise transfers between stakeholder groups.

Table 12. Summary of Positive and Negative Model Inputs by Cash Flow and Stakeholder Group

Cash Flow	Stakeholder Group					
	Program Participants	Non-participants	Focus on Energy	Program Trade Allies and Partners	In-State Utilities	Out-of-State Utilities
Program Payments	Negative	Negative	--	--	--	--
Program Spending	--	--	Positive	Positive	--	--
Incentives	Positive	--	--	--	--	--
Participant Payments	Negative	--	--	Positive	--	--
Bill Reductions	Positive	--	--	--	Negative	--
Avoided Utility Costs	--	--	--	--	Positive	Negative
Baseline Energy Payments	Negative	Negative	--	--	Positive	Positive

Model Input Data

Economic impacts derive from Focus on Energy program investments, project spending, and resulting energy savings. This section presents the key REMI PI^{+} model inputs and describes the evaluation of the impact of various measures. All monetary inputs are presented in fixed 2014 dollars.

Program Spending

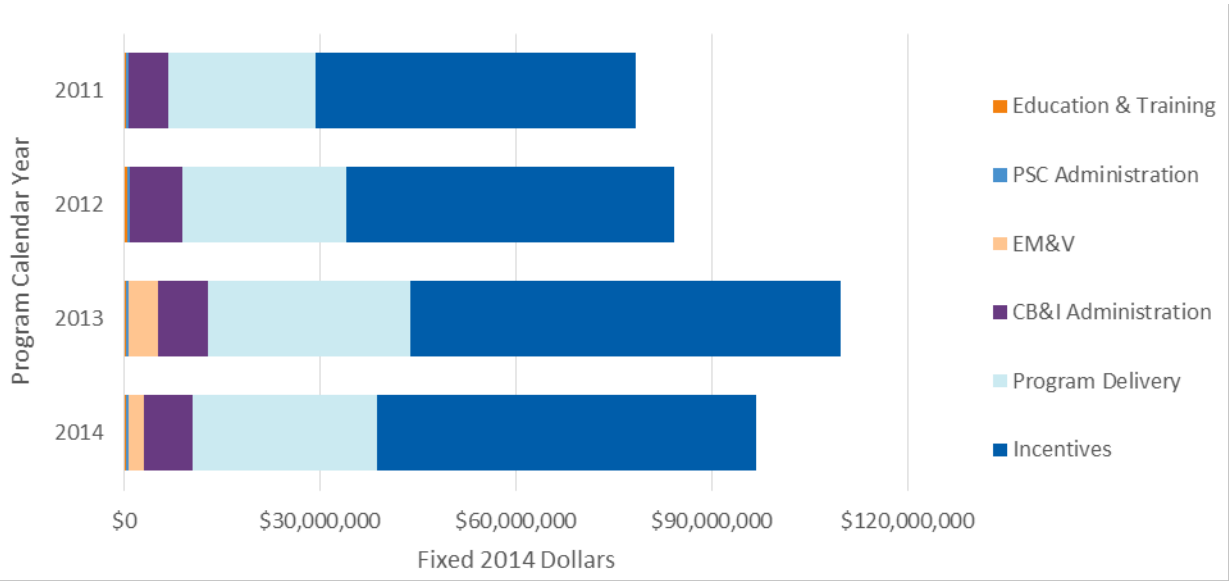
Cadmus modeled the economic impacts of portfolio-level, residential program, and business program expenditures. As shown in Table 13, total annual program spending increased steadily from 2011 to 2013 before decreasing slightly in 2014. Focus on Energy diverted approximately $370 million to administration, education and training, EM&V, implementation, and incentive payments during the programs' operational period (i.e., 2011–2014).

Table 13. Program Spending by Calendar Year

Program Calendar Year	Total Program Spending
2011	$78,369,289
2012	$84,221,056
2013	$109,640,111
2014	$96,680,444
2011–2014	**$368,910,899**

As Figure 15 illustrates, a majority of annual program funds were allocated to expenditures on incentive payments and, to a lesser extent, program delivery. Combined program spending on education and training, administration, and EM&V comprised a significantly smaller share of total program spending each year.

Figure 15. Annual Program Spending by Category



Participant Payments

In addition to receiving incentives, program participants provided their own co-funding to complete payments for project goods and services. For each program year and the quadrennial, Cadmus modeled the economic impacts resulting from participant co-funding payments. As shown in Table 14, annual participant co-funding payments for business projects were consistently larger than for residential projects. There was a significant rise in business and, by extension, total participant co-funding in 2012, mostly because of a few large legacy projects completed that year.

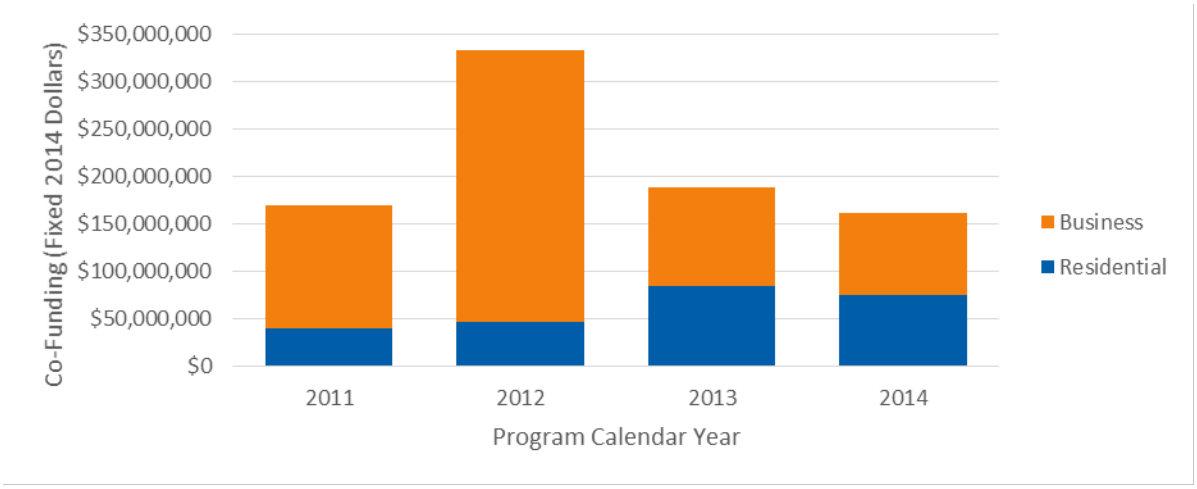
Table 14. Participant Payments by Program Calendar Year and Market Segment

Program Calendar Year	Mass Markets	Targeted Markets	Total
2011	$39,897,003	$129,379,353	$169,276,356
2012	$47,116,044	$285,138,949	$332,254,993
2013	$85,162,737	$103,840,224	$189,002,961
2014	$75,382,105	$86,130,011	$161,512,116
2011–2014	**$247,557,889**	**$604,488,537**	**$852,046,426**

As Figure 16 illustrates, participant co-funding payments for residential projects remained relatively steady from 2011 to 2012 and from 2013 to 2014; meanwhile, business participant co-funding payments decreased steadily from 2011 to 2014, with a large rise in 2012, as explained above.



Figure 16. Participant Payments by Program Calendar Year and Market Segment



Electric Energy Savings

For each program year and the quadrennial, Cadmus collected net verified electric savings from annual evaluation data. Table 15 presents the first-year, future-year, and cumulative electric savings by program calendar year and market segment.

Table 15. First-Year, Future-Year, and Cumulative Electric (kWh) Savings

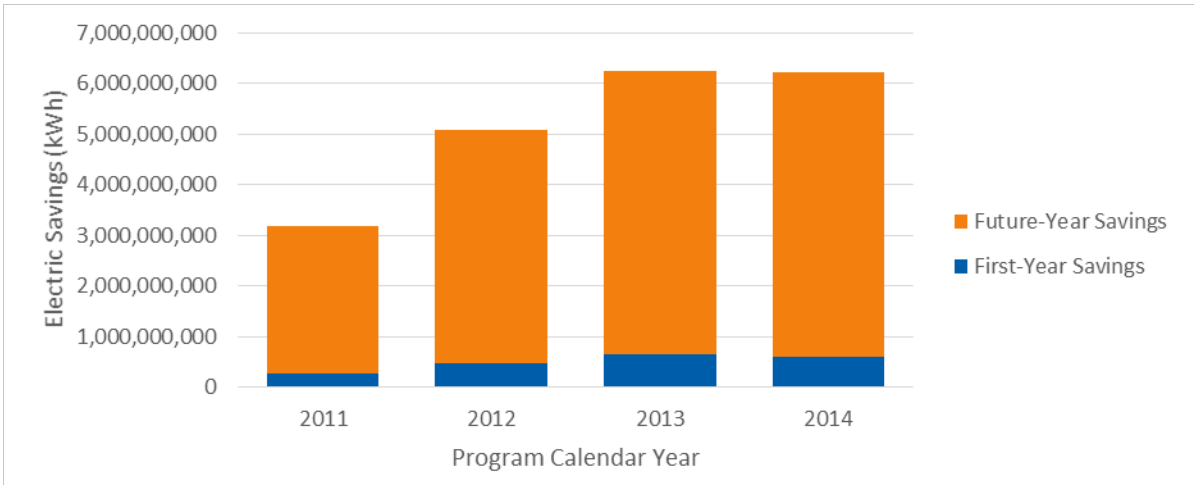
Year	Segment	First-Year Savings*	Future-Year Savings	Cumulative Savings**
2011	Residential	61,541,619	533,411,199	594,952,818
	Business	206,817,656	2,381,639,067	2,588,456,723
	Total	**268,359,274**	**2,915,050,266**	**3,183,409,541**
2012	Residential	126,830,608	914,898,603	1,041,729,211
	Business	338,818,402	3,709,096,446	4,047,914,848
	Total	**465,649,010**	**4,623,995,049**	**5,089,644,059**
2013	Residential	346,716,087	2,273,431,851	2,620,147,938
	Business	303,106,294	3,333,232,341	3,636,338,635
	Total	**649,822,381**	**5,606,664,192**	**6,256,486,573**
2014	Residential	271,409,802	1,793,431,344	2,064,841,146
	Business	318,556,905	3,854,955,044	4,173,511,949
	Total	**589,966,708**	**5,648,386,387**	**6,238,353,095**
2011–2014	Residential	806,498,116	5,515,172,997	6,321,671,113
	Business	1,167,299,257	13,278,922,898	14,446,222,155
	Total	**1,973,797,373**	**18,794,095,895**	**20,767,893,268**

*First-year savings do not equal annual savings presented in the CY2014 evaluation report due to rounding.

**Cumulative savings do not equal lifecycle savings presented in the CY2014 evaluation report because the economic impact evaluation does not assess savings that accrue beyond the study period (i.e., 25 years).

As Figure 17 illustrates, first-year electric savings increased steadily from 2011 to 2013 before declining slightly in 2014, while projected future-year electric savings increased each year.

Figure 17. First-Year and Future-Year Electric Savings by Program Calendar Year



Natural Gas Energy Savings

For each program year and the quadrennial, Cadmus organized net verified natural gas savings from annual evaluation data. Table 16 presents the first-year, future-year, and cumulative natural gas savings by program calendar year and market segment.

Table 16. First-Year, Future-Year, and Cumulative Natural Gas (therm) Savings

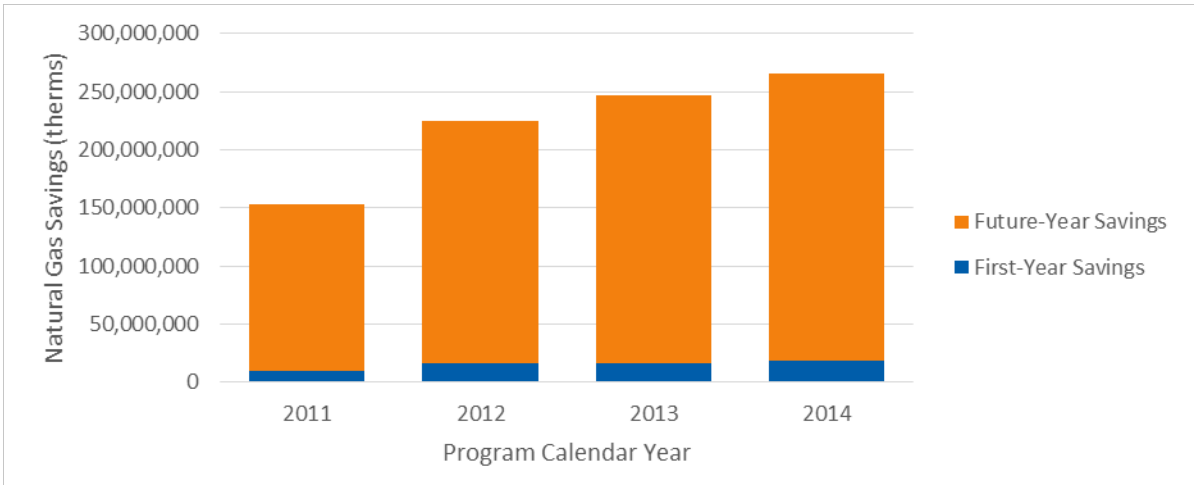
Year	Segment	First-Year Savings*	Future-Year Savings	Cumulative Savings**
2011	Residential	2,196,890	48,530,193	50,727,084
	Business	7,871,812	94,406,230	102,278,042
	Total	**10,068,702**	**142,936,424**	**153,005,126**
2012	Residential	3,268,948	58,765,790	62,034,738
	Business	13,080,386	149,431,183	162,511,569
	Total	**16,349,333**	**208,196,973**	**224,546,306**
2013	Residential	3,407,564	58,973,976	62,381,540
	Business	12,843,586	171,365,097	184,208,682
	Total	**16,251,150**	**230,339,073**	**246,590,223**
2014	Residential	2,913,490	49,764,269	52,677,759
	Business	15,242,822	197,418,356	212,661,177
	Total	**18,156,312**	**247,182,625**	**265,338,937**
2011–2014	Residential	11,786,892	216,034,229	227,821,121
	Business	49,038,605	612,620,866	661,659,470
	Total	**60,825,497**	**828,655,094**	**889,480,591**

*First-year savings do not equal annual savings presented in the CY2014 evaluation report due to rounding.
**Cumulative savings do not equal lifecycle savings presented in the CY2014 evaluation report because the economic impact evaluation does not assess savings that accrue beyond the study period (i.e., 25 years).



As Figure 18 illustrates, first-year natural gas savings increased from 2011 to 2012 and decreased the following year before increasing again in 2014; projected future-year natural gas savings increased for each consecutive program year.

Figure 18. First-Year and Future-Year Natural Gas Savings by Program Calendar Year



Electric Bill Reductions

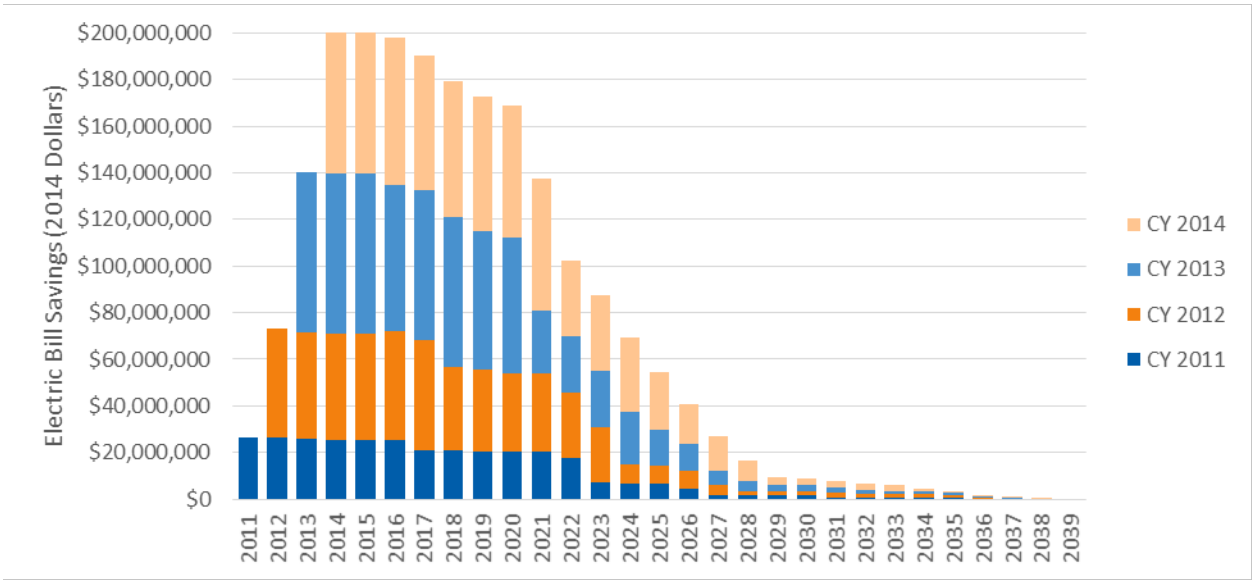
For each program year and the quadrennial, Cadmus used net verified electric savings and EIA retail rate data to determine annual electric bill reductions. Table 17 presents the first-year, future-year, and cumulative electric bill reductions attributable to each program calendar year.

Table 17. First-Year, Future-Year, and Cumulative Electric Bill Reductions by Program Calendar Year

Program Calendar Year	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
2011	$26,210,758	$283,312,601	$309,523,360
2012	$46,867,486	$463,463,173	$510,330,659
2013	$68,563,909	$595,284,888	$663,848,798
2014	$60,803,167	$590,328,247	$651,131,414
2011–2014	**$202,445,320**	**$1,932,388,910**	**$2,134,834,230**

As Figure 19 illustrates, annual electric bill reductions attributable to Focus on Energy projects accumulated as electricity-saving measures were implemented during the programs' operational period. Electric bill reductions are projected to reach a maximum of approximately $201 million in 2015, then taper off as measures installed during the programs' operational period begin to reach their maximum effective useful life.

Figure 19. Annual Electric Bill Reductions by Program Calendar Year



Natural Gas Bill Reductions

For each program year and the quadrennial, Cadmus used net verified natural gas savings and EIA retail rate data to determine annual natural gas bill reductions. Table 18 presents the first-year, future-year, and cumulative natural gas bill reductions attributable to each program calendar year.

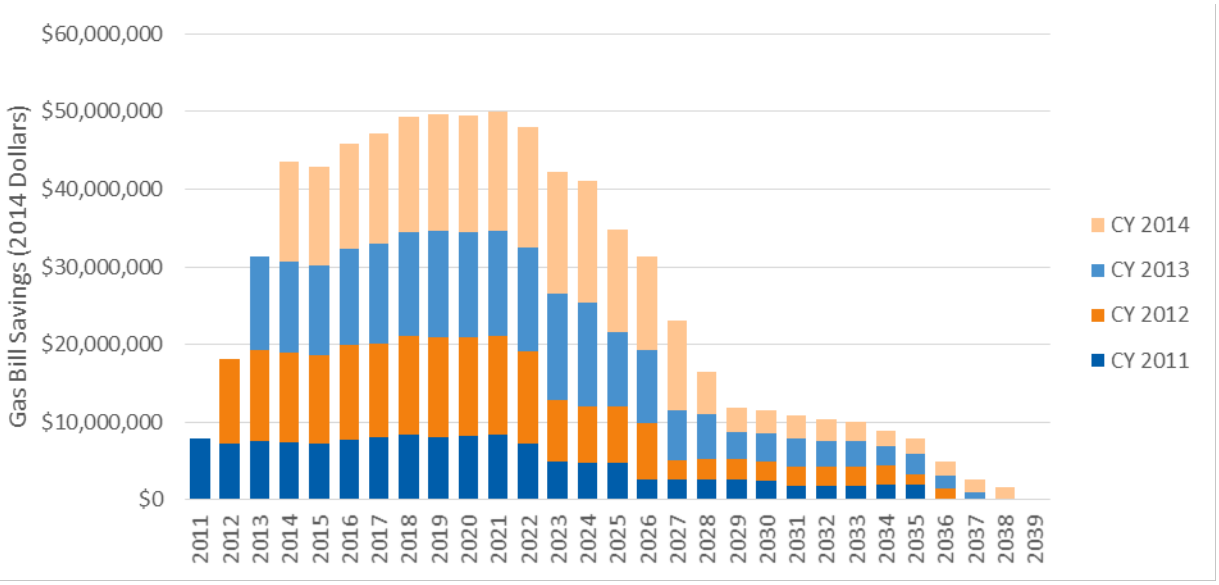
Table 18. First-Year, Future-Year, and Cumulative Natural Gas Bill Reductions

Program Calendar Year	First-Year Reductions	Future-Year Reductions	Cumulative Reductions
2011	$7,894,400	$122,210,951	$130,105,351
2012	$11,030,764	$174,082,000	$185,112,763
2013	$12,070,369	$199,729,606	$211,799,975
2014	$12,764,952	$212,914,208	$225,679,160
2011–2014	**$43,760,485**	**$708,936,764**	**$752,697,249**

As Figure 20 illustrates, annual natural gas bill reductions attributable to Focus on Energy projects accumulated as natural gas saving measures were implemented during the programs' operational period. Unlike electric bill reductions, natural gas bill reductions are projected to continue increasing annually beyond the programs' operational period, reaching a maximum of approximately $50 million in 2021, then tapering off thereafter. The projected annual natural gas bill reductions are less than electric bill reductions due mostly to differences in retail prices, which are generally higher for electricity. Relative to electric bill reductions, natural gas bill reductions reach a peak later, mainly because of differences in average measure lifetimes, which are typically longer for natural gas measures.



Figure 20. Annual Natural Gas Bill Reductions by Program Calendar Year



Electric Utility Net Revenue Effects

As a result of Focus on Energy participants' reduced energy usage, participating utilities benefit by spending less on fuel and other variable costs. Because participants also purchase less energy, participating utilities experience a reduction in energy sales. The reduction in energy sales may cause utilities to collect less revenue than forecasted. Cadmus calculated differences between avoided utility costs and lost utility revenues to determine net revenue effects.

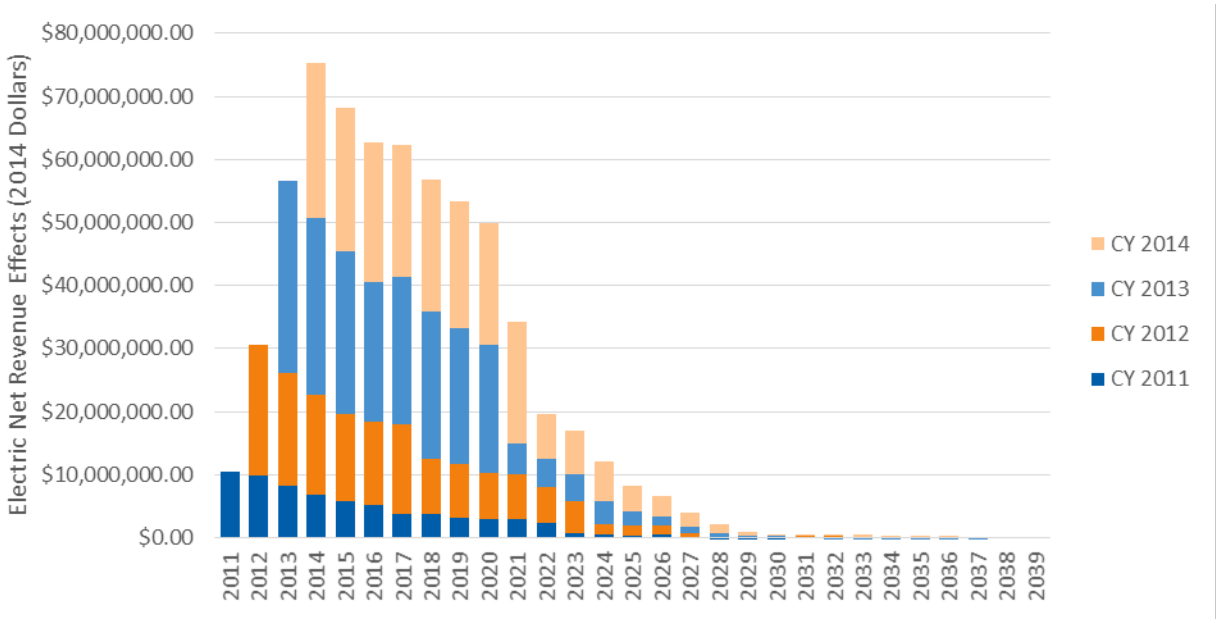
For each year of the study period, Cadmus calculated positive electric utility net revenue effects; in other words, the analysis determined that annual electric avoided costs are greater than annual electric revenue losses. Table 19 presents the first-year, future-year, and cumulative electric utility net revenue effects attributable to each program year.

Table 19. First-Year, Future-Year, and Cumulative Electric Utility Net Revenue Effects

Program Calendar Year	First-Year Effects	Future-Year Effects	Cumulative Effects
2011	$10,548,923	$58,014,264	$68,563,187
2012	$20,726,455	$122,698,331	$143,424,786
2013	$30,600,598	$187,186,381	$217,786,980
2014	$24,705,644	$178,541,131	$203,246,776
2011–2014	**$86,581,622**	**$546,440,107**	**$633,021,729**

As Figure 21 illustrates, annual electric utility net revenue effects accumulated as electricity-saving measures were implemented during the programs' operational period. Electric utility net revenue effects are estimated to have reached a maximum of approximately $75 million in 2014.

Figure 21. Annual Electric Net Revenue Effects by Program Calendar Year



Natural Gas Utility Net Revenue Effects

For each year of the study period, Cadmus calculated negative natural gas utility net revenue effects. Unlike electric utility revenue effects, forecasted annual natural gas avoided costs are less than annual natural gas revenue losses, resulting in negative net effects on natural gas utility revenues. However, the negative natural gas revenue effects are significantly smaller in fixed 2014 dollars than the positive electric revenue effects described above. Table 20 presents the first-year, future-year, and cumulative natural gas net revenue effects attributable to each program year.

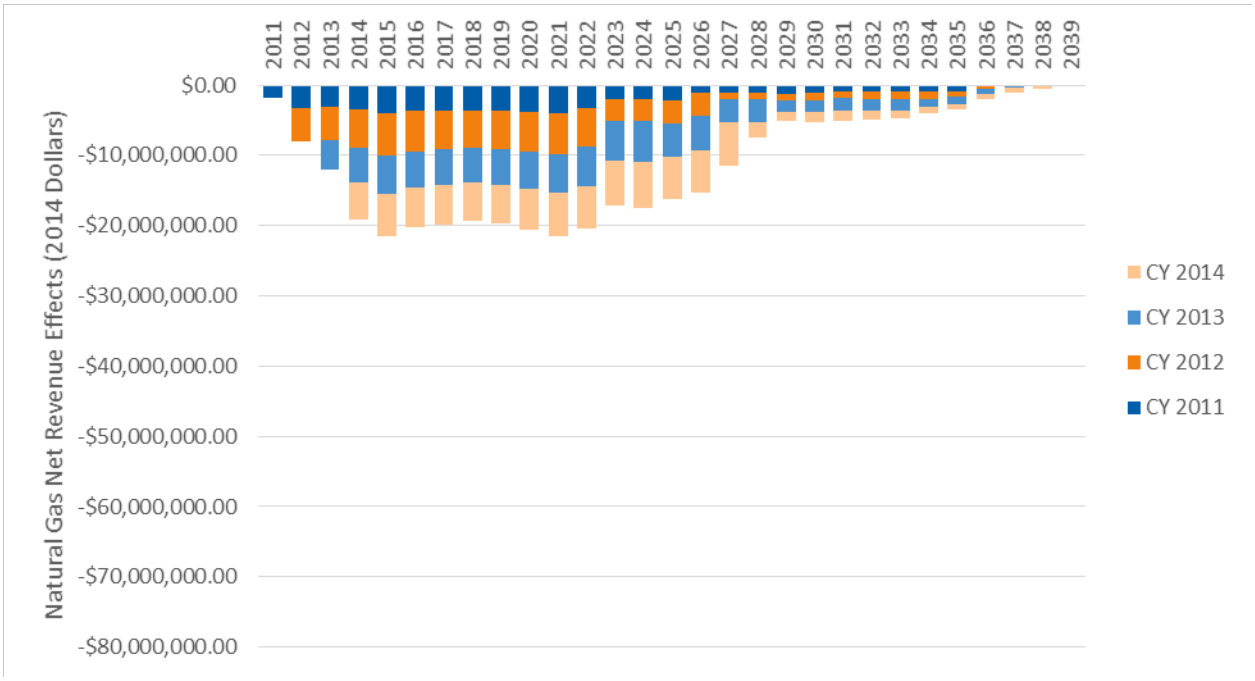
Table 20. First-Year, Future-Year, and Cumulative Natural Gas Net Revenue Effects

Program Calendar Year	First-Year Effects	Future-Year Effects	Cumulative Effects
2011	-$1,833,611	-$55,503,571	-$57,337,182
2012	-$4,914,966	-$77,764,673	-$82,679,639
2013	-$4,205,935	-$86,557,842	-$90,763,777
2014	-$5,351,361	-$90,106,296	-$95,457,658
2011–2014	**-$16,305,873**	**-$309,932,382**	**-$326,238,255**

As Figure 22 illustrates, annual natural gas utility net revenue effects are lower than the electric utility net revenue effects described above. Net revenue effects accumulated as natural gas saving measures were implemented during the programs' operational period. Natural gas net revenue effects are projected to reach a minimum of approximately -$22 million in 2015.



Figure 22. Annual Natural Gas Net Revenue Effects by Program Calendar Year



Environmental Benefits

An accurate and acceptable method for quantifying the Wisconsin health and quality-of-life benefits of reduced emissions of atmospheric pollutants such as mercury, sulfur dioxide (SO_2), nitrogen oxides (NO_X), and carbon dioxide (CO_2) is currently unavailable. However, quantifying the benefits of displaced emissions of NO_X and SO_2 for utilities is possible because these emissions are regulated under the federal Clean Air Act. Cap and trade markets assign these emissions a monetary value that in turn has a measurable effect on the Wisconsin economy. As such, Cadmus included emissions benefits for NO_X and SO_2 in the analysis of program year and quadrennial economic impacts.

Carbon pricing structures are currently under investigation in Wisconsin; however, Cadmus did not model CO_2 emissions benefits in the economic analysis because there are no established mechanisms for reducing carbon emissions in Wisconsin. As a result, there are no trading markets to place a defined value on displaced CO_2 emissions. Therefore, CO_2 emissions have no distinct monetary value in the Wisconsin economy that is well-defined for accurate modeling. Cadmus did include CO_2 emissions benefits in the cost-effectiveness tests described previously. The Wisconsin PSC has monetized the societal benefits of displaced CO_2 emissions at $30 per ton.[7]

Monetizing emissions benefits requires three key parameters: lifecycle net energy savings, emissions factors, and the value of the displaced emissions. Emissions factors are the rate at which pollutants are emitted per unit of energy and are most often expressed in tons of pollutant per energy unit (for electric

[7] The Public Service Commission of Wisconsin ordered this monetary value in docket 5-GF-191, Electronic Regulatory Filing System reference number 137513.

energy it is tons/MWh). The product of the emissions factor and the net lifecycle energy savings is the total weight of air pollutant displaced by the program. The avoided emissions benefit is the product of the total tonnage of pollutant displaced and the dollar value of the displaced emissions per ton.

Table 21 shows the electric emissions factors and allowance prices used to estimate emissions benefits for the economic impact analysis, which are consistent with those used in other evaluation analyses conducted during the quadrennial period.

Table 21. Emissions Factors and Allowance Prices by Pollutant

Service Fuel Type	NO_X	SO_2
Electric Emissions Factor (Tons/MWh)	0.0012	0.0008
Allowance Price ($/Ton)	$4.10	$1.08

The emissions allowance prices used as a basis for this analysis are 2012 prices from the EIA.[8] Cadmus calculated the forecasted NO_X and SO_2 allowance prices by applying the same 2.5% inflation factor provided by Focus on Energy to forecast avoided fuel and capacity costs. Again, these data are consistent with those used in other analyses conducted between 2011 and 2014.

Table 22 shows the emissions benefits incorporated into the REMI PI$^+$ modeling analysis by pollutant and program calendar year.

Table 22. Cumulative Emissions Benefits Modeled

Program Calendar Year	NO_X Emissions Benefits	SO_2 Emissions Benefits
2011	$17,845	$3,134
2012	$28,913	$5,077
2013	$36,001	$6,322
2014	$37,190	$6,531
2011–2014	**$119,949**	**$21,064**

[8] http://www.eia.gov/todayinenergy/detail.cfm?id=4830



Appendix A: 2014 Program Calendar Year Impacts

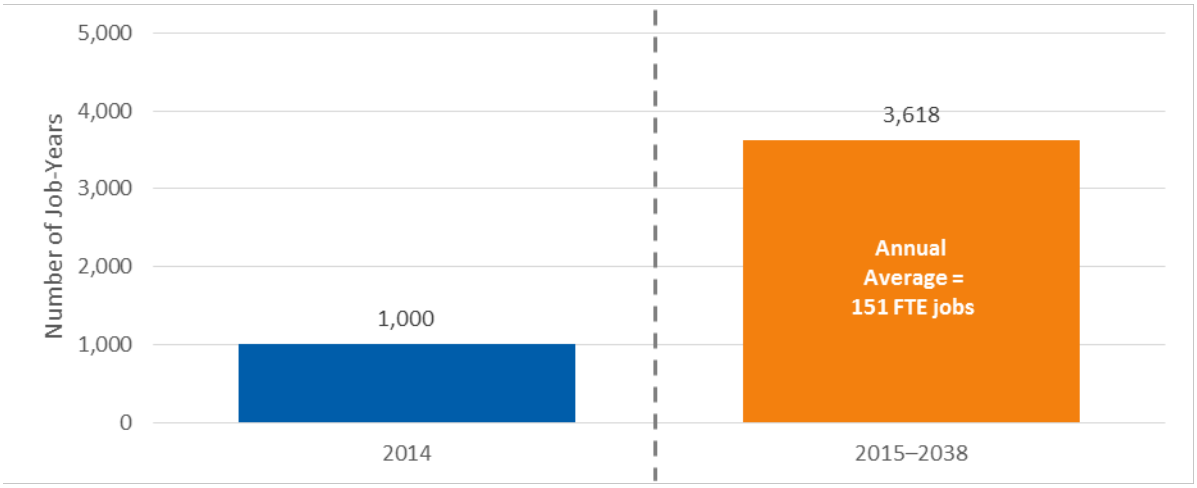
The following sections summarize employment growth, economic benefits, personal income increases, and sales generated that can be attributed to the 2014 program calendar year.

Employment

Program Year and Future Year Employment Growth

Figure A-1 illustrates the net program year and future year employment impacts of the 2014 Focus on Energy program portfolio relative to the hypothetical scenario in which the 2014 Focus on Energy programs did not operate.

Figure A-1. Program Year and Future Year Employment Growth, Program Calendar Year 2014

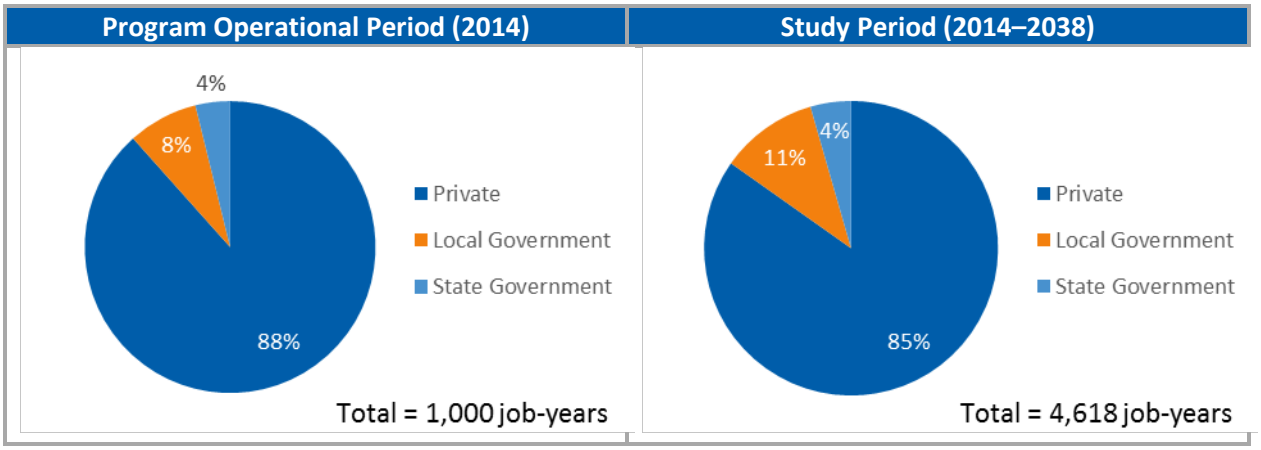


The 2014 portfolio created 1,000 net FTE jobs in the first year, not accounting for the employment impacts produced in previous program years. Similar to the findings from the quadrennial model, ongoing energy savings attributable to 2014 Focus on Energy programs will continue to generate employment impacts at lower levels through the duration of the study period. As shown in Figure A-1, the 2014 portfolio is projected to create a total of 3,618 net job-years between 2015 and 2038, representing an average of approximately 151 FTE jobs annually during the 24-year period.

Net Employment Growth by Market Sector

Similar to the quadrennial analysis, most of the net job growth generated by the 2014 Focus on Energy portfolio affects industries in the private sector and, to a lesser extent, in the local government sector. Figure A-2 illustrates the relative share of total job growth attributable to the private, local government, and state government sectors in 2014 and throughout the study period. Job growth in the public sector is sustained for a longer period of time relative to employment effects in the private sector. As a result, the relative share of public sector job growth increases during the study period.

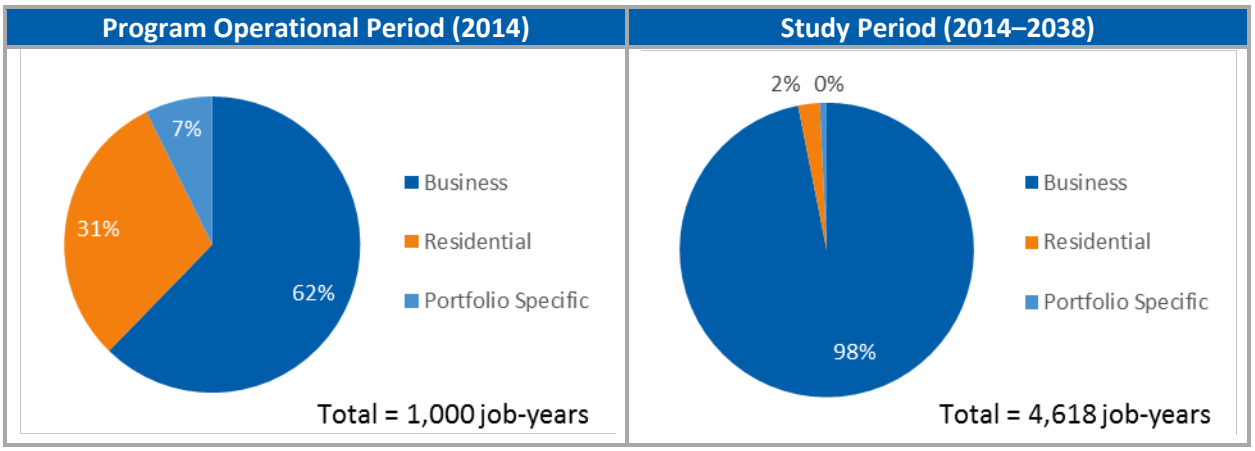
Figure A-2. Program Operational Period and Study Period Employment Growth by Sector



Net Employment Growth by Market Segment

Figure A-3 shows the relative share of net statewide employment impacts attributable to the 2014 portfolio-specific, residential, and business segments during the program operational period (i.e., 2014) and the entire study period (i.e., 2014–2038).

Figure A-3. Program Operational Period and Study Period Employment Growth by Segment



In the operational and study periods, the relative shares of employment growth fluctuate among market segments for the same reasons as described for the quadrennial portfolio analysis. That is, the share of total employment growth attributable to portfolio-specific spending decreases over time since portfolio-specific spending does not result in ongoing energy savings. The share of total employment growth attributable to business programs relative to residential programs increases over time due to relatively substantial energy savings that accrue throughout the study period from business projects.

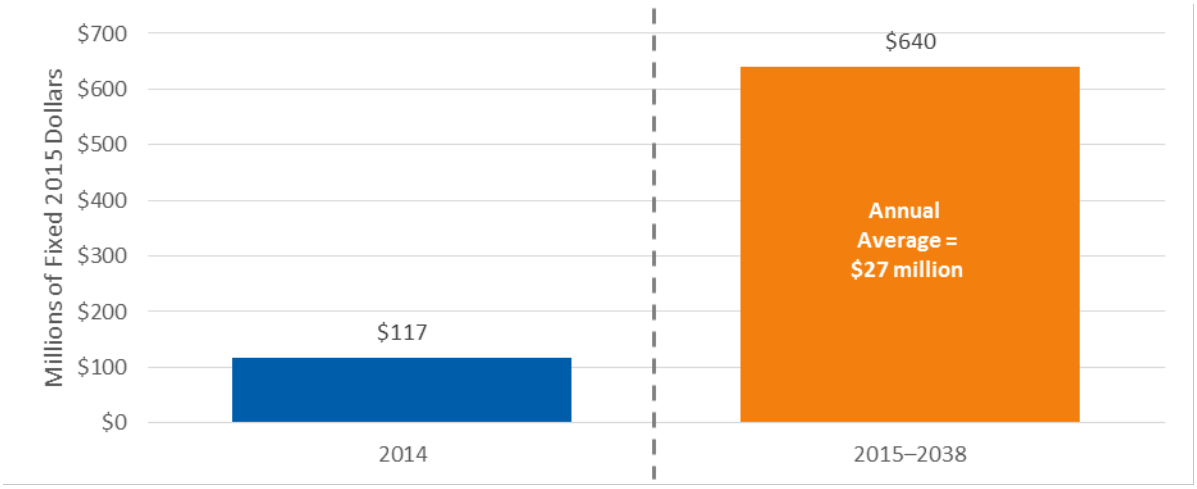


Economic Benefits

Program Year and Future Year Economic Benefits

Figure A-4 illustrates the net program year and future year economic benefits of the 2014 Focus on Energy program portfolio relative to the hypothetical scenario in which the 2014 Focus on Energy programs did not operate.

Figure A-4. Program Year and Future Year Economic Benefit Impacts, Program Calendar Year 2014

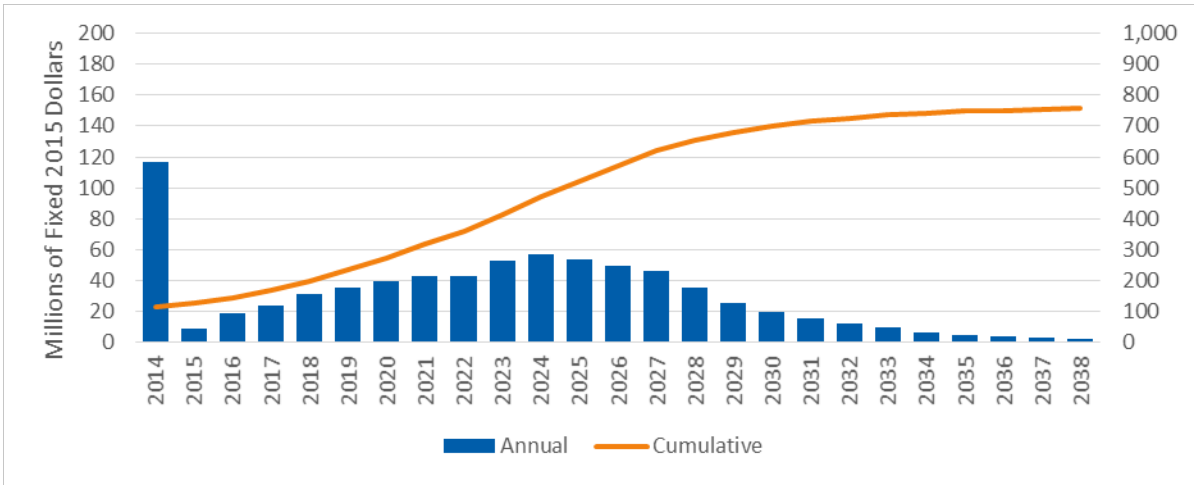


The 2014 portfolio generated $117 million of statewide economic benefits in the first year, not accounting for the economic benefits attributable to previous program years. The 2014 analysis did not account for sustained program activity beyond the first year. Similar to the findings from the quadrennial model, ongoing energy savings attributable to 2014 Focus on Energy programs will continue to generate economic benefits during the study period. The 2014 portfolio is projected to generate $640 million of net economic benefit between 2015 and 2038, representing an annual average of approximately $27 million during the 24-year timeframe.

Annual and Cumulative Economic Benefits

Figure A-5 illustrates the net annual and cumulative economic benefits of the 2014 Focus on Energy program portfolio relative to the scenario in which Focus on Energy programs did not operate. The 2014 portfolio analysis did not account for sustained program investment, and although economic benefit impacts increase annually from 2015 through 2024, they continue at lower levels between 2025 and 2038.

Figure A-5. Net 2014 Program Portfolio Economic Benefits through 2038

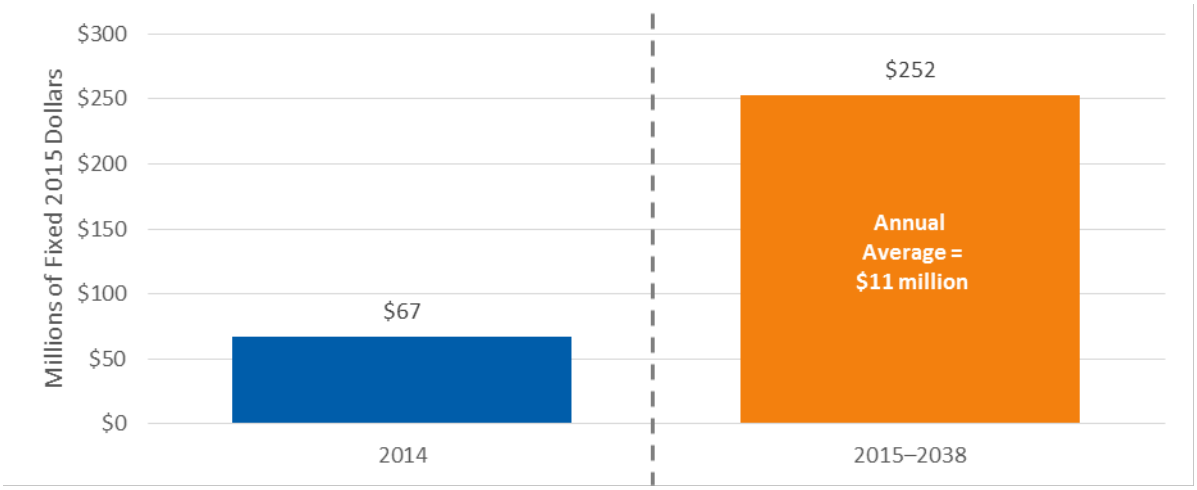


Personal Income

Program Year and Future Year Personal Income Increases

Figure A-6 illustrates the effects of the 2014 Focus on Energy program portfolio on net program year and future year personal income relative to the hypothetical scenario in which the 2014 Focus on Energy programs did not operate.

Figure A-6. Program Year and Future Year Personal Income Increases, Program Calendar Year 2014



The 2014 portfolio generated $67 million of statewide personal income in the first year, not counting the income effects from previous program years. The 2014 analysis did not account for sustained program investment or project spending beyond the first year. Similar to the quadrennial model findings, ongoing energy savings attributable to 2014 Focus on Energy programs will continue to generate personal income increases through 2038. The 2014 portfolio is expected to generate $252 million of net statewide personal income between 2015 and 2038, representing an average of about $11 million annually for 24 years.

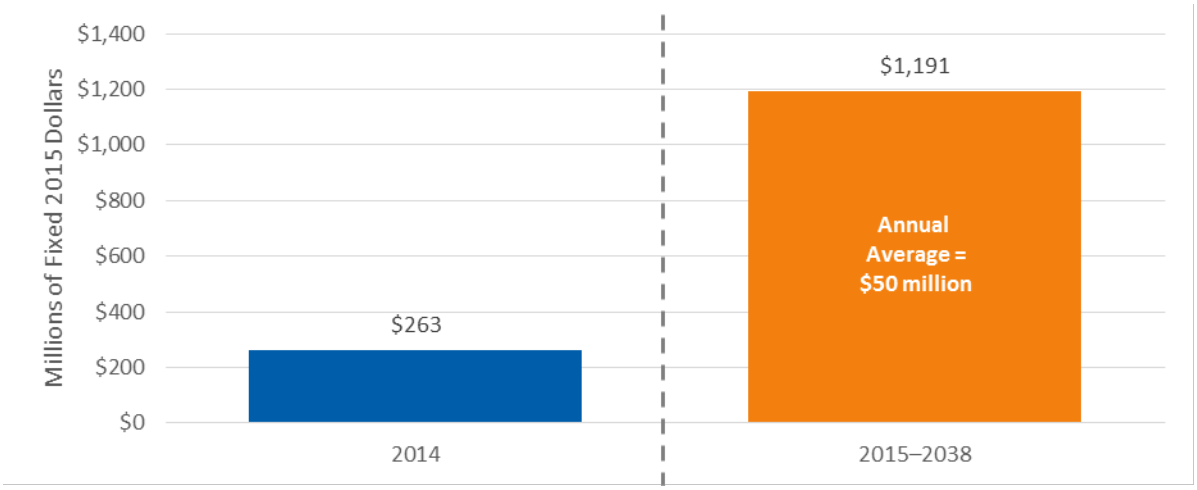


Sales Generated

Program Year and Future Year Sales Generated

Figure A-7 illustrates the net program year and future year sales generated by the 2014 Focus on Energy program portfolio relative to the hypothetical scenario in which the 2014 programs did not operate.

Figure A-7. Program Year and Future Year Sales Generated, Program Calendar Year 2014



The 2014 portfolio generated $263 million of statewide net sales in the first year, not including the sales generated from previous program year investments and project activities. The 2014 analysis did not account for sustained program investment or project spending beyond the first year. Similar to the quadrennial analysis findings, ongoing energy savings attributable to 2014 Focus on Energy programs will continue to generate sales through 2038. The 2014 portfolio is projected to generate an additional $1,191 million of statewide net sales between 2015 and 2038, or approximately $50 million annually during the 24-year timeframe.

Appendix B: 2012 Program Calendar Year Impacts

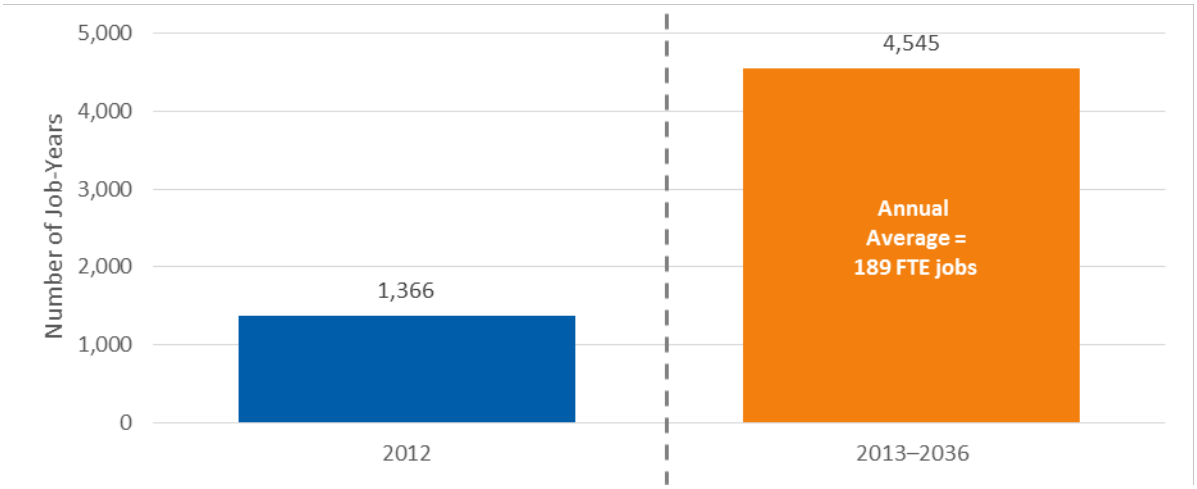
The following sections summarize employment growth, economic benefits, personal income increases, and sales generated attributable to the 2012 program calendar year. As discussed in the body of the report, the following findings allow comparisons of year-to-year impacts within this report, but should not be interpreted as a restating of the previous analysis completed in 2013.

Employment

Program Year and Future Year Employment Impacts

Figure B-1 illustrates the net program year and future year employment impacts of the 2012 Focus on Energy program portfolio relative to the hypothetical scenario in which the 2012 Focus on Energy programs did not operate.

Figure B-1. Program Year and Future Year Employment Impacts, Program Calendar Year 2012



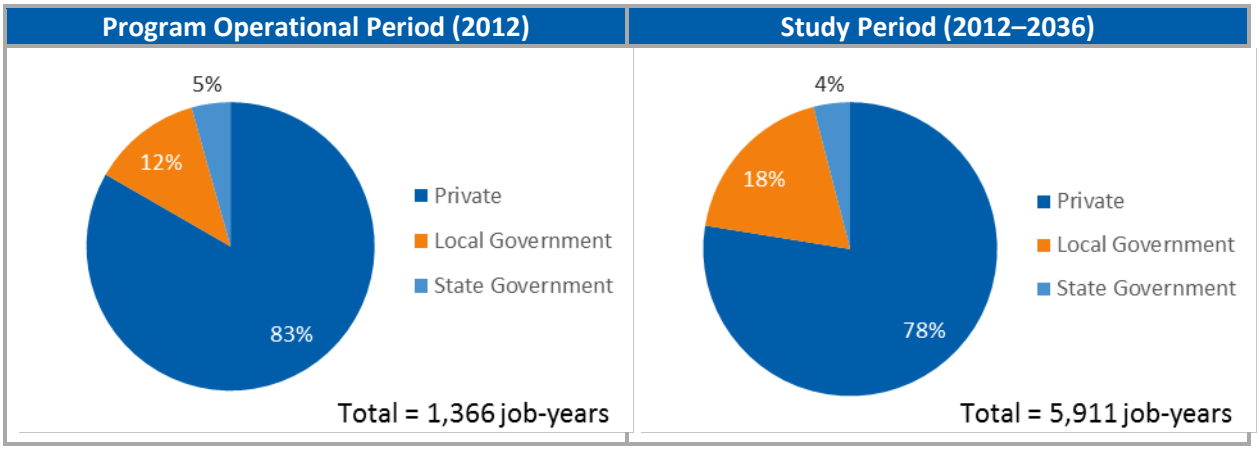
The 2012 portfolio created 1,366 net FTE jobs in the first year. First-year employment growth was higher than in 2014 because of differences in annual program activities and annual project spending, and because the REMI PI$^+$ model accounts for annual changes in labor productivity. In REMI PI$^+$, an equivalent activity modeled in 2012 and 2014 results in higher and lower employment growth, respectively, since labor productivity (i.e., production per job) generally increases over time. The 2012 model did not account for continued program activity beyond the first year. Energy savings from 2012 projects will create jobs, although at a declining annual rate, throughout the study period due to ongoing bill savings being spent. As shown in Figure B-1, the 2012 program portfolio is projected to generate 4,545 total net job-years between 2013 and 2036, representing an annual average of approximately 189 FTE jobs during the 24-year period.

Net Employment Growth by Market Sector

Similar to the quadrennial and 2014 analyses, most of the net job growth initiated by the 2012 Focus on Energy portfolio affects industries in the private sector and, to a lesser extent, in the local government

sector. Figure B-2 illustrates the relative share of total net job growth attributable to the private, local government, and state government sectors in 2012 and throughout the study period. Job growth in the public sector is sustained for a longer period of time relative to employment in the private sector. As a result, the relative share of public sector employment growth increases during the study period.

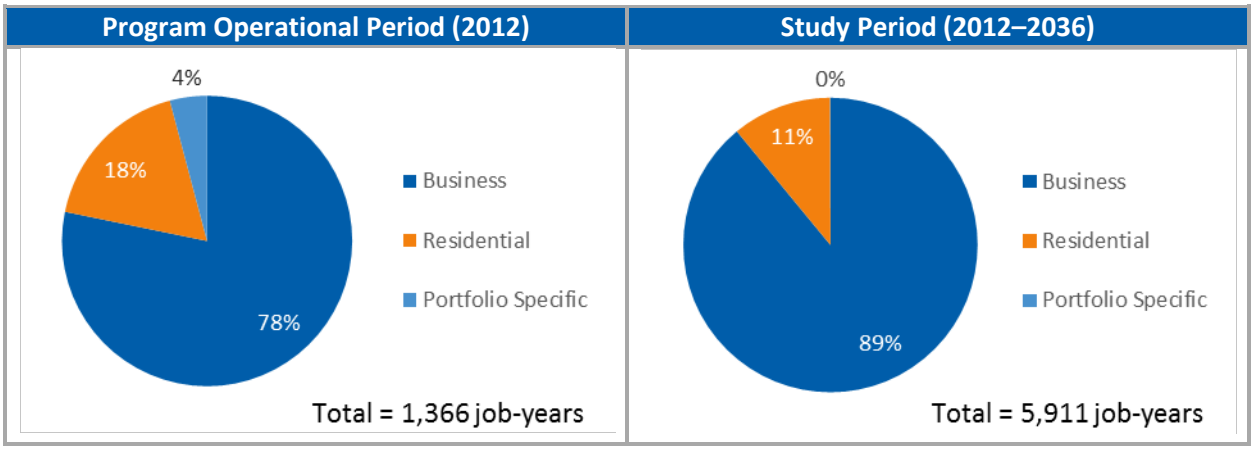
Figure B-2. Program Operational Period and Study Period Employment Growth by Sector



Net Employment Growth by Market Segment

Figure B-3 shows the relative share of net statewide employment impacts attributable to the 2012 portfolio-specific, residential, and business segments during the program operational period (i.e., 2012) and the study period (i.e., 2012–2036).

Figure B-3. Program Operational Period and Study Period Employment Growth by Segment



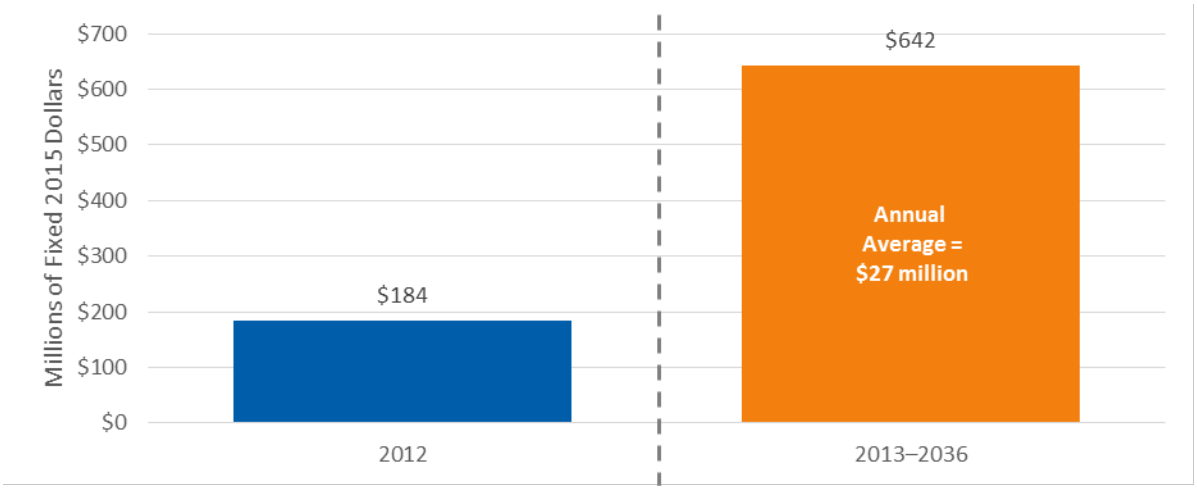
The relative shares among market segments of employment growth fluctuate for the same reasons as described for the quadrennial portfolio analysis.

Economic Benefits

Program Year and Future Year Economic Benefits

Figure B-4 illustrates the net program year and future year economic benefits of the 2012 Focus on Energy program portfolio relative to the hypothetical scenario in which the 2012 Focus on Energy programs did not operate.

Figure B-4. Program Year and Future Year Economic Benefits, Program Calendar Year 2012



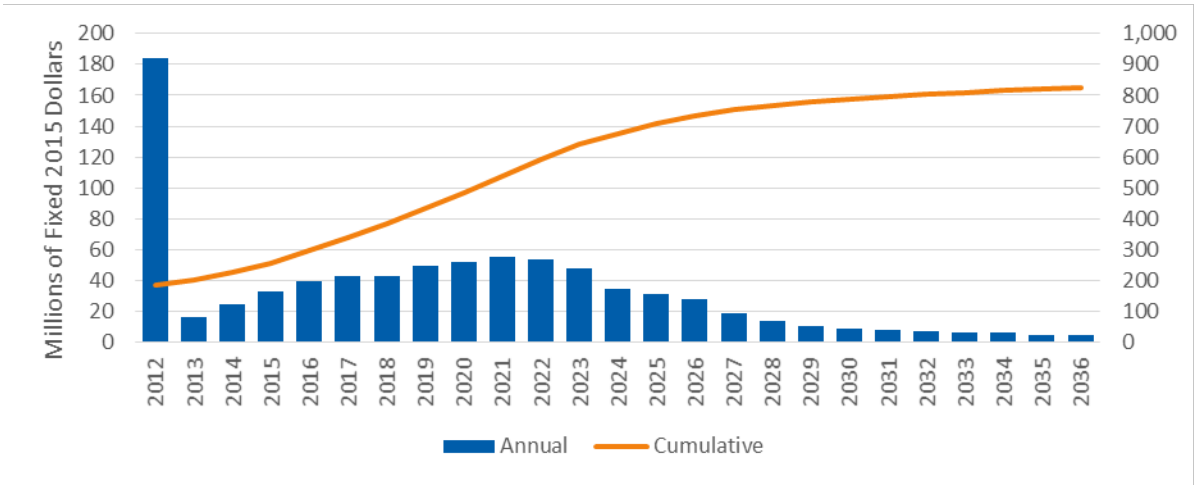
The 2012 portfolio generated $184 million of net economic benefits in the first year. First-year economic benefits attributable to 2012 programs were higher than those attributable to 2014 programs due to differences in annual program investments and project spending. Projected future year economic benefits attributable to the 2012 and 2014 program years are approximately equal. Similar to the 2014 and quadrennial portfolio analyses, energy savings from 2012 projects will continue to generate net economic benefits, although at a declining annual rate, throughout the study period due to ongoing bill savings being spent. The 2012 program portfolio is projected to generate $642 million in total net economic benefits between 2013 and 2036, representing an average of approximately $27 million annually during the 24-year timeframe.

Annual and Cumulative Economic Benefits

Figure B-5 illustrates the net annual and cumulative economic benefits of the 2012 Focus on Energy program portfolio relative to the scenario in which Focus on Energy programs did not operate. The 2012 portfolio analysis did not account for sustained program investment, and although economic benefits increase annually from 2013 through 2021, they continue at lower levels between 2022 and 2036.



Figure B-5. Net 2012 Program Portfolio Economic Benefits through 2036

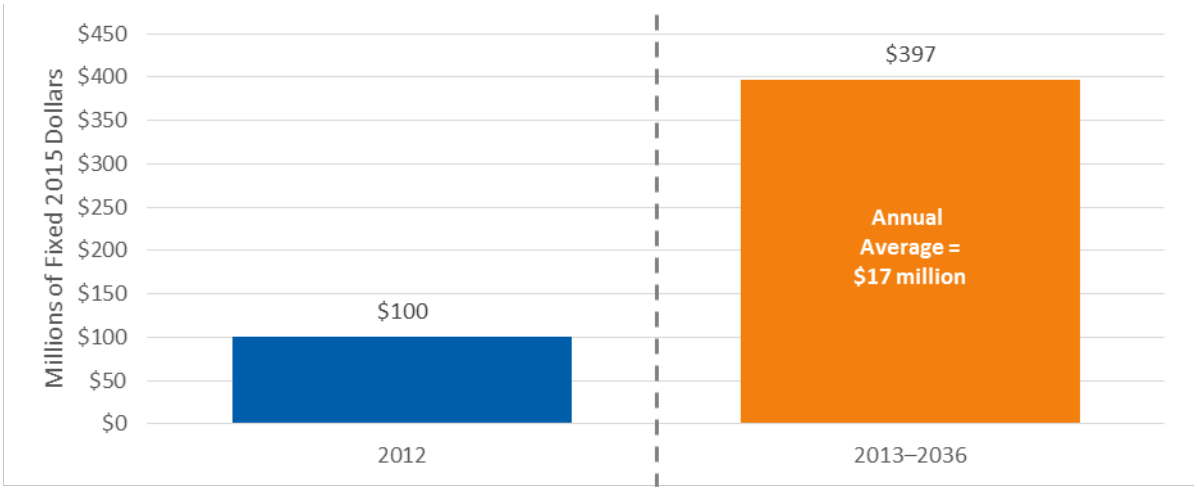


Personal Income

Program Year and Future Year Personal Income Increases

Figure B-6 illustrates the effects of the 2012 Focus on Energy program portfolio on net program year and future year personal income relative to the hypothetical scenario in which the 2012 Focus on Energy programs did not operate.

Figure B-6. Program Year and Future Year Personal Income Increases, Program Calendar Year 2012



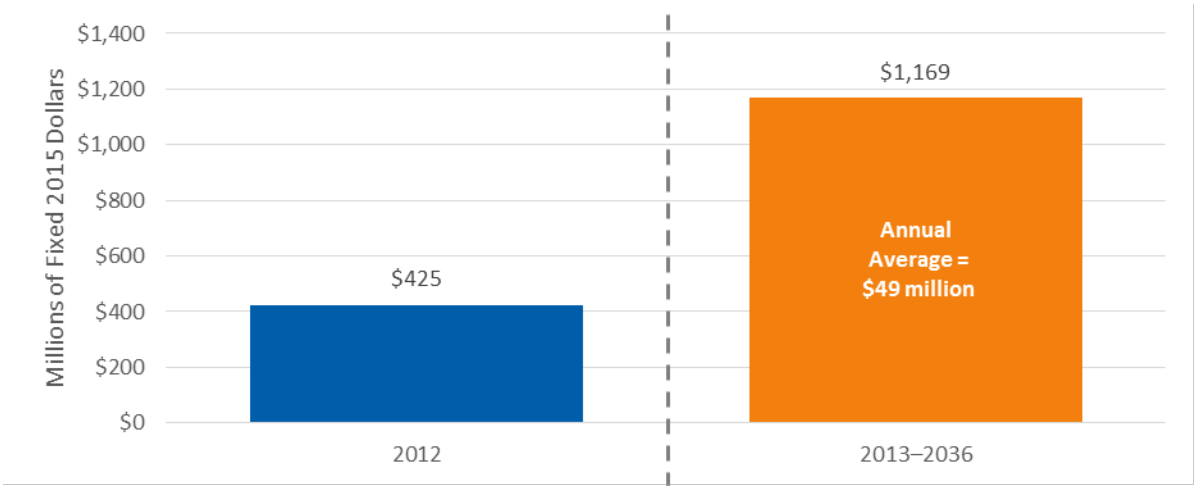
The 2012 portfolio generated $100 million in statewide personal income in the first year, not counting the income generated by the previous program year projects. The 2012 analysis did not account for sustained program investment or project spending beyond the first year. Similar to the quadrennial and 2014 model findings, ongoing energy savings attributable to 2012 Focus on Energy programs will continue to generate personal income throughout the study period. The 2012 portfolio is projected to generate $397 million of net statewide personal income between 2013 and 2036, representing an average of approximately $17 million annually in the 24-year period.

Sales Generated

Program Year and Future Year Sales Generated

Figure B-7 illustrates the net program year and future year sales generated by the 2012 Focus on Energy program portfolio relative to the hypothetical scenario in which the 2012 Focus on Energy programs did not operate.

Figure B-7. Program Year and Future Year Sales Generated, Program Calendar Year 2012



The 2012 portfolio generated $425 million of net sales during the first year. Similar to economic benefits, first-year sales generated by 2012 programs were higher than 2014 programs due to differences in annual program investments and project spending. Projected future year sales generated by the 2012 and 2014 program years are approximately equal. The 2012 analysis did not account for sustained program investment or project spending beyond the first year. Similar to the quadrennial and 2014 analysis findings, ongoing energy savings attributable to 2012 Focus on Energy programs will continue to generate sales throughout the study period. The 2012 portfolio is expected to generate an additional $1,169 million of statewide net sales between 2013 and 2036, or approximately $49 million annually for 24 years.



Appendix C: Summary of Residential, Business, Energy Efficiency, and Renewable Energy Program Impacts

Cadmus modeled the economic impacts attributable to Focus on Energy residential programs. Table C-1 summarizes the quadrennial results by economic development indicator variable.

Table C-1. Cumulative Economic Development Impacts of Residential Programs, Quadrennial

Economic Development Impact	Quadrennial (2011–2014)
Employment (jobs)	1,711
Economic Benefit (millions of 2015 dollars)	$39
Personal Income (millions of 2015 dollars)	$74
Sales Generated (millions of 2015 dollars)	$235

Cadmus modeled the economic impacts attributable only to Focus on Energy business programs. Table C-2 summarizes the quadrennial results by economic development indicator variable.

Table C-2. Cumulative Economic Development Impacts of Business Programs, Quadrennial

Economic Development Impact	Quadrennial (2011–2014)
Employment (jobs)	17,382
Economic Benefit (millions of 2015 dollars)	$2,804
Personal Income (millions of 2015 dollars)	$1,501
Sales Generated (millions of 2015 dollars)	$5,251

Cadmus modeled the economic impacts attributable only to installed energy efficiency measures. Table C-3 summarizes the quadrennial results by economic development indicator variable.

Table C-3. Cumulative Economic Development Impacts of Energy Efficiency Measures, Quadrennial

Economic Development Impact	Quadrennial (2011–2014)
Employment (jobs)	17,976
Economic Benefit (millions of 2015 dollars)	$2,667
Personal Income (millions of 2015 dollars)	$1,329
Sales Generated (millions of 2015 dollars)	$5,135

Cadmus modeled the economic impacts attributable only to installed renewable energy measures. Table C-4 summarizes the quadrennial results by economic development indicator variable.

Table C-4. Cumulative Economic Development Impacts of Renewable Energy Measures, Quadrennial

Economic Development Impact	Quadrennial (2011–2014)
Employment (jobs)	1,211
Economic Benefit (millions of 2015 dollars)	$177
Personal Income (millions of 2015 dollars)	$93
Sales Generated (millions of 2015 dollars)	$350

Appendix D: Focus on Energy Programs by Year

Table F-1 lists the programs included in the macroeconomic analysis by market segment and year. Mass markets programs serve residential customers and targeted markets programs serve customers in business sectors (i.e., agriculture, commercial, and industrial).

Table F-1. Residential and Business Programs by Program Calendar Year

Mass Markets (Residential) Programs	Targeted Markets (Business) Programs
2011	
ACES—New Home Construction	Agricultural Program
ACES—Whole Building Existing	Commercial Program
Appliance and Plug Load	ENERGY STAR Lighting
Efficient Heating and Cooling	Industrial Program
ENERGY STAR® Lighting	Nonresidential New Construction Program
Head Start	Schools and Government Program
Home Performance with ENERGY STAR	
New Homes	
Residential Renewables	
Targeted Home Performance	
2012	
Appliance Plug Load	Agricultural Program
Appliance Recycling	Business Incentives
Assisted Home Performance with ENERGY STAR	Chains and Franchises
Efficient Heating and Cooling	Commercial Program
ENERGY STAR Lighting	Industrial Program
Enhanced Rewards	Large Energy User
Express Energy Efficiency (E3)	Schools and Government Program
Home Performance with ENERGY STAR	Small Business
Multifamily—New Construction	
Multifamily—Whole Building	
Multifamily Direct Install	
Multifamily Energy Savings	
New Homes	
Residential Renewables	
Residential Rewards	
Retailer Lighting and Appliance	
Targeted Home Performance	
2013	
Appliance Recycling	Business Incentives
Assisted Home Performance with ENERGY STAR	Chains and Franchises
Enhanced Rewards	Design Assistance
Express Energy Efficiency (E3)	Emerging Technology
Home Performance with ENERGY STAR	Large Energy User



Mass Markets (Residential) Programs	Targeted Markets (Business) Programs
Lighting and Appliance	RECIP-Business Incentives
Multifamily—Whole Building	RECIP—Large Energy Users
Multifamily Direct Install	Retrocommissioning
Multifamily Energy Savings	Small Business
New Homes	
Residential Rewards	
2014	
Appliance Recycling	Business Incentives
Assisted Home Performance with ENERGY STAR	Chains and Franchises
Enhanced Rewards	Design Assistance
Express Energy Efficiency (E3)	Design Assistance—Residential
Home Performance with ENERGY STAR	Emerging Technology
Lighting and Appliance	Large Energy User
Multifamily Direct Install	RECIP—Business Incentives
Multifamily Energy Savings	RECIP—Large Energy Users
New Homes	Small Business
Renewable Rewards—Business	Training
Renewable Rewards—Residential	
Residential Rewards	

Appendix E: Changes Since the 2013 Report

Since the previous analysis completed in 2013, federal organizations that track and report on economic production and growth have released updated economic data and forecasts. These data contribute to the assumptions of REMI PI+ models. As expected, the new data differ from the 2013 data.

Relative to the assumptions of the previous study's model, the most significant updates account for increases in labor productivity in historical data and forecasts. In effect, increases in economic output modeled for this study result in relatively fewer employment impacts and, by extension, income impacts than during the previous study.

In addition to updated economic data integrated in the REMI PI+ model, Cadmus contributed the following modeling improvements, which were approved by the Public Service Commission of Wisconsin (PSC) and the PSC's Evaluation Working Group:

- **Farming Sector Bill Reductions.** Energy bill savings resulting from the Agriculture Program were modeled as changes to proprietor (i.e., owner) income in the farming sector, whereas they were previously modeled as changes to farm employee compensation.

  The REMI PI+ model assumes that farming sector output remains constant despite changes in production costs; as a result, there is no production cost variable for the farming sector in the model. This is because farm output is a function of land use, soil, and weather conditions; furthermore, farmers have no control over prices in world markets, and the federal government provides an extensive insurance system to protect against farm losses and overproduction. The best available proxy variable is therefore farming sector proprietor income, which represents farmers' profit margins (i.e., revenues minus costs) in the model. Additionally, it may be unreasonable to assume that farm owners transfer all costs to their employees.

- **Farming Sector Participant Co-Funding.** Participant co-funding payments for Agriculture Program projects were modeled as changes to proprietor income in the farming sector, whereas they were previously modeled as changes to production costs in the agriculture and forestry support activities sector.

  For the reasons described previously, there is no production cost variable for the farming sector in the REMI PI+ model. The individual industries that comprise the agriculture and forestry support activities sector do not accurately represent the farming sector, as it relates to participation in Focus on Energy programs. As such, modeling farming sector participant co-funding as changes to proprietor income in the farming sector represents the best available option.