PA Consulting Group

State of Wisconsin Public Service Commission of Wisconsin

Focus on Energy Evaluation

Semiannual Report (18-month Contract Period)

Final: April 8, 2009
Revised: August 14, 2009
Revised: October 19, 2009

Evaluation Contractor: PA Consulting Group

Prepared by the Focus evaluation team

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The power is within you.

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[1] Revised to correct Tables 2-21 and 2-22.

[2] Revised to reflect changes in the modeling that generates the simple b/c values. An explanatory note has been added (immediately following the column definitions on page 2-28) and Tables 2-21 and 2-22 have been updated.

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1. INTRODUCTION

The purpose of this document is to present an overview of all Focus on Energy (Focus) impacts achieved for the previous eighteen months and the program to date. Focus on Energy has had a number of impacts on the state of Wisconsin. The most important are energy impacts—the energy savings realized through the implementation of energy conservation measures. Other impacts that result from the program are (1) environmental benefits (with emphasis on quantification of displaced generation emissions); (2) other non-energy benefits following from increased health, safety, and comfort; and (3) the economic benefits realized as a result of savings on energy bills, stimulation of economic development, and the creation of jobs. Another significant benefit provided by Focus on Energy, beyond the implementation of energy efficiency measures, is encouragement to various members of the marketplace—manufacturers, distributors, retailers, building contractors, trade allies, and consumers—to "raise the bar" for practices and standards related to energy efficiency technologies.

1.1 TRACKED ENERGY IMPACTS

The numbers in the tracked energy impacts tables presented in this report are annual energy savings—the energy saved by an installed conservation measure over 12 months. The annual energy impacts reported for a given time period are the sum of the annual energy savings for all of the energy conservation measures installed in that period. See the introduction to *Section 2, Focus Impacts,* for additional explanation of the date references that will be used in this report as Focus transitions from a fiscal year basis to a calendar year basis.

The program administrators for Focus must maintain a *program tracking database* that includes all of the energy efficiency measures and actions taken within the program. The term "tracked" is used to signify that these savings result from program efforts directly counted (or tracked) by program administrators. This is the fundamental foundation for a program-based evaluation of energy impacts.

1.1.1 Reporting of tracked energy impacts: annual first year vs. lifecycle

Focus includes many long-term initiatives directed toward lasting changes in the state's energy efficiency markets. As a result, any meaningful assessment of the benefits (and costs) of Focus must consider a multi-year timeframe. Thus, as in the formal benefit-cost analysis conducted for Focus, in order to appropriately value Focus energy impacts, the energy savings must be estimated as a *projected stream* based on the program-area evaluations.[3] These energy savings are counted as benefits over the measure lifetime, or the 25-year horizon of the benefit-cost analysis, whichever is shorter.

[3] Documentable energy savings, projected net verified savings based on documented impacts, are the foundation of Focus benefits included in the benefit-cost analysis (see *Interim Benefit-cost Analysis: FY07 Evaluation Report*, February 26, 2007). In this analysis, the projected new implementation of energy efficient measures includes both direct effects (in-program) and projected market effects.

Table 1-1 below provides definitions for each of the various tracked savings impacts incorporated in the Focus impact evaluation system. As introduced in the last semiannual report (*First Half of 2008.* Final: October 22, 2008), the types of reported impacts have been expanded for this semiannual report corresponding to three added impact types which are now included in Table 1-1 (definitions), and also shown in Table 1-2 (with Appendix D providing a complete listing of tables and figures in the report linked to the type of impacts reported).

These additional reported impact types are necessitated by the need to report more accurately what were previously referred to as "cumulative" savings (simple summing of annual first year savings), as well as to conform to the impacts as used in the benefit-cost. As the energy impacts of Focus are increasingly seen as resources in the state's long-term planning, these impacts must be as realistically reported as we can. While it is important to know the cumulative energy impacts from Focus on Energy, simply summing the savings is an oversimplification and can be misleading. For this reason we have taken the program-to-date (PTD) savings numbers out of the semiannual reports, since they were previously compiled by a simple summing of annual first year savings.

Why is a "lifecycle" approach needed? The energy efficiency measures installed typically last for a number of years, so their lifetime energy impacts would be calculated by multiplying the annual energy savings by the number of years that the energy efficiency measure is expected to be in operation. These lifetime energy impacts—explicitly considering measure life interpreted as the median number of years of expected operation—are now termed in this report *lifecycle* energy impacts. An additional new concept embodied in the energy impacts presented in this semiannual report is *persistent* savings. These are lifecycle impacts that also include an exponential decay rate, such that half the savings remains after the measure life. (See additional discussion in *Section 2.1 and Section 2.8*.).

The term "tracked" is used to signify that these savings result from Focus efforts directly counted (or tracked) by program administrators. Table 1-1 below provides definitions for each of the various tracked savings impacts referred to throughout this report.

Table 1-1. Tracked Energy Impacts

Gross Reported Savings	Energy savings as reported by the program administrator, unverified by an independent evaluation (inputs to the evaluation impact analyses).
Verified Gross Savings	Energy savings verified by an independent evaluation based on reviews of the number and types of implemented improvements and the engineering calculations used to estimate the energy saved.
Verified Net Savings	Energy savings that can confidently be attributed to Focus efforts. Evaluators make adjustments for participants who were not influenced by Focus (Program Administrator contract performance targets currently use these savings).
Lifecycle Savings	Energy savings, expressed either as *verified gross* or *verified net*, that explicitly incorporate measure life (lifecycle verified gross savings are shown in the tables that accompany maps depicting the geographic distribution of Focus energy impacts—see Appendix A).
Persistent Savings	Energy savings, expressed as *verified net*, that are lifecycle impacts that also include an exponential decay rate, such that half the savings remains after the measure life (used in the Economic and Benefit-cost analyses, and also reflected in the Appendix A maps).

Table 1-2, below, presents a matrix of the energy impact reporting types that shows the different types as a product of level of evaluation (gross reported, verified gross, and verified net) and how the duration of impacts is approached (first year, lifecycle, and persistent). The table also identifies the impact types that are included in this report, denoted as "Reported," and those that are "Not Reported."

Table 1-2. Tracked Energy Impacts and Approach to Impact Duration

	First Year	Lifecycle	Persistent
Gross	Reported	Not Reported	Not Reported
Verified Gross	Reported	Reported	Not Reported
Verified Net	Reported	Reported	Reported

Note: See Appendix D for a complete listing of tables and figures in the report linked to the type of impacts noted in this table as "Reported."

1.2 NONTRACKED ENERGY IMPACTS

For purposes of clarity, *nontracked energy savings* can be distinguished from *tracked energy savings* in that they are not directly counted (tracked) by program administrators. Nontracked energy savings are likely to consist of a combination of savings resulting from participant spillover (e.g., participants who, after an initial program experience, go on to adopt more energy saving products or practices without program assistance), market effects (e.g., changes in "marketplace" practices, services, and promotional efforts which induce businesses and consumers to buy energy saving products and services without direct program assistance), and unclaimed rewards (e.g., people who intend to submit the paperwork in order to claim Focus rewards but fail to do so). Nontracked energy savings are attributed to the program if it can be demonstrated that these impacts were the result of program initiatives or that program initiatives were at least a key driver.

Quantifying nontracked energy savings is important when program initiatives are designed to create impacts beyond what the program can capture in a tracking database. The savings can be, for example, a direct extension of steps toward verification of *net* energy savings via the gathering of data that document the effects of a program on a specific market. An example from Focus is the use of CFL sales tracking data to estimate changes in product market share that can be confidently attributed to the presence of a program explicitly seeking to influence the CFL market in a specific geography.

1.3 SUPPORTING INFORMATION

Because this document is an overview, significant amounts of supporting information are not provided here. This makes it incumbent on the reader to seek out supporting information if they would like to better understand specific aspects of this report. Supporting information can be found in the various reports listed in Table E-1 in Appendix E. An effort has been made to reference the appropriate evaluation reports in the relevant places throughout this report. Table E-1 provides a list of all of the evaluation reports (and other deliverables) submitted during the 18-month contract period.

2. FOCUS IMPACTS

This chapter describes various Focus estimated impacts and associated evaluation analyses.

- Tracked energy impacts
- Nontracked energy impacts
- Market effects
- Economic impacts
- Environmental impacts
- Non-energy benefits
- Benefit-cost analysis.

Data for the energy impacts tables throughout this report are derived from data downloaded from WECC's tracking databases and WISeerts (the PSCW's new tracking database) on January 15, 2009.

Recognizing the PSCW's desire for a calendar year basis for program and evaluation reporting, this report adopts the following conventions for referencing time periods. References to time periods covered during the analysis will be "the last half of 2007," "the first half of 2008," or "the 18-month contract period" depending on what is being discussed. Tables will be labeled as shown below.

Table 2-1. Example of Date References Used in this Report

FY02 Mar 02–June 02	FY03 Jul 02–Jun 03	FY04 Jul 03–Jun 04	FY05 Jul 04–Jun 05	FY06 Jul 05–Jun 06	FY07 Jul 06–Jun 07	The 18-month Contract Period (July 1, 2007–December 31, 2008)	Program To Date

2.1 VERIFIED TRACKED ENERGY IMPACTS

2.1.1 New energy impact reporting types

To continue a discussion introduced in Section 1 (and initially introduced in the semiannual report—*First Half of 2008*), earlier versions of the semiannual reports have shown cumulative savings, simply summing up the savings from each fiscal year. While it is important to know the cumulative energy impacts from Focus on Energy, simply summing the savings is an oversimplification and can be misleading. Also, this year's Program Administrator goals are now based on verified *net* energy impacts, where previously they were based on verified *gross* impacts.

In addition, Focus is now in its ninth year of operation and some measures installed in the first years of the program have reached the end of their useful life. Compact fluorescent lights (CFLs), a significant measure for the Residential and Business programs, have an estimated useful life of six years. Therefore, many of the CFLs installed in 2001 are no longer operating and saving energy—adding to potential confusion concerning cumulative savings.

There are also other factors that result in measures no longer remaining in operation. For example, people move out of Wisconsin and take the CFLs with them or they do not last as long as expected. Because of this, we have taken the program-to-date (PTD) savings numbers out of the semiannual reports.

There are, however, figures in this section that show the stream of net energy impacts over 20 years of all of the measures installed through December 2008. These are termed *lifecycle verified gross* impacts (Figures 2-1 through 2-3 for energy, demand, and gas savings respectively), and *persistent verified net* (Figures 2-4 through 2-6, again corresponding to energy, demand, and gas savings). As of December 2008, the persistent verified net energy savings from all measures installed since Focus began in July 2001 that are still in operation is 1,049 GWh, 180 MW of demand reductions, and 49.2 million therms (see Figure 2-4. Persistent Verified Net Electricity Savings, Figure 2-5. Persistent Verified Net Electricity Demand Reductions, and Figure 2-6. Persistent Verified Net Gas Savings, which graph Focus net savings from fiscal year 2002 through fiscal year 2026).

Applying an exponential decay rate to report persistent verified net. The energy savings impacts for each year are the total impacts of all measures implemented as a result of the program up through that year. Thus, the documentable energy savings for Year 1 would be the annual energy savings due to measures implemented through the programs and attributable to them (first-year net savings). The documentable savings shown for Year 10 are the net (i.e. program-attributable) annual energy savings due to all measures implemented through the program in Years 1 through 10 *and persisting until Year 10*.

The development of the stream of energy savings impacts involves discounting according to an assumed discount rate, or decay curve, to account for measure persistence over a theoretical measure life. This decay curve is an exponential decay, with median measure lifetime equal to the savings-weighted average measure life for each program area (calculated at the level of major end-uses for each program area—see Section 2.8 for further discussion). Thus, the savings implemented in each program year are extended into the future, using the exponential decay rate, such that half the savings remains after the measure life.[4]

With this interpretation and an assumed exponential decay, the fraction f of savings that survives from one year to the next is given by

$$f = 2^{-(1/L)}$$

where L is the measure life. For example, if the measure life is 15 years, the surviving fraction each year is

$$f = 2^{-1/15} = 95.5\%.$$

[4] That is, we interpret the measure life as the time until half the units would be expected to have failed or been removed. This interpretation is consistent with the persistence study framework used in California and elsewhere. Under those rules, the “expected useful life” is the median survival time, where “surviving” means remaining in place and operable.

The decay rate is

d = 1-f = 4.5%.

Thus, in this example, the surviving savings from the prior year is calculated as 95.5 percent of the prior year's amount; 4.5 percent of the prior year's savings is lost.

Future considerations. Another factor that can have a significant impact on the stream of energy savings from installed measures occurs when Focus on Energy is successful in getting participants to purchase energy efficient equipment before their existing inefficient equipment fails. This results in a higher energy savings in the early years of the equipment life which then drops to a lower level of savings at the time that the equipment was expected to have failed or been replaced (had there been no program intervention). Both first-year savings tables (for each fiscal year) and the stream of energy savings that is shown in this section do not presently account for this. However, the evaluation team has developed a "white-paper" that discusses this issue and presents possible methods for addressing it. After receiving review comments from interested stakeholders (including WECC), this paper was submitted to the PSCW for their review, and the PSCW has subsequently directed the evaluation team to incorporate in our impact measurement approaches the capability of estimating separately the energy savings from "accelerated" and "efficiency" savings.[5]

2.1.2 Energy impacts summaries

One of the routine tasks in preparing the evaluation semiannual reports is to reconcile the program gross energy impacts reported in WECC's monthly performance reports with the summary of the detailed data downloaded from the tracking system(s). This is now the second time that this process has been done with data from the new tracking system (the Wisconsin Energy Efficiency and Renewables Tracking System or WISeerts) for the Focus Business program developed by the Public Service Commission of Wisconsin (PSCW). This system replaces the Wisconsin Activity and Technology Tracking System (WATTS) developed by WECC.

One component of the Business Programs (BP) gross savings that WISeerts does not track is the ENERGY STAR rebate measures, which is still maintained at WECC. Previously, the ENERGY STAR rebate data was summarized in the WATTS system, so this also the second semiannual report for which detailed data from the ENERGY STAR rebate database have been imported from WECC's database and included in the evaluation database used for this semiannual report. Therefore, we continue to see some minor differences in the gross BP numbers between WECC's December 2008 monthly report and the gross impacts included in this report (e.g., evaluation estimates of overall gross savings are a little over one-percent higher than WECC's final December 2008 numbers). We will continue to work with staff at WECC to identify and minimize these discrepancies.

Table 2-1a presents a summary by program area of the annual kWh, kW, and therm impacts with dollar values along with number of participants. It is important to note that these are

[5] See *Focus on Energy Evaluation: Treatment of Accelerated Savings*, Mimi Goldberg, Rick Winch, Tom Talerico, Ralph Prahl, and Bryan Ward. July 2, 2008.

lifecycle verified gross impacts. Thus, they reflect a stream of savings that incorporates measure life assumptions.

Table 2-1b also shows the same summary as Table 2-1a, but the values are *first year* annual impacts for verified gross—not *lifecycle.* They are also broken out by the Business, Residential, and Renewable Energy Program areas for energy efficiency measures implemented from July 1, 2001, through December 31, 2008, as documented in their respective tracking systems (Tracked Energy Impacts).

Table 2-1a. All Programs: Tracked Energy Impacts—Lifecycle Verified Gross (July 1, 2001—December 31, 2008)

Program Area	Annual Verified kWh Saved	Annual Verified kW Saved	Annual Verified Therms Saved	Annual Dollar Value of Energy Saved	Number of Participants
Total Saved	**1,729,990,576**	**301,725**	**87,122,741**	**$239,262,236**	
Business	1,093,233,207	218,766	68,836,785	$151,540,503	54,787
Residential	582,079,215	73,937	12,774,784	$77,093,906	1,035,985
Renewables	54,678,154	9,022	5,511,172	$10,627,827	697

Note: The numbers in this table are *lifecycle verified gross* impacts. Thus, they reflect a stream of savings that incorporates measure life assumptions.

Table 2-1b. All Programs: Tracked Energy Impacts—Annual First Year Verified Gross (July 1, 2001–December 31, 2008)

	Annual Verified kWh Saved	Annual Verified kW Saved	Annual Verified Therms Saved	Annual Dollar Value of Energy Saved	Number of Participants
The 18-month Contract Period (July 1, 2007–December 31, 2008)					
Total Saved	**591,021,366**	**103,184**	**26,623,540**	**$77,421,471**	
Business	403,836,022	85,387	20,248,020	$50,283,907	16,509
Residential	180,197,195	16,606	4,146,014	$24,104,658	200,214
Renewables	6,988,148	1,190	2,229,505	$3,032,905	401
FY07 (July 1, 2006–June 30, 2007)					
Total Saved	**238,189,767**	**41,008**	**13,694,194**	**$34,847,157**	
Business	151,014,313	32,282	11,513,742	$23,250,145	12,812
Residential	78,656,906	6,855	1,506,976	$10,144,534	214,782
Renewables	8,518,546	1,870	673,474	$1,452,477	117
FY06 (July 1, 2005–June 30, 2006)					
Total Saved	**218,883,777**	**41,469**	**13,042,576**	**$33,117,671**	
Business	131,863,070	28,308	9,418,597	$20,039,321	13,019
Residential	73,961,454	11,286	1,573,063	$9,733,386	226,886
Renewables	13,059,251	1,874	2,050,914	$3,344,963	87
FY05 (July 1, 2004–June 30, 2005)					
Total Saved	**214,892,987**	**35,913**	**9,175,217**	**$28,452,157**	
Business	110,718,465	20,905	7,106,161	$15,445,041	13,258
Residential	82,266,120	11,745	1,725,612	$10,796,282	207,575
Renewables	21,908,400	3,262	343,443	$2,210,833	65

	Annual Verified kWh Saved	Annual Verified kW Saved	Annual Verified Therms Saved	Annual Dollar Value of Energy Saved	Number of Participants
FY04 (July 1, 2003–June 30, 2004)					
Total Saved	**228,323,107**	**37,696**	**14,467,224**	**$34,799,967**	
Business	137,364,603	23,543	12,613,286	$22,972,226	1,561
Residential	90,474,549	13,931	1,640,104	$11,552,445	210,910
Renewables	483,953	220	213,833	$275,296	52
FY03 (July 1, 2002–June 30, 2003)					
Total Saved	**221,681,741**	**35,777**	**8,086,332**	**$27,661,851**	
Business	128,323,628	21,384	6,196,248	$15,574,474	1,528
Residential	89,638,259	13,787	1,890,083	$11,776,025	146,747
Renewables	3,719,852	604	0	$311,351	31
FY02 (July 1, 2001–June 30, 2002)					
Total Saved	**56,484,523**	**11,705**	**2,652,791**	**$7,873,550**	
Business	30,532,158	7,036	1,740,728	$4,009,527	1,164
Residential	25,952,364	4,668	912,062	$3,864,023	47,625

Note: The numbers in this table *are annual first year savings*—not *lifecycle.* Also, the numbers in this table are the verified gross savings.

Table 2-1c again provides the *lifecycle* approach to estimating energy impacts, and also shows by program area the *lifecycle verified gross, lifecycle verified net,* and the net-to-gross percentages used to derive verified net from verified gross. Table 2-1d corresponds to Table 2-1b by presenting *first year* (not *lifecycle*) summary results. For Table 2-1d the gross, verified gross, and verified net energy impacts are shown by fiscal year and program area.

Table 2-1c. All Programs: Tracked Energy Impacts - Lifecycle Verified Gross and Lifecycle Verified Net (July 1, 2001–December 31, 2008)

	Annual kWh Saved			kW Reduction			Annual Therms Saved		
	Verified Gross	Verified Net	NTG	Verified Gross	Verified Net	NTG	Verified Gross	Verified Net	NTG
Total Saved	**1,729,990,576**	**1,205,728,382**	**70%**	**301,725**	**202,219**	**67%**	**87,122,741**	**53,859,138**	**62%**
Business	1,093,233,207	647,715,867	59%	218,766	129,223	59%	68,836,785	40,479,243	59%
Residential	582,079,215	543,582,140	93%	73,937	69,899	95%	12,774,784	11,636,021	91%
Renewables	54,678,154	14,430,375	26%	9,022	3,097	34%	5,511,172	1,743,874	32%

Note: The numbers in this table are lifecycle verified gross and lifecycle verified net.

Table 2-1d. All Programs: Tracked Energy Impacts - Annual First Year Program to Date (July 1, 2001–December 31, 2008)

	Annual kWh Saved			kW Reduction			Annual Therms Saved		
	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net
The 18-month Contract Period (July 1, 2007–December 31, 2008)									
Total Saved	**625,335,422**	**591,021,366**	**393,477,991**	**109,615**	**103,184**	**64,867**	**28,698,506**	**26,623,540**	**14,758,518**
Business	433,653,604	403,836,023	240,728,194	91,286	85,387	50,340	22,145,786	20,248,021	10,796,685
Residential	179,864,369	180,197,195	148,799,826	16,583	16,606	13,824	4,143,595	4,146,014	3,278,792
Renewables	11,817,448	6,988,149	3,949,971	1,746	1,190	703	2,409,124	2,229,506	683,041
FY07 (July 1, 2006–June 30, 2007)									
Total Saved	**260,254,357**	**238,189,767**	**162,763,097**	**43,911**	**41,008**	**27,979**	**15,914,328**	**13,694,194**	**8,520,818**
Business	157,130,223	151,014,314	98,462,584	33,460	32,282	21,776	13,658,924	11,513,743	6,809,760
Residential	94,250,649	78,656,907	63,883,459	8,913	6,855	5,852	1,566,780	1,506,977	1,394,290
Renewables	8,873,486	8,518,546	417,054	1,538	1,871	351	688,625	673,475	316,767
FY06 (July 1, 2005–June 30, 2006)									
Total Saved	**234,862,916**	**218,883,777**	**166,124,214**	**44,348**	**41,469**	**30,494**	**13,606,641**	**13,042,576**	**6,311,815**
Business	131,911,853	131,863,071	91,697,275	28,366	28,309	19,042	9,674,445	9,418,597	4,365,774
Residential	90,185,421	73,961,454	72,078,061	14,066	11,286	11,066	1,858,471	1,573,064	1,489,822
Renewables	12,765,642	13,059,252	2,348,878	1,916	1,874	385	2,073,725	2,050,914	456,220
FY05 (July 1, 2004–June 30, 2005)									
Total Saved	**276,013,670**	**214,892,987**	**152,928,433**	**41,103**	**35,913**	**22,850**	**9,615,956**	**9,175,217**	**5,232,659**
Business	143,707,711	110,718,465	55,861,214	27,083	20,906	9,972	7,045,122	7,106,161	3,463,969
Residential	112,935,136	82,266,121	92,805,638	11,027	11,745	11,893	2,123,643	1,725,612	1,680,593
Renewables	19,370,823	21,908,401	4,261,581	2,993	3,262	985	447,192	343,443	88,097
FY04 (July 1, 2003–June 30, 2004)									
Total Saved	**282,836,318**	**228,323,107**	**168,974,239**	**44,697**	**37,696**	**26,986**	**13,556,180**	**14,467,224**	**12,436,908**
Business	156,470,715	137,364,604	79,935,444	28,607	23,544	13,187	11,639,771	12,613,286	10,614,752
Residential	125,867,708	90,474,549	88,589,694	15,890	13,932	13,604	1,824,949	1,640,105	1,622,408
Renewables	497,895	483,954	449,101	199	220	195	91,460	213,833	199,749
FY03 (July 1, 2002–June 30, 2003)									
Total Saved	**230,845,735**	**221,681,741**	**145,617,986**	**38,144**	**35,777**	**23,213**	**7,935,747**	**8,086,332**	**5,523,996**
Business	129,814,716	128,323,629	62,483,249	23,353	21,385	10,551	6,258,454	6,196,249	3,642,577
Residential	97,358,904	89,638,260	80,130,947	14,066	13,788	12,184	1,677,293	1,890,084	1,881,419
Renewables	3,672,115	3,719,852	3,003,790	725	604	478	0	0	0
FY02 (July 1, 2001–June 30, 2002)									
Total Saved	**54,507,968**	**56,484,523**	**39,048,723**	**10,935**	**11,705**	**8,163**	**3,673,296**	**2,652,791**	**1,616,168**
Business	30,559,935	30,532,158	18,764,493	6,966	7,036	4,397	2,760,541	1,740,729	785,725
Residential	23,948,033	25,952,365	20,284,229	3,969	4,668	3,766	912,755	912,062	830,443

Note: The numbers in this table are *annual first year* (not *lifecycle*).

As cited above, Figures 2-1, 2-2, and 2-3 below reflect the *lifecycle verified gross* stream of energy savings over time from program inception in fiscal year 2002 for twenty years, through calendar year 2021. These graphs are based on the verified gross savings shown in Table 2-1c, above. The savings implemented each fiscal year continue over the effective useful life of the measures installed to realize the savings. The charts show that the lifecycle savings peak at about 1,730 GWh and 87 million therms at the end of 2008 (the current reporting period) and then begin to decline since it only reflects those measures that have been installed through December 2008. The electricity savings for the residential programs decline more

rapidly that the electricity savings for the business programs because CFLs make up a significant proportion of the residential programs electricity savings and CFLs have an expected measure life of six years. For example, the high bay fluorescent lighting measures that account for approximately 25.3 percent of the business programs savings (see Figure 2-7) have an expected measure life of fifteen years. There are measures for both programs that have expected measure lives of more than fifteen years.

Figures 2-4 through 2-6, below, again present energy, demand, and gas savings through 2021, but incorporate the decay factor and verified net—and are thus the *persistent verified net savings*.

The measure life is interpreted as the median measure life. Measure lives for all program measures included in this analysis are provided in Appendix C. The savings implemented in each program year are extended into the future with an exponential decay rate, such that half the savings remains after the measure life.

That is, we interpret the measure life identified from the literature as the time until half the units would be expected to have failed or been removed. This interpretation is consistent with the persistence study framework used in California and elsewhere. Under those rules, the "expected useful life" is the median survival time, where "surviving" means remaining in place and operable. (See section 2.8 for additional discussion of these computations.)

Additional explanation of the cumulative stream of demand reduction impacts for Focus on Energy will also aid in interpretation of Figure 2-2 and Figure 2-5. In particular, guidance for calculating demand impacts for Focus can be found in the Focus Business Programs Operations Manual (page 57). It specifies that the demand (kW) impacts for Focus measures should be calculated for non-weather dependent equipment based on the "average kW savings over the period from 1:00 pm to 4:00 pm, Monday through Friday, during the months of June through August. Average kW is the kWh savings realized over the three hour peak period (1:00 pm to 4:00 pm), divided by these same three hours per day for weather dependent measures, such as air conditioning they will be calculated based on state-wide average design-day conditions as defined by the latest version of ASHRAE Fundamentals."

The manual provides further guidance in the calculation of demand impacts, and this guidance has evolved over the life of the Focus program. The current level of specificity was especially important in this fiscal year (FY08) since in many cases the incentives paid to participants explicitly consider the demand impacts of equipment.

The changes over time in the guidance regarding the calculation of demand impacts for Focus measures means that cumulative demand impacts across program years (reflected in Figure 2-2 and Figure 2-5) are not based on exactly the same definition (since changes in the calculation guidance are not applied retroactively).

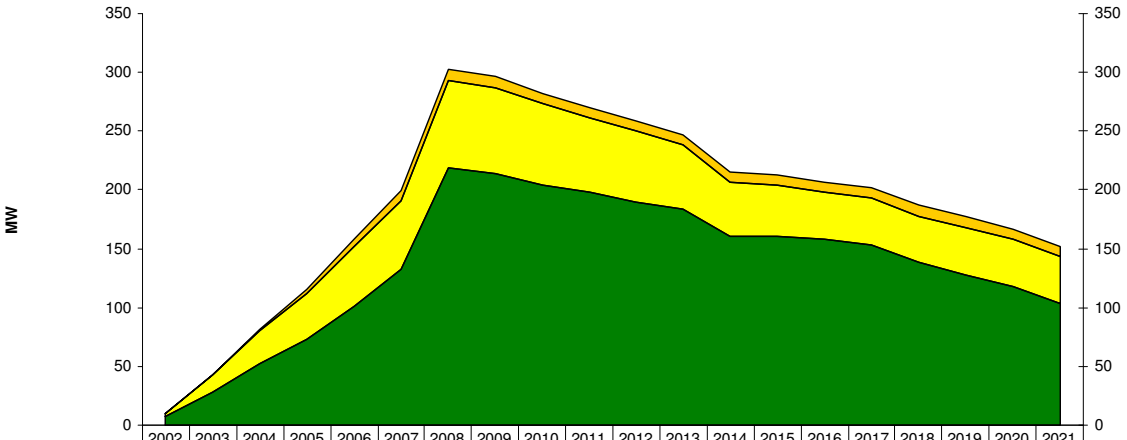
Figure 2-1. Lifecycle Verified Gross Electricity Savings (GWh)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Renew ables		4	4	26	39	48	55	55	55	55	55	55	55	55	55	55	55	55	55	55
Residential	17	89	176	259	333	411	582	538	481	418	360	285	152	146	113	106	98	88	79	79
Business	31	159	296	407	539	690	1093	1073	1040	1014	988	955	873	870	867	843	763	690	642	575
Total	48	252	477	692	911	1149	1730	1666	1575	1487	1402	1295	1080	1071	1034	1004	916	832	776	708

Fiscal Year

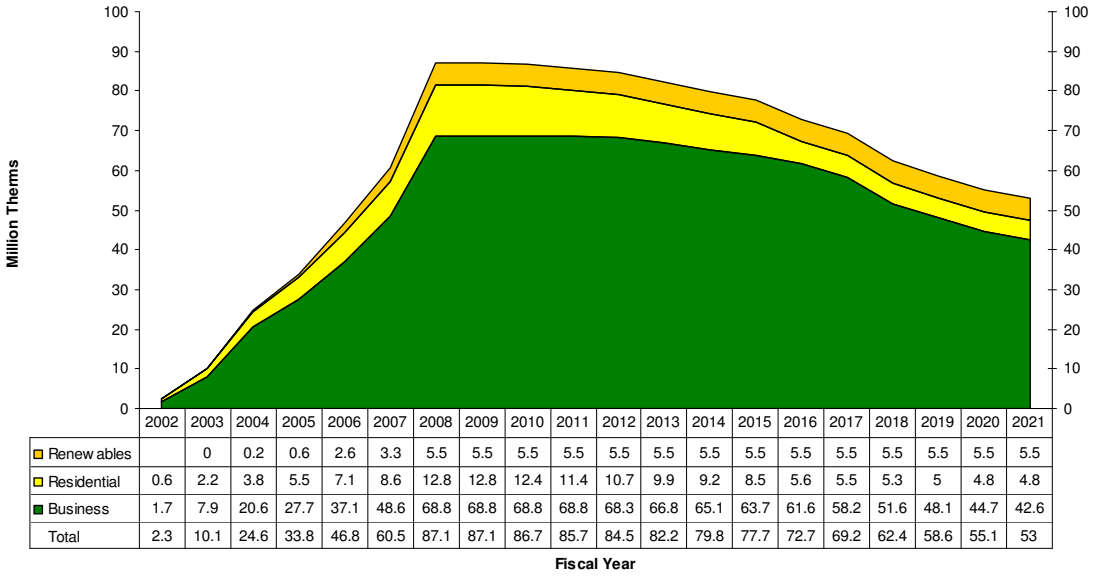
Figure 2-2. Lifecycle Verified Gross Electricity Demand Reductions (MW)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Renew ables		1	1	4	6	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Residential	3	14	28	39	51	58	74	73	69	63	60	55	46	44	40	40	40	40	40	40
Business	7	28	52	73	101	133	219	214	204	198	190	183	160	160	158	153	138	128	118	103
Total	10	43	81	116	158	199	302	295	282	270	259	247	215	213	207	203	187	177	167	152

Fiscal Year

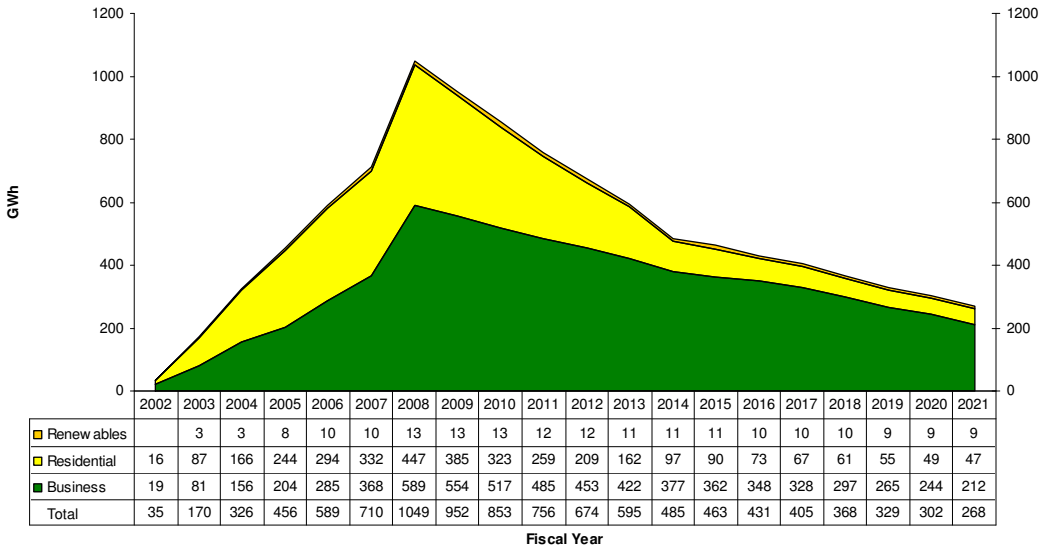
Figure 2-3. Lifecycle Verified Gross Gas Savings (Million Therms)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Renewables		0	0.2	0.6	2.6	3.3	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Residential	0.6	2.2	3.8	5.5	7.1	8.6	12.8	12.8	12.4	11.4	10.7	9.9	9.2	8.5	5.6	5.5	5.3	5	4.8	4.8
Business	1.7	7.9	20.6	27.7	37.1	48.6	68.8	68.8	68.8	68.8	68.3	66.8	65.1	63.7	61.6	58.2	51.6	48.1	44.7	42.6
Total	2.3	10.1	24.6	33.8	46.8	60.5	87.1	87.1	86.7	85.7	84.5	82.2	79.8	77.7	72.7	69.2	62.4	58.6	55.1	53

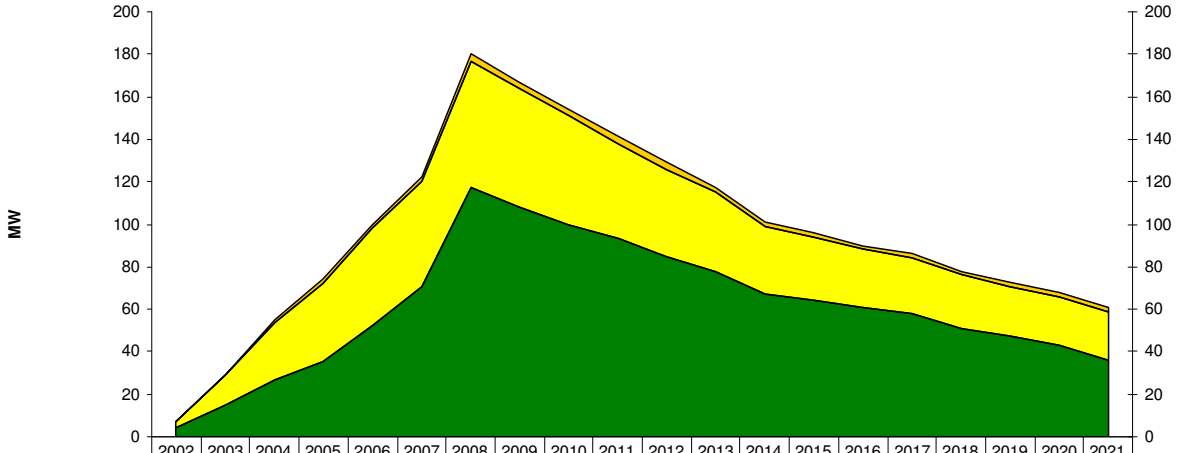
Figures 2-4, 2-5, and 2-6 reflect the stream of *persistent verified net* savings—thus applying a decay factor to the lifecycle savings—and indicate that the savings stream peaks at about 1,049 GWh and 49.2 million therms at the end of 2008 (the current reporting period). It also declines, again because it only reflects those measures that have been installed through December 2008.

Figure 2-4. Persistent Verified Net Electricity Savings (GWh)



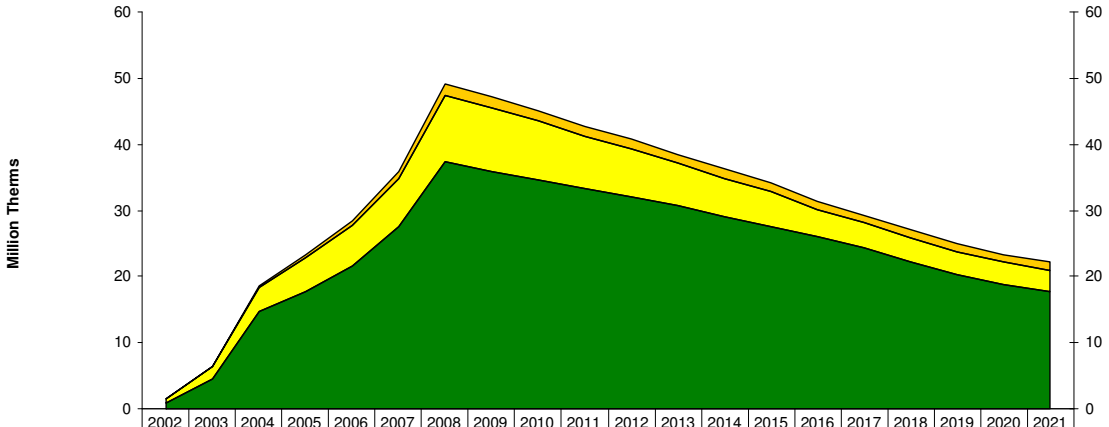
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Renewables		3	3	8	10	10	13	13	13	12	12	11	11	11	10	10	10	9	9	9
Residential	16	87	166	244	294	332	447	385	323	259	209	162	97	90	73	67	61	55	49	47
Business	19	81	156	204	285	368	589	554	517	485	453	422	377	362	348	328	297	265	244	212
Total	35	170	326	456	589	710	1049	952	853	756	674	595	485	463	431	405	368	329	302	268

Figure 2-5. Persistent Verified Net Electricity Demand Reductions (MW)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Renew ables		0	1	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2
Residential	3	14	27	37	46	49	60	56	51	45	41	37	32	30	27	26	25	24	23	23
Business	4	15	27	35	52	71	117	108	100	93	85	78	67	64	61	58	51	47	43	36
Total	8	29	54	74	100	122	180	167	153	140	128	117	101	96	91	86	79	73	68	61

Figure 2-6. Persistent Verified Net Gas Savings (Million Therms)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Renew ables		0	0.2	0.3	0.7	1	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.1
Residential	0.6	2.1	3.6	5.1	6.3	7.3	10.2	9.6	8.9	7.9	7.2	6.4	5.8	5.2	4	3.8	3.7	3.5	3.3	3.2
Business	0.8	4.4	14.8	17.8	21.5	27.5	37.3	35.9	34.6	33.4	32.1	30.7	29	27.6	26.1	24.3	22.2	20.3	18.8	17.8
Total	1.4	6.5	18.7	23.2	28.5	35.9	49.2	47.1	45	42.8	40.7	38.5	36.2	34.2	31.3	29.4	27	24.9	23.1	22.1

**Figure 2-7. Electric Energy Impacts by Measure Category, Business Programs
The 18-month Contract Period
(July 1, 2007–December 31, 2008)**

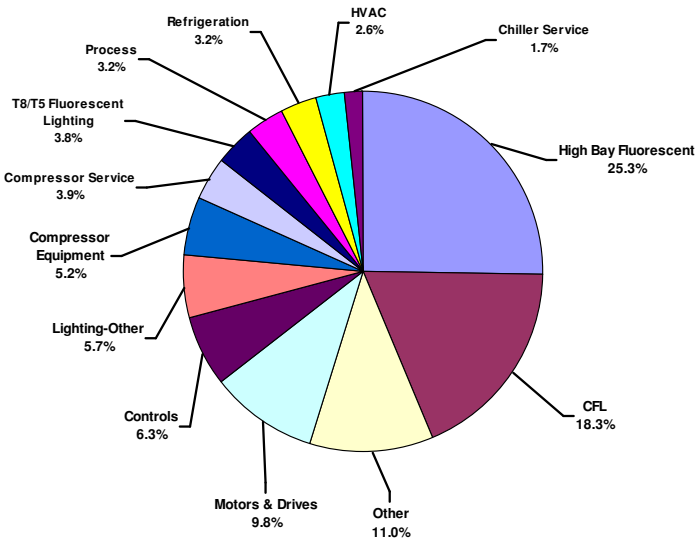


**Figure 2-8. Electric Energy Impacts by Measure Category, Business Programs
Program to Date
(July 1, 2001–December 31, 2008)**

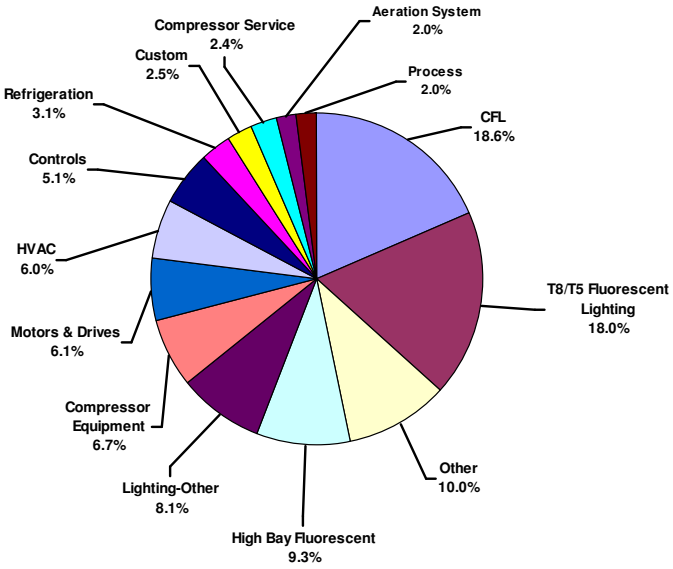


**Table 2-2. Electric Energy Impacts by Measure Category, Business Programs
The 18-month Contract Period
(July 1, 2007–December 31, 2008)**

Measure Category	Verified Gross kWh	Percent of Total
High Bay Fluorescent	101,998,307	25.3%
CFL	73,723,567	18.3%
Other	44,443,243	11.0%
Motors & Drives	39,455,003	9.8%
Controls	25,367,090	6.3%
Lighting-Other	23,003,793	5.7%
Compressor Equipment	21,060,542	5.2%
Compressor Service	15,850,274	3.9%
T8/T5 Fluorescent Lighting	15,463,536	3.8%
Process	13,044,499	3.2%
Refrigeration	12,852,897	3.2%
HVAC	10,597,770	2.6%
Chiller Service	6,975,503	1.7%

**Table 2-3. Electric Energy Impacts by Measure Category, Business Programs
Program to Date
(July 1, 2001–December 31, 2008)**

Measure Category	Verified Gross kWh	Percent of Total
CFL	203,206,832	18.6%
T8/T5 Fluorescent Lighting	196,743,230	18.0%
Other	109,797,927	10.0%
High Bay Fluorescent	101,998,307	9.3%
Lighting-Other	88,632,440	8.1%
Compressor Equipment	73,504,894	6.7%
Motors & Drives	66,646,267	6.1%
HVAC	65,694,103	6.0%
Controls	56,121,708	5.1%
Refrigeration	34,280,137	3.1%
Custom	27,532,945	2.5%
Compressor Service	25,810,930	2.4%
Aeration System	21,879,289	2.0%
Process	21,803,253	2.0%

**Figure 2-9. Gas Energy Impacts by Measure Category, Business Programs
The 18-month Contract Period
(July 1, 2007–December 31, 2008)**

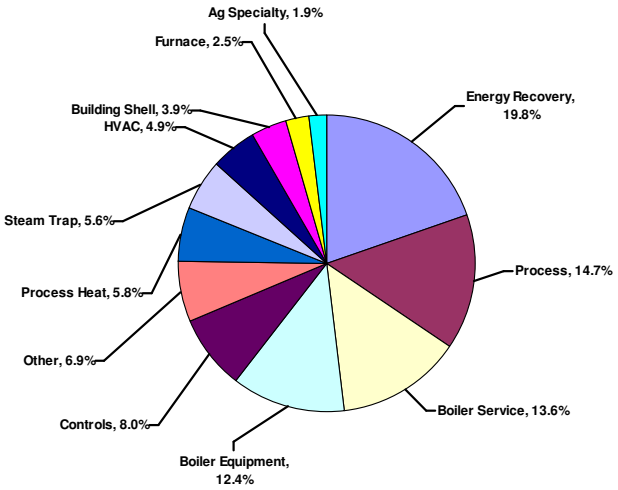


**Figure 2-10. Gas Energy Impacts by Measure Category, Business Programs
Program to Date
(July 1, 2001–December 31, 2008)**

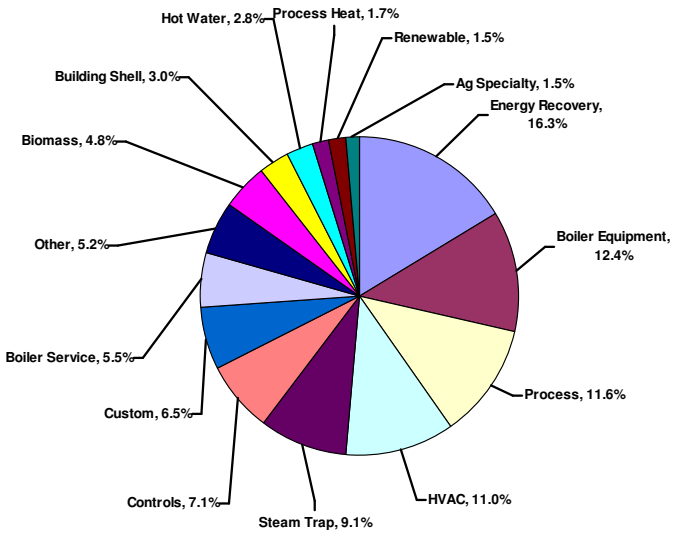


**Table 2-4. Gas Energy Impacts by Measure Category, Business Programs
The 18-month Contract Period
(July 1, 2007–December 31, 2008)**

Measure Category	Verified Gross Therms	Percent of Total
Energy Recovery	4,017,772	19.8%
Process	2,980,341	14.7%
Boiler Service	2,747,041	13.6%
Boiler Equipment	2,509,121	12.4%
Controls	1,620,821	8.0%
Other	1,389,347	6.9%
Process Heat	1,165,659	5.8%
Steam Trap	1,131,489	5.6%
HVAC	993,394	4.9%
Building Shell	785,198	3.9%
Furnace	515,752	2.5%
Ag Specialty	392,087	1.9%

**Table 2-5. Gas Energy Impacts by Measure Category, Business Programs
Program to Date
(July 1, 2001–December 31, 2008)**

Measure Category	Verified Gross Therms	Percent of Total
Energy Recovery	11,218,234	16.3%
Boiler Equipment	8,539,510	12.4%
Process	7,961,223	11.6%
HVAC	7,602,140	11.0%
Steam Trap	6,278,237	9.1%
Controls	4,867,372	7.1%
Custom	4,504,209	6.5%
Boiler Service	3,785,227	5.5%
Other	3,574,928	5.2%
Biomass	3,277,426	4.8%
Building Shell	2,042,353	3.0%
Hot Water	1,951,452	2.8%
Process Heat	1,165,659	1.7%
Renewable	1,060,107	1.5%
Ag Specialty	1,008,709	1.5%

**Figure 2-11. Electric Energy Impacts by Measure Category, Residential Programs
The 18-month Contract Period
(July 1, 2007–December 31, 2008)**

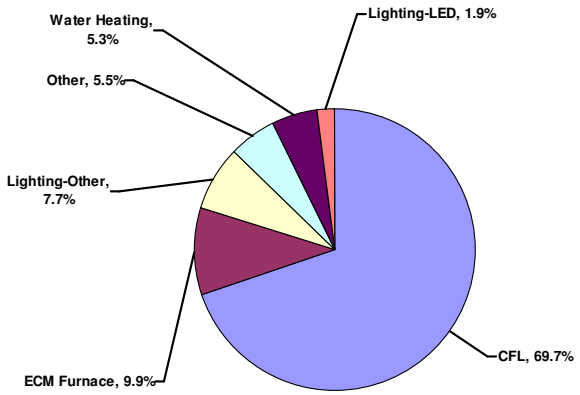


**Figure 2-12. Electric Energy Impacts by Measure Category, Residential Programs
Program to Date
(July 1, 2001–December 31, 2008)**

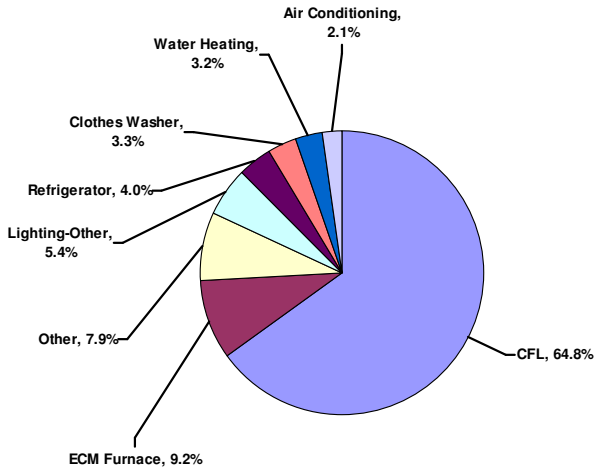


**Table 2-6. Electric Energy Impacts by Measure Category, Residential Programs
The 18-month Contract Period
(July 1, 2007–December 31, 2008)**

Measure Category	Verified Gross kWh	Percent of Total
CFL	125,551,720	69.7%
ECM Furnace	17,906,964	9.9%
Lighting-Other	13,880,006	7.7%
Other	9,889,303	5.5%
Water Heating	9,585,564	5.3%
Lighting-LED	3,383,638	1.9%

**Table 2-7. Electric Energy Impacts by Measure Category, Residential Programs
Program to Date
(July 1, 2001–December 31, 2008)**

Measure Category	Verified Gross kWh	Percent of Total
CFL	402,522,469	64.8%
ECM Furnace	57,136,895	9.2%
Other	49,115,129	7.9%
Lighting-Other	33,401,899	5.4%
Refrigerator	25,090,109	4.0%
Clothes Washer	20,764,380	3.3%
Water Heating	19,936,937	3.2%
Air Conditioning	13,179,033	2.1%

Figure 2-13. Gas Energy Impacts by Measure Category, Residential Programs The 18-month Contract Period (July 1, 2007–December 31, 2008)

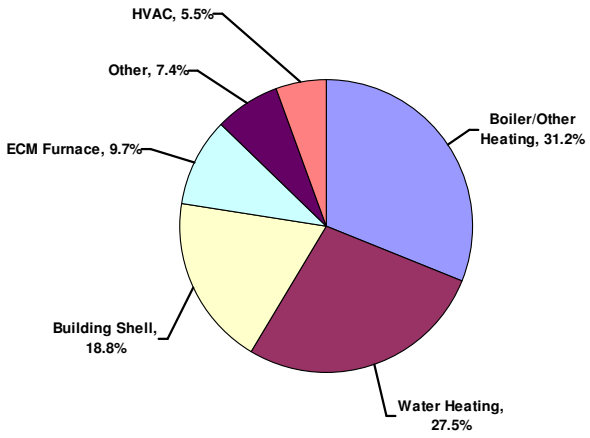


Figure 2-14. Gas Energy Impacts by Measure Category, Residential Programs Program to Date (July 1, 2001–December 31, 2008)

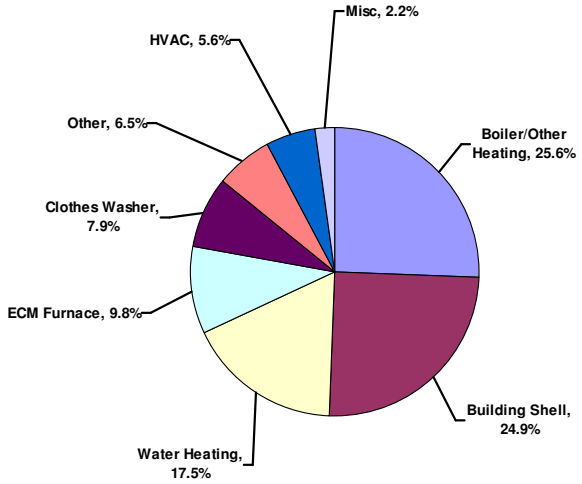


Table 2-8. Gas Energy Impacts by Measure Category, Residential Programs The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified Gross Therms	Percent of Total
Boiler/Other Heating	1,293,873	31.2%
Water Heating	1,138,214	27.5%
Building Shell	779,124	18.8%
ECM Furnace	401,693	9.7%
Other	305,958	7.4%
HVAC	227,152	5.5%

Table 2-9. Gas Energy Impacts by Measure Category, Residential Programs Program to Date (July 1, 2001–December 31, 2008)

Measure Category	Verified Gross Therms	Percent of Total
Boiler/Other Heating	3,433,718	25.6%
Building Shell	3,335,837	24.9%
Water Heating	2,337,986	17.5%
ECM Furnace	1,315,260	9.8%
Clothes Washer	1,056,735	7.9%
Other	869,454	6.5%
HVAC	749,790	5.6%
Misc	295,138	2.2%

The figures above (Figures 2-7 through 2-14) summarize the distribution of energy impacts by measure category and fuel type for Business Programs and Residential program areas. The accompanying tables present corresponding verified gross impact values.

2.2 VERIFIED NONTRACKED ENERGY IMPACTS

As the Focus program progresses, the evaluation team also seeks to quantify energy savings attributable to the Focus effort that are not directly "tracked" by program administrators. For example; participants who, after an initial program experience, go on to adopt more energy saving products or practices without program assistance (often referred to as "spillover"), changes in marketplace practices, services, and promotional efforts which induce businesses and consumers to buy energy saving products and services without direct program assistance (often referred to as "market effects"), and unclaimed rewards—people who intend to submit the paperwork in order to claim rewards but fail to do so.

Presently, the majority of the "nontracked" energy savings quantified as attributable to Focus on Energy are related to the ENERGY STAR® Products program compact fluorescent light bulb (CFL) initiative in the residential and business sector (in the business sector the program is referred to as CFL Participants). Also, spillover savings have been quantified for the rest of the business sector participants, referred to in the table as "Non-CFL Participants."

In the business sector, the results for the "CFL Participants—through June 30, 2006" are presented as a range. The report providing these estimates characterized the lower estimate as a "robust" estimate at about 1.1 million annual kWh saved and 298 annual kW reduction and the higher estimate as a "basic" estimate of about 16.2 million annual kWh saved and over 4,600 annual kW reduction.

Table 2-10. Nontracked Energy Impacts

Program Area (Sector)	Program		Annual kWh Saved	kW Reduction	Annual Therms Saved
Residential	ENERGY STAR Products - CFLs FY02		14,964,840	453	0
Residential	ENERGY STAR Products - CFLs FY02		2,302,014	70	0
Business	CFL Participants—through June 30, 2006	Robust	1,108,813	298	0
		Basic	16,196,526	4,609	0
Business	Non-CFL Participants—through June 30, 2006		629,248	452	845
	Total	Robust	**19,005,005**	**1,273**	**845**
		Basic	**34,092628**	**5,584**	**845**

For the business programs, nontracked impacts are not broken out by program. Instead, they are categorized and "CFL Participants" and "Non-CFL Participants." The "CFL Participants" are businesses in the Agricultural and Commercial programs that have received rewards through the ENERGY STAR Products program, which accounts for approximately 20 percent of the overall business programs savings. "Non-CFL Participants" are the business sector participants that have received benefits and services from Focus on energy through initiatives other than ENERGY STAR Products program.

In the 18-month contract period additional research on nontracked energy impacts was completed for the Education & Training Program in the business programs. The primary purpose of the Focus on Energy Business Programs Education and Training (E&T) Program Untracked Savings Study was to estimate untracked[6] attributable savings (UAS) resulting

[6] The terms "tracked" and "untracked" indicate whether or not an energy-efficient project appears in the Focus WATTS or WISeerts program tracking databases and therefore were included in the Business

from the E&T Program. These UAS are the E&T-attributable portion of energy savings from projects that do not appear in the Focus WATTS or WISeerts databases and were implemented at the building or facilities of the trainees' companies. We estimated the E&T UAS that occurred in the recent past and used these past energy savings to project 2008 E&T Program UAS. We also showed how these recent UAS can be used to project UAS for future years.

It is important to note that these untracked attributable savings are different from participant spillover savings that we estimated in previous studies. When we estimated participant spillover effects from the Focus on Energy Business Programs in 2005,[7] we were estimating the level of untracked energy savings that had "spilled over" due to the influence of tracked projects. To credit a project with participant spillover energy savings, we had to find a causal link between the older tracked project and the newer untracked project. For example, a program participant might have had a positive experience with a tracked energy-savings project and decided to implement similar projects in their other facilities. Although in most cases such program participants would have also sought Focus financial incentives for these new projects (therefore making them "tracked projects"), sometimes they did not and these were generally the types of projects that produced participant spillover energy savings.

The untracked attributable savings from the Focus E&T Program are different from the aforementioned participant spillover savings. They do not represent spillover from an earlier tracked project, but are the first effects of a clearly identified program activity (e.g., a company representative took a particular training course).[8] This explicit causal link between an E&T Program training course and a specific energy-saving project also distinguishes the E&T Program untracked energy savings from more loosely defined claims of program market effects where the causal links between program effects and end user behaviors are not clearly defined.

For additional description of the methodology used please see section 3.6 of this report (Education & Training Spillover). Table 2-11 shows untracked attributable savings (UAS) for year 2008 by project type (one-time vs. O&M projects) and savings type.

Program's *ex ante* gross energy savings claims. In theory any energy-saving project that the Focus program influenced, even if this influence did not include financial incentives, can be claimed in these program tracking databases. In reality, however, the projects listed in these databases are almost exclusively projects that received financial incentives from Focus on Energy.

[7] Miriam L. Goldberg, Christopher Dyson, and Valy T. Goepfrich, KEMA Inc , *Focus on Energy Statewide Evaluation, Business Programs: Participant Spillover Savings Study, Final Report*: December 22, 2005, Evaluation Contractor: PA Government Services Inc.

[8] This is not to say that the trainees were not influenced by earlier tracked projects. They could have been. But we are assuming that in assigning relative attribution to the training courses, the trainees are accounting for these other influences. So, for example, if an untracked project was mostly influenced by a positive experience with a tracked project and only slightly influenced by a training course, we are assuming that the respondent would capture the lesser influence of the training course in the way that they responded to the program attribution questions. The estimated effects of tracked projects on untracked projects would be captured elsewhere through our estimates of participant spillover.

Table 2-11. Untracked Attributable Savings (UAS) for 2008 by Project Type and Savings Type

Project Type	Savings Type	2008
One-time	kWh	6,149,181
One-time	kW	751
One-time	therms	3,268,883
O&M	kWh	2,799,165
O&M	kW	1,695
O&M	therms	549,388
All	**kWh**	**8,948,346**
All	**kW**	**2,447**
All	**therms**	**3,818,271**

2.3 MARKET EFFECTS

One of the objectives of Focus is to be able to translate market effects into energy impacts attributable to program activities or specific market interventions by the programs. Translation into energy impacts is important to allow inclusion of impacts of program-induced market effects into long-term energy resource planning and for appropriate evaluation of the benefit-cost ratio of market transformation-oriented programs or programs with significant market transformation components. While a relatively high level of uncertainty is inherent in estimating the energy impacts of market transformation-oriented programs, the uncertainty can be managed. For example, consistent measurement of key market effects and/or their indicators over time will allow for significant reduction of the uncertainty.

Ultimately, for the concept of market transformation to be proven and the potential significant benefits realized, it is critical for policy makers to provide consistent and sound policy objectives, administrators to use discipline in designing their programs with clear program logic models, and evaluators to consistently provide appropriate feedback through implementation of sound research. Then, policy makers and administrators can use the evaluation feedback (along with other sources of information) to inform policy changes and refine their program logic models.

Both market indicators and market effects can be translated into energy impacts attributable to the program. Market indicators (for example, Point-of-Sale (POS) data) provide value because (1) changes in indicators can typically be measured earlier after an intervention than can changes in market effects; (2) indicators can provide insights into drivers of changes in market effects; and (3) because indicators that are typical pre-cursors to actual purchase behavior represent important stages in program logic—and therefore facilitate assigning appropriate attribution to the program.

The length of time it takes before measurable changes can be observed in either market indicators or market effects metrics can vary dramatically, depending on the market actors targeted by the intervention (e.g., changes at the manufacturer level can have a dramatic impact sooner); the size of the intervention; the size of the market; the readiness of the market for a product; etc. Typically, market indicators are more likely to be measurable in the short term, but can “evaporate” after a year of program activity. Market effects (for example,

manufacturer sales data), involve a much longer time span and are unlikely to be measurable until after at least a year of program activity. Market effects that are sizable enough to be translated into energy impacts should not typically be expected until at least three to five years of program activity.

Much of the Focus evaluation efforts to date have been focused on review of market indicators, including (but not limited to) those market indicators that have been included as contract metrics each year for the program administrators. However, in FY07, the residential evaluation team—in coordination with the business program evaluation team—established a comprehensive system for collecting retail-based CFL sales information that addresses the limitations of the former POS approach. A *uniform approach* to program attribution for all sectors touched by the retail-based CFL initiative (i.e., residential, commercial, agricultural, and multifamily). The system, carried into FY08, provides a representative picture of Wisconsin retail-based CFL sales by including both participating and nonparticipating retailers. The system attempts to include a census of retailers who are responsible for the bulk of rewarded CFL sales, a statewide representative sample of the remaining participating retailers, and, a statewide representative sample of nonparticipating retailers. The *Second Comprehensive CFL Market Effects Study* report (final – September 30, 2008) presents the continuing findings of this effort.

2.4 ECONOMIC IMPACTS[i]

One of the goals of Wisconsin Focus on Energy programs is to support economic development. In general, economic development is a process of enhancing the state's economy by supporting the growth, retention, and attraction of business activity in the state. By strengthening and diversifying the state's economic base, Wisconsin residents can enjoy better job opportunities, higher incomes, and higher living standards. Economic prosperity can also increase revenue for state and local government. In an era of global economic change and uncertainty, it is particularly important to see that programs such as Focus are indeed addressing these economic development goals.

Focus directly affects participating business and residential customers' energy costs. Decreasing energy costs through increased efficiency and conservation can make business operations more profitable and can also leave more money in families' pockets (to spend on other desired purchases). By lowering costs of doing business, it also makes Wisconsin a more competitive location for additional business attraction, investment, and expansion.

Focus also creates other direct and indirect impacts throughout Wisconsin's economy. Wisconsin businesses are major manufacturers of heating and air conditioning equipment, motors, and controls. Focus stimulates sales for these industries in Wisconsin, as well as the development of solar, wind, and biomass energy production within the state. At the same time as it is increasing the flow of dollars staying within Wisconsin, it is also reducing the outflow of money from the state associated with importation of coal and natural gas.

There are also cost effects. When customers make energy efficiency purchases that they might not have made, they are also spending some of their own money, because Focus pays only part of the extra cost of buying energy-efficient equipment. The energy bill surcharge that funds Focus is a cost to customers, although not a new one, since customers have paid the cost of demand-side management programs through utility rates for a number of years.

To analyze the economic development impacts of the Focus on Energy programs, the following three steps were performed for two funding scenarios (low and high) in the FY07 research and will be conducted again in 2009:

1. Document direct effects. The first step is to track the net direct effects of the program. These are changes in program-related spending by Focus and program participants, household, and business savings in energy costs, and spending on new equipment. Here, careful attention is given to establishing ***net*** changes *compared to what would otherwise be expected to occur without the program*.

2. Apply the economic model. The second step is to apply the Regional Economic Models, Inc. (REMI) economic model of Wisconsin. This is a tool used to trace how the direct effects (from step 1) lead to changes in household and business costs, spending and sales patterns in the state. In our analysis, we apply the Wisconsin statewide REMI model to track impacts including:

a. Lower business operating costs
b. Lower household living costs
c. Reduced outflow of dollars to purchase out-of-state coal and natural gas
d. Increase in dollars going to equipment manufacturers and installers in Wisconsin
e. Emissions benefits from NO_x and SO_2 reductions (monetized)
f. Non-energy benefits (monetized)
g. Indirect effects on orders for business suppliers and induced effects of workers re-spending their income within Wisconsin.
h. Results of the REMI model represent changes in the state economy over time. The key indicators of change in the state's economy are changes in business sales, jobs, personal income, and value added (gross regional product) in Wisconsin.

3. Analyze policy implications. The third and final step in the analysis process is to apply results of the economic model (from step 2) to assess how the forecast program impacts translate into economic development changes. These include:

a. Diversified business growth
b. Expanded mix of those jobs available to Wisconsin residents
c. Shifts in the nature and size of impacts occurring over time
d. Shifts in the competitiveness of Wisconsin as a place to live and to locate a business
e. Changes in the incidence of economic impacts, in terms of urban and rural locations.

This general approach for conducting economic impact analysis, using a regional economic model, has been proven in use around the country including studies of the economic impacts of energy programs and policies in over twenty states.

2.4.1 Summary of economic analysis results

The REMI economic model generated estimates of economic impacts of Focus on Energy from its inception in 2002 through 2026. Program funding was assumed, for purposes of this analysis, to continue through 2012 after which measure-related savings persist with some decay and market transformation effects begin to take hold. Since a key feature of Focus programs is energy cost savings for households and businesses, and since those savings

continue over the lifetime of installed equipment, it is necessary to measure economic impacts over a period of time. This analysis examined Focus programs assuming a ten-year implementation span. However, some economic impacts will continue for an additional 15 years beyond any active program period.

Tables 2-12a and 2-12b summarize the economic analysis results for all Focus programs combined—including Residential, Renewables, and Business programs for low and high funding scenarios. The tables show the projected economic impacts for selected years and periods. They also show how program impacts accumulate over a 25-year interval. These economic impacts are presented in terms of (1) the number of job years created for Wisconsin residents, (2) the sales generated for Wisconsin businesses, (3) the value added portion of those sales, and (4) disposable income generated for Wisconsin residents.

The tables also summarize impacts when both the Residential and Business programs include expected "market effects" beyond what the program instigates in terms of increases in household and business purchases of energy efficient products, adoption of energy efficient practices, and the ensuing energy savings. These are effects in the economy without formal program participation. Market effects reflect the behavior of customers, retailers, wholesalers, and manufacturers who are influenced by Focus programs to take additional actions on their own to increase the supply and use of energy-efficient equipment *that they would not have done without the existence of the program.*

Altogether, the analysis found that Focus leads to significant economic development benefits for Wisconsin's economy. Even without counting market effects, the first year of program operation (fiscal year 2002) resulted in a variety of household and business cost savings and spending changes that altogether support over 351 jobs in the state, and that impact grows to 1,417 jobs by the fifth year of program operation (fiscal year 2006). The disposable income generated in Wisconsin from program-generated savings and this additional business activity represents $12 million in the first year, and grows to $85 million by the fifth year of program operation. The impacts inclusive of market effects also grow over time, adding a small impact in the first five years, but then adding roughly 2.9–4.0 percent to jobs and income over the 25-year analysis interval.

Tables 2-12a and 2-12b. Economic Development Impacts for all Focus on Energy Programs, Low and High Funding Scenarios

Low Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact without Market Effects					
Jobs (job year for sums)	351	1,417	3,216	16,711	60,496
Sales generated	$39	$181	$444	$2,208	$8,984
GRP (Value-added)	$26	$104	$265	$1,310	$5,415
Disposable income generated	$12	$85	$213	$1,014	$4,195
Impact with Market Effects*					
Jobs (job year for sums)	351	1,418	3,218	16,716	62,296
Sales generated	$39	$181	$444	$2,209	$9,261
GRP (Value-added)	$26	$104	$266	$1,310	$5,575
Disposable income generated	$12	$85	$213	$1,014	$4,366
*note: Renewable program has no built in market effect projections					

High Funding Scenario (mil. $ 2006)	Year 1	Year 5	Year 10	Sum 10 Years	Sum 25 Years
Impact without Market Effects					
Jobs (job year for sums)	351	1,417	3,934	18,229	73,233
Sales generated	$39	$181	$549	$2,438	$10,863
GRP (Value-added)	$26	$104	$316	$1,411	$6,637
Disposable income generated	$12	$85	$257	$1,097	$5,095
Impact with Market Effects*					
Jobs (job year for sums)	351	1,418	3,949	18,275	77,741
Sales generated	$39	$181	$551	$2,445	$11,598
GRP (Value-added)	$26	$104	$318	$1,415	$7,060
Disposable income generated	$12	$85	$258	$1,100	$5,468
*note: Renewable program has no built in market effect projections					

Who benefits? To assess the diversity of economic development benefits, the REMI economic model was applied to show the breakdown of economic growth impacts by industry sector and occupation category. The comparison of job impacts by industry shows that Focus programs provide widespread benefits among all sectors of the economy. While many of the program participants are manufacturing and commercial businesses, many of the spillover economic benefits accrue to wholesalers, retailers, and service providers that provide goods and services to participating businesses, or that benefit from the re-spending of additional household income within the state. A further analysis shows that the program economic benefits are concentrated on those industries that offer growth for the state economy.

A further breakdown of job impacts by occupation shows that the types of additional jobs created or supported by Focus programs span a wide range of skill-levels among both blue-collar and white-collar categories. In addition, the impacts are widely distributed among urban and rural areas, with urban areas having proportionally greater participation in the residential programs while the semi-urban and rural areas have had proportionally greater participation in the industrial programs.

The economic analysis for Focus on Energy is scheduled to be conducted again in the 2009 contract period (CY09). Results will be provided in the *Semiannual Report* issued in the third calendar quarter of 2009, which will cover the period through June 30, 2009.

2.5 ENVIRONMENTAL IMPACTS

Evaluators also estimated emission factors or rates for the electric generating plants serving Wisconsin (Table 2-13)[ii] and used these data to estimate displaced emissions associated with the Focus programs (Table 2-14). The evaluation team estimated the generation emissions rates shown in Table 2-13 using hourly measured emissions data from EPA data in a model developed by the evaluation team to estimate emissions rates for NO_x, SO_2, CO_2, and mercury for the power plants supplying Wisconsin. Emissions factors from reduced use of natural gas at the customer site (the "On-site Therms" column in Table 2-15) were also taken from EPA data. There are also very small amounts of NO_x and SO_2 in natural gas but they are not large enough to significantly affect the emissions numbers.

Table 2-13. Electrical Generation from Wisconsin Plants Monitored by the EPA (Excludes Hydro and Nuclear)

Fuel	2000 GWH	2000 Percent	2005 GWH	2005 Percent
Coal	42,276	96.5%	36,650	87.3%
Natural Gas	106	0.2%	168	0.3%
Pipeline Natural Gas	384	0.9%	4,947	11.8%
Diesel	834	1.9%	0	0.0%
Oil	208	0.5%	0	0.0%
Wood	0	0.0%	205	0.5%
Total	**43,809**	**100.0%**	**41,970**	**100.0%**

Source: Environmental Protection Agency, Office of Air and Radiation, "Acid Rain Hourly Emissions Data" for 2005.

The following table shows emissions factors by fuel type for 2000 and 2005 *on all units*. (Note that the basis is therefore different than for Table 2-15, which represents only marginal plants.)

Table 2-14. Emissions Factors by Fuel Type, 2000 and 2005, for Wisconsin Plants Monitored by the EPA (Excludes Hydro and Nuclear)

	NO_x (lbs/MWh)		SO_2 (lbs/MWh)		CO_2 (lbs/MWh)		Mercury (lbs/GWh)	
Fuel	**2000**	**2005**	**2000**	**2005**	**2000**	**2005**	**2000**	**2005**
Coal	6.00	4.81	11.57	11.24	1,250	1,320	0.06	0.06
Natural Gas	4.07	3.58	0.61	0.11	1,040	800	0.00	0.00
Pipeline Natural Gas	2.01	0.81	0.07	0.02	1,340	800	0.00	0.00
Diesel	1.68		0.10		920		0.01	
Oil	3.53		0.18		2,000		0.02	
Wood		6.73		4.85		1,570		0.00
Total	**5.64**	**4.15**	**10.48**	**8.67**	**1,250**	**1,220**	**0.06**	**0.04**

In general, the emissions produced per MWh of electricity generated, went down from 2000 to 2005, with the exception of the CO_2 in coal-fired generators, which increased from 1,250 pounds per MWh in 2000 to 1,320 pounds per MWh in 2005.

The emissions rates provided in Table 2-15 have been updated (since the last semiannual report) based on evaluation team research. In this research, we compare our approach to the recent World Resources Institute "Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects," with special attention to the identification of plants operating on the margin of system supply. We described an approach that uses the average duration of operation of each generating unit to identify the dispatch order and thus plants operating on the margin. We use data from 2002 to 2006 from the Environmental Protection Agency's (EPA) "Acid Rain Hourly Emissions" data series to estimate an emission rate for CO_2, NO_X, and SO_X for all monitored utilities serving on the grid that serves Wisconsin. We find that emission rates for all pollutants have declined over the study period. We trace this decline to the decreasing use of coal generation at the margin.

Table 2-15. Emissions Rates

Emissions	Generation lbs/MWh	On-site Therms lbs/Therms*
NO_x	2.87	0.009804
SO_2	2.71	0.0000588
Mercury	0.0000154	0.00000002549
CO_2	1,700	11.76

Sources: Generation factors from *Quantifying Environmental Benefits of Focus on Energy: Emission-rate Estimates 2002 to 2006.* Eric Rambo, Bryan Ward and David Sumi. PA Consulting Group Report for the Public Service Commission of Wisconsin, October 28, 2008.

Therm factors from EPA data (EPA's *E-Grid 2000 database* with data for the MAIN and MAPP NERC regions from 1998). Update based on memo from Eric Rambo and Bryan Ward dated January 5, 2007.

Using the marginal emission rates and evaluation-verified *gross* electricity savings estimates,[iii] the Focus programs together potentially displaced 5,819,224 pounds of NO_x; 4,693,397 pounds of SO_2; over 3,965 million pounds of CO_2; and almost 29 pounds of mercury from Focus inception to December 31, 2008 (Table 2-17). *[Note: the draft version of this report presented verified net displaced emissions. This final version has reverted to verified gross emissions impacts to be consistent with the publicly reported verified gross energy impacts. However, the reader should be aware that the economic and benefit-cost analyses for Focus use net displaced emissions. Further, markets for greenhouse gases (GHG), and the protocols for quantifying and reporting GHG effects, stringently require net emissions impacts.]*

Table 2-16 Verified Gross Emissions Displaced (lbs) Annually
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Program Area	Verified Gross MWh	Verified Gross Therms	NO_x	SO_2	CO_2	Mercury
Business	403,836.00	20,248,021.00	1,357,520	1,095,586	924,637,959	6.74
Renewables	6,988.00	2,229,506.00	41,914	19,068	38,098,840	0.16
Residential	180,197.00	4,146,014.00	557,813	488,578	355,092,357	2.88
Total	**591,021.00**	**26,623,540.00**	**1,957,248**	**1,603,233**	**1,317,829,158**	**9.78**

Table 2-17 Lifecycle Verified Gross Emissions Displaced (lbs) Annually Cumulative in Current Year (July 1, 2001–December 31, 2008)

Program Area	Lifecycle Verified Gross MWh	Lifecycle Verified Gross Therms	NO_x	SO_2	CO_2	Mercury
Business	1,093,233	68,836,785	3,812,455	2,966,709	2,668,017,046	18.59
Renewables	54,678	5,511,172	210,957	148,501	157,764,240	0.98
Residential	582,079	12,774,784	1,795,811	1,578,185	1,139,766,128	9.29
Total	**1,729,991**	**87,122,741**	**5,819,224**	**4,693,397**	**3,965,547,414**	**28.86**

Emission reductions are calculated using the marginal cost emission rates.

Wisconsin's investor-owned utilities are included in the federal SO_2 regulatory structure of the Clean Air Act (acid rain provisions). In this cap-and-trade system SO_2 emissions cannot be considered reduced or avoided unless EPA lowers the SO_2 cap.

An additional estimation of the verified gross emissions displaced in the 18-month contract period is shown in Table 2-18. This presentation of the verified gross emissions displaced adjusts the results for the Renewables program by removing the CO_2 (and SO_x and NO_x) impacts for the program's biomass projects. With reference to *The GHG Protocol for Project Accounting* (World Resources Institute and World Business Council for Sustainable Development, 2005), these biomass projects are seen as a source of "upstream" secondary effects. That is, these projects use biomass fuels to generate electricity, heat, or steam and cause changes in the release of CO_2 (and to some extent SO_x and NO_x) from the project processes. The evaluation team will, in CY09, estimate the direction (positive or negative in terms of emissions released) and relative magnitude of this secondary effect by obtaining appropriate emission rates to apply to the levels of biomass inputs used in the program projects. For now, the reduced verified gross emissions displaced as shown in Table 2-18 reflect application of the "conservativeness principle" that the GHG Protocol suggests guide any effort to assess the significance of secondary effects.

Table 2-18. Verified Gross Emissions Displaced (lbs) Annual with Adjustments for Energy Impacts from Renewables Biomass/Biogas The 18-month Contract Period (July 1, 2007–December 31, 2008)

Program Area	Verified Gross MWh	Verified Gross Therms	NO_x	SO_2	CO_2
Business	403,836	20,248,021	1,357,520	1,095,586	924,637,959
Renewables	1,754	60,409	5,625	4,756	3,691,829
Residential	180,197	4,146,014	557,813	488,578	355,092,357
Total	**585,787**	**24,454,444**	**1,920,960**	**1,588,920**	**1,283,422,147**

The Department of Natural Resources (DNR) has developed an emissions registry to track emissions reductions in Wisconsin. The ongoing reporting of emissions reductions associated with Focus programs' energy impacts has been the basis for the Division of Energy's entries to the DNR's *Voluntary Emissions Reduction Registry (http://www.dnr.state.wi.us/org/aw/air/registry/index.html*). For purposes of this Registry, the Focus evaluator serves as the independent third-party verification organization for a residential program offered through Wisconsin's Focus on Energy. The program, ENERGY STAR® Products, promotes the installation of energy-efficient appliances, lighting, and windows. Drawing upon the evaluation activities conducted over the past four years, the emissions savings from the Energy Saver compact fluorescent light bulb portion of the program were verified for the Registry. The calculations, assumptions, and research activity

backup that supports the registered reductions in emissions associated with the verified energy impacts of the program are cited and available on the state's DNR website.

2.6 NON-ENERGY BENEFITS

Table 2-19 shows the total value of non-energy benefits (NEBs) for each program area. The NEBs reported are based on the reports that were completed for each program area.[9] NEBs values are calculated using the same approach utilized by the recently completed benefit cost analysis. However, they are a combination of one-time savings and ongoing savings, so it is not straightforward to turn these values into lifetime benefits. A review of the NEBs attributed to Focus is in process. A draft report will be issued shortly.

Table 2-19. Value of Non-energy Benefits by Program Area

<table>
<tr><th rowspan="2">Program Area</th><th colspan="2">Value of Non-energy Benefits</th></tr>
<tr><th>The 18-month Contract Period
(July 1, 2007–December 31, 2008)</th><th>Lifecycle Persistent Net
(as of December 31, 2008)</th></tr>
<tr><td>Business Programs</td><td>$8.5 million</td><td>$23.7 million</td></tr>
<tr><td colspan="2">Example Benefits from Business Programs:
Maintenance employee morale
Equipment life
Productivity
Waste generation</td><td>Defects and errors
Sales
Non-energy costs
Personnel needs
Injuries and illnesses</td></tr>
<tr><td>Residential Programs</td><td>$8.3 million</td><td>$33.0 million</td></tr>
<tr><td colspan="3">Example Benefits from Residential Programs:
Increased safety resulting from a reduction of gasses such as carbon monoxide due to the installation of a new high-efficiency furnace
Fewer illnesses resulting from elimination of mold problems due to proper air sealing, insulating and ventilation of a home
Reduced repair and maintenance expense due to having newer, higher quality equipment
Increased property values resulting from installation of new equipment
Reduced water and sewer bill from installation of an ENERGY STAR qualified washing machine, which uses much less water than conventional washing machine.</td></tr>
</table>

[9] Jeff Riggert, Nick Hall, and Tom Talerico, TecMRKT Works, *Non-energy Benefits Cross-cutting Report. Year 1 Efforts, December* 4, 2002.

Nick Hall and Johna Roth, TecMarket Works, *Non-energy Benefits to Implementing Partners from the Wisconsin Focus on Energy Program*, October 20, 2003.

Nick Hall, TecMarket Works, *A Qualitative Program Effects Status Study,* January 17, 2005.

Program Area	Value of Non-energy Benefits	
	The 18-month Contract Period (July 1, 2007–December 31, 2008)	Lifecycle Persistent Net (as of December 31, 2008)
Renewable Energy Programs	$324,097	$962,704
Example Benefits from Renewable Energy Programs: • Greater diversity of primary in-state energy supplies • Use of wastes as a fuel instead of disposal • Increased ability to handle energy emergencies or generation short-falls • Increased sales of renewable energy by-products.		

2.7 HISTORICAL SIMPLE B/C AND COST OF CONSERVED ENERGY (CCE)

This section of the *Semiannual Report* presents the simple benefit-cost test and cost of conserved energy results for the 18-month contract period and for the program to date, along with information on the key input assumptions for the analysis. Note that this is different from section 2.8, which presents results from the benefit cost analysis completed in FY07 covering a ten-year program horizon. The numbers presented in this section are based on the program activities through December 31, 2008. However, the inputs and methodology applied are consistent.

The simple benefit-cost test is based on the Total Resource Cost (TRC) test, a commonly used test of program cost effectiveness. The test compares program and participant costs against the avoided costs of supplying the conserved energy. The methodology and inputs used for this test are consistent with the recently completed benefit cost reports, which is covered in greater detail in section 2.8.

The methodology for calculating the cost of conserved energy was outlined in a memo report issued by the evaluation team (*Cost of Conserved Energy (CCE): Potential Calculations for Focus on Energy*, October 31, 2005). The specification and calculation of CCE originated with the desire to compare energy conservation measures, specific technologies, energy efficiency (EE) programs, or entire program portfolios to the relative cost of achieving a specific unit of energy savings (i.e., $/kWh). A key potential benefit of the CCE approach is to give equal weight to both energy *supply* and energy *demand* options. Thus, cost of conserved energy curves were developed about two decades ago to place energy efficiency cost estimates at a level comparable to that for supply-side options (Meier, 1982). Much of the early development of CCE curves was conducted at the Lawrence Berkeley National Lab. Recent development work has been sponsored by the California Energy Commission (CEC)[10] . Based on reporting by ACEEE, CCE results have also been calculated and reported by six other public benefits states. They are California, Connecticut, Massachusetts, New Jersey, New York, and Vermont.

[10] See Sathaye, Jayant, and Scott Murtishaw. 2004. *Market Failures, Consumer Preferences, and Transaction Costs in Energy Efficiency Purchase Decisions.* Lawrence Berkeley National Laboratory for the California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-202.

The cost of conserved energy has several inputs in common with the simple benefit-cost test. For example, the discount rate and the expected life of the savings resulting from the program(s) and the results of the two tests are presented together in the tables below.

It should be noted that one of the key assumptions for calculating the cost of conserved energy for programs that result in both electric and gas savings is the allocation of program costs (a known value) to the attributed savings. In other words, what proportion of the program costs were required to generate the electric savings and what proportion of the program costs were required to generate the gas savings? In Tables 2-21 and 2-22 below, the allocation of program costs is indicated in the column "Elec %" The methodology for attributing program costs is based on a three-step process that is based on the value of incentive dollars paid to realize the energy savings, where this is known. A number of incentives, however, are related to measures that realize both electric and gas savings. And, other incentives are paid for measures/activities for which no energy savings is directly related. For these the program cost allocation is based on the value of the energy savings realized by the program.

2.7.1 Key inputs

Discount rate: 5%

Table 2-20. Utility Avoided Costs

Sector	kW	kWh	Therms
Schools/Government	$104.00	$0.056	$0.917
Commercial/Agriculture			$0.987
Industrial			$0.878
Residential			$1.061

Details on measure life and the basis for incremental costs are presented by program and benefit-cost measure category in Appendix C of this report.

2.7.2 Definitions for each of the columns in tables 2-21 and 2-22

Value of Energy Savings. The present value of the utility avoided costs over the life of the measures installed through the program. This is comparable to the "documentable savings" referred to in the next section.

Value of Avoided Emissions. The present value of the utility avoided costs over the life of the measures installed through the program. This is comparable to the "externalities" referred to in the next section.

Program Costs. Program spending less incentives, but including program administrative costs.

Incremental Costs. The costs of a measure over and above a standard efficiency measure. For the renewables program area, it is the full project costs. The NTG ratio is applied to these costs to obtain the value to be included in the simple b/c formula.

Simple B/C. The simple benefit-cost ratio.

CCE kWh. The cost of conserved energy for each kilowatt-hour saved.

CCE Therms. The cost of conserved energy for each therm saved.

Elec %. The proportion of the program cost that are allocated to electricity savings.

NTG kWh. The net-to-gross ratio for the electric energy savings.

NTG Therms. The net-to-gross ratio for the gas energy savings.

NOTE: The simple b/c values in this re-issued report reflect some changes in the modeling that generates them. These are (1) a more accurate calculation of the net present value of the value of energy savings and value of avoided emissions, which results in slightly higher values. (2) A correction of incremental cost values. These were under-stated in a previous version of this report because they were adjusted to net values after they had already been calculated as net. (3) An eight percent line loss factor has been added to the energy savings. (4) For the renewables portfolio, incremental costs are based on actual project costs as tracked in the program tracking system rather than estimated values. This change is a deviation from a policy against making ad hoc changes to inputs; however, an exception was made in the interest of significantly greater accuracy.

The business program area has the best simple b/c ratio for the 18-month contract period, 2.9, and the best ratio for program to date at 2.6. For the residential program area, the simple b/c ratio is 1.5 for the 18-month contract period and 1.4 for the program to date. For the renewables program area, the simple b/c is 0.7 for the 18-month contract period and 1.0 for the program to date. The results of the simple b/c test indicate that the benefits outweigh the costs of the Focus on Energy across all of the program areas combined.

Table 2-21. Simple Benefit-cost and Cost of Conserved Energy
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Program Area	Value of Energy Savings	Value of Avoided Emissions	Program Costs	Incentives	Incremental Costs	Simple B/C	CCE kWh	CCE Therms	Elec %	NTG kWh	NTG Therms
Business	$240,324	$13,031	$21,650	$28,993	$108,782	3.0	$0.038	$0.223	79%	60%	53%
Renewables	$10,936	$495	$2,553	$4,966	$25,670	0.7	$0.318	$0.495	79%	57%	31%
Residential	$95,508	$5,766	$16,343	$17,955	$51,453	1.6	$0.060	$0.459	79%	83%	79%
Total	$346,767	$19,292	$40,546	$51,914	$185,905	2.2	$0.049	$0.296	79%	67%	55%

"Program Costs" does not include incentives. Dollar values, with the exception of the CCE values, are denominated in thousands (000).

Table 2-22. Simple Benefit-cost and Cost of Conserved Energy
Program to Date (July 1, 2001–December 31, 2008)

Program Area	Value of Energy Savings	Value of Avoided Emissions	Program Costs*	Incentives	Incremental Costs	Simple B/C	CCE kWh	CCE Therms	Elec %	NTG kWh	NTG Therms
Business	$730,680	$36,762	$82,983	$63,904	$330,116	2.7	$0.044	$0.176	79%	59%	59%
Renewables	$32,679	$1,740	$11,067	$9,269	$55,146	1.1	$0.175	$0.394	79%	26%	32%
Residential	$383,946	$22,244	$69,044	$70,536	$224,107	1.5	$0.066	$0.500	79%	91%	91%
Total	$1,147,305	$60,746	$163,094	$143,709	$609,369	2.1	$0.054	$0.264	79%	69%	62%

"Program Costs" does not include incentives. Dollar values, with the exception of the CCE values, are denominated in thousands (000).

2.8 BENEFIT-COST ANALYSIS[iv]

The analysis takes a societal perspective to counting Focus benefits and costs. The "simple" b/c test (results presented below in Table 2-23) is somewhat conservative. It counts as benefits only the avoided costs of well-documented *net* energy savings. These avoided costs include the value of avoided emissions for which active offset markets currently exist. The simple test is comparable to Total Resource Cost or Societal tests typically done in other states.

The "expanded" test used is intended to be more realistic by including a broader range of effects (Table 2-24). However, including this broader set of effects requires using estimates that have somewhat less empirical certainty and that are not necessarily counted in other jurisdictions.

Costs in both tests are program spending, excluding incentive payments, and customer incremental costs for measures attributable to the programs.

The expanded b/c test expands upon the simple test in several ways.

- Market effects are counted that are considered reasonably likely, but have not been rigorously or precisely quantified in impact analysis to date.
- Non-energy benefits (and costs) are included for all programs.
- Avoided emissions externality costs for expected future emissions offset markets are counted as a benefit.
- Benefits are valued in terms of their net impact on the economy, as determined from the economic impact analysis. The net economic impacts take into account the economic ripple effects on the Wisconsin economy of energy savings and associated non-energy and emissions effects.

2.8.1 Documentable savings, measure life, and decay rates

Documentable savings for the earlier program years are taken from the prior evaluation reports, in particular the most recent year-end report. In addition, the energy efficiency measures installed typically last for a number of years, so their lifetime energy impacts would be calculated by multiplying the annual energy savings by the number of years that the energy efficiency measure is expected to be in operation. These lifetime energy impacts—explicitly considering measure life interpreted as the median number of years of expected operation—are now termed in Focus evaluation impact reporting *lifecycle* energy impacts. An additional new concept embodied in the energy impacts used in this Benefit-cost Report is *persistent* savings. These are *lifecycle* impacts that also include an exponential decay rate, such that half the savings remains after the measure life.

Measure life was assessed for each program component by the program area evaluators, primarily based on secondary sources. This measure life is interpreted as the median measure life. (Measure lives for all program measures included in this analysis are provided in Appendix D of the *Interim Benefit-cost Analysis: FY07 Evaluation Report*.) The savings implemented in each program year is extended into the future with an exponential decay rate, such that half the savings remains after the measure life.

That is, we interpret the measure life identified from the literature as the time until half the units would be expected to have failed or been removed. This interpretation is consistent with the persistence study framework used in California and elsewhere. Under those rules, the "expected useful life" is the median survival time, where "surviving" means remaining in place and operable.

With this interpretation and an assumed exponential decay, the fraction "f" of savings that survives from one year to the next is given by

$$f = 2^{-(1/L)}$$

where L is the measure life. For example, if the measure life is 15 years, the surviving fraction each year is

$$f = 2^{-1/15} = 95.5\%.$$

The decay rate is

$$d = 1-f = 4.5\%.$$

Thus, in this example, the surviving savings from the prior year is calculated as 95.5 percent of the prior year's amount; 4.5 percent of the prior year's savings is lost. Associated non-energy and environmental benefits decay at the same rate.

The exponential decay formula implies a constant failure rate over time. This assumption is not necessarily realistic for many measures. Experience from numerous persistence studies conducted in California indicates that the failure process is often a mixture of two phenomena—in the short term, removal due to defect or dissatisfaction, and in the longer term, more or less steady wear-out patterns. This mixture suggests a "hazard rate" that is high in the early years, then declines, becoming stable (exponential) or eventually rising again in much later years.

The Weibull function is commonly used for survival analysis. This form can give either an increasing or decreasing hazard rate, but not one that starts high, drops, then stabilizes or climbs. For a fixed median measure life, we considered a Weibull with shape parameter 1/2 (decreasing hazard) and one with shape parameter 2 (increasing hazard). The first gives a five to ten percent NPV and the second gives a five to ten percent higher NPV compared to the exponential. A mixture of the two distributions, representing a combination of the two contributing phenomena, would give NPV somewhere between, or close to that from the exponential itself. Thus, the exponential assumption, which is computationally convenient, appears to yield appropriate end results for purposes of this analysis.

2.8.2 Spending scenarios

For this long-term analysis, conducted in the middle of the life of the program, it is necessary to establish meaningful assumptions of the levels and duration of future program spending. Two spending scenarios are considered.

- The low-funding version of the analysis assumes that spending levels will be similar to those observed in the first five program years. This version indicates the cost-effectiveness of the program as it has existed to date, but assumes a longer total

program life. The low-funding scenario provides a minimum realistic benefit-cost assessment.

- The high-funding version assumes that spending rises based on the currently legislated funding levels for the remaining years. Under this scenario, we also count additional market effects that are reasonably likely under increased funding but have not been documented for the programs so far. Thus, the high-funding scenario provides a measure of likely cost-effectiveness of the programs as they could proceed under current funding plans.

2.8.3 Benefit-cost analysis results

In terms of benefit-cost ratios, the low- and high-funding scenarios gave very similar results for Focus as a whole, as well as for the Business and Residential program areas and individual programs. We present the high-funding results as representing a more likely future path for the programs. The consistency with the low-funding results reduces possible concern that the cost-effectiveness would be overstated if future funding turns out to be less than currently planned.

Focus as a whole is projected to have positive net benefits for the state for all forms of the benefit-cost comparison conducted. For the expanded test, high-funding assumption, the projected net present value of 10 years of program operations over a 25-year horizon is a net benefit of $4.4 billion. The benefit-cost ratio for Focus as a whole is 5.3. Under the more conservative simple test, net benefits are $1.4 billion, with a benefit-cost ratio of 2.4.

Table 2-23. Benefits and Costs by Program Area
25-Year Net Present Value ($000,000), Simple B/C Test, High Funding

Program Area	Benefits	Costs	Net Benefits	B/C Ratio
Residential	$785	$469	$316	1.7
Business	$1,499	$483	$1,016	3.1
Renewables	$94	$56	$38	1.7
Total	**$2,377**	**$1,008**	**$1,369**	**2.4**

Table 2-24. Benefits and Costs by Program Area
25-Year Net Present Value ($000,000), Expanded B/C Test, High Funding

Program Area	Benefits	Costs	Net Benefits	B/C Ratio
Residential	$1,418	$469	$950	3.0
Business	$3,577	$483	$3,094	7.4
Renewables	$366	$56	$310	6.5
Total	**$5,361**	**$1,008**	**$4,353**	**5.3**

The Residential Portfolio has projected benefits substantially above the program costs. The net benefit is estimated at $0.3 billion using the simple test and $1 billion with the expanded test. The benefit-cost ratio is 1.7 using the simple test and 3.0 using the expanded test. A large fraction of the program area achievement comes from compact fluorescent bulbs, both through direct savings tracked by the program and through market effects savings. The ENERGY STAR® Products (ESP) program, which is dominated by the CFL effort, has the highest simple b/c ratio of any of the Residential Programs. (For FY08, this program was divided into ENERGY STAR lighting and ENERGY STAR appliances.)

The Business Program area has net benefits of $1 billion and a benefit-cost ratio of 3.1 under the simple test and $3.1 billion and 7.4 under the expanded test. These b/c ratios represent improvements compared to the findings from the initial b/c report. Contributors to this improvement include increased attribution levels based on the most recent impact report, some projected added market effects savings, and, for the expanded b/c analysis, the inclusion of non-energy benefits. (The increased attribution stems largely from the change in attribution method for CFLs, applying the same analysis as has been used in the past for the Residential CFLs.)

For the Renewables program, the Low scenario appears to represent a more realistic estimate of the overall b/c ratio than does the High scenario. Under this scenario, the b/c ratio is 1.7 using the simple test, and 6.5 using the expanded test. Thus, even under the most conservative analysis, the program is cost-effective.

In tandem and coordinated with the economic analysis scheduled for the next CY09 period, the Benefit-cost analysis will again be conducted for Focus on Energy. These results will be reported separately in their entirety and will also be included in the semiannual report issued in the third calendar quarter of 2009.

2.9 COMPARISONS OF FOCUS ENERGY IMPACTS AND ACHIEVABLE POTENTIAL

As part of an effort to present additional information at the measure and market levels, this section supplements the energy impacts results reported at the technology-specific level with comparisons to *achievable potential* in Wisconsin. The intent of these comparisons is to provide some insights regarding the present selection of markets promoted in Focus. The results for achievable potential are taken from the study on *Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006–2015* prepared by the Energy Center of Wisconsin (ECW) on behalf of The Governor's Taskforce on Energy Efficiency and Renewables (November 2005). In the following discussion, the ECW's report is referred to as the *Potential Study*. Prior to presenting the comparison results in tables, the methods used are summarized. [Note: The ECW is currently preparing an update to their 2005 Potential Study; the evaluation team will coordinate with the PSCW (and ECW as needed) to explore whether future Focus on Energy impacts can appropriately be compared to the manner in which the ECW's new potential study results are presented.]

2.9.1 "Mapping" Focus measure categories to potential study markets

The ECW's *Potential Study* produced results for 36 markets (15 C&I, 15 residential, and 6 renewable). To compare to Focus impacts, some of these markets have been combined and others have been added to provide information about the types of markets that had significant activity in Focus but were not included in the *Potential Study*, e.g., energy-efficient refrigerators and freezers in the residential sector (see Tables 2-25 through 2-30).

To make comparisons between potential savings and achieved savings, the first step was to "map" or assign the measures installed through Focus to the *Potential Study* markets. The evaluation team made the initial assignments early in FY07 with some review by the ECW's author of the *Potential Study* report. Subsequently, there has been collaboration between the program administrators and representatives from the ECW and the evaluation team to review the assignments. This has resulted, over time, in a number of changes being made to the assignments of Focus measures for both the residential and the commercial and industrial markets. Changes in the evaluation reporting database have now made it easier to specify

market assignments at the measure level, where for the commercial and industrial sectors assignments were made at the program/measure category level. Therefore, additional review of the assignments of measures to markets has occurred, including by the PSCW and program implementers, as the measure lists for inclusion in the PSCW's tracking system for business programs have been established.

2.9.2 Markets with no identified potential

The *Potential Study* estimates the potential in the 30 C&I and residential markets "to save electric energy, electric demand, and natural gas at or below current utility avoided costs" (Volume I, page 9). The markets included were not exhaustive, therefore, it should be noted that there could be markets that were not included in the study that could provide additional potential for energy savings.

Where there are no Focus energy impacts noted for markets it is because current Focus programs do not capture energy savings from the market. Note that this can be affected by the *Potential Study's* definitions of markets and the mapping task of assigning Focus measure categories to markets.

2.9.3 Values used to represent energy savings potential

The estimated values for market-specific energy efficiency potential have "considerable variation in the magnitude of these contributions, depending on the resource and sector in question" (Volume I, page 14). The *Potential Study* used 90 percent probability boundaries for each market's estimates. The point estimate used in the comparison tables in this report represents the upper boundary of the average annual incremental impact (referred to in the tables as "high" potential). Also, the *Potential Study* used both a 5-year and 10-year horizon for estimating the incremental impacts. The point estimate is based on the 5-year horizon values.

All tables (2-25 through 2-30) use Focus net energy impacts for the period July 1, 2007, through December 31, 2008. A full year of Focus program results makes comparisons to the *Potential Study's* annual incremental potentials feasible.

In the results provided in these tables, the percent of potential achieved is color-coded as follows: red signifies that the Focus net savings are at least 66 percent of the estimated annual achievable potential (or have exceeded it); yellow indicates that the Focus savings are realizing 33 percent to 66 percent of the achievable potential; and, green identifies *Potential Study* markets for which Focus is realizing less than 33 percent of the achievable potential. The intent of this scheme is to assist the reader in interpreting the many comparisons.

A. COMMERCIAL & INDUSTRIAL MARKETS

Table 2-25 provides the comparison results for electric C&I markets. As shown in the table, and summarized in the *Potential Study* report (Volume I, page 14), "Lighting, industrial process improvements, commercial new construction and industrial pump system improvements dominate the C&I sector contribution to overall potential." A close convergence can be seen between achievable potential and actual net Focus kWh impacts for the most important end-use—lighting. The *Potential Study* indicates that lighting markets account for about 46 percent of achievable potential. At this end-use level, Focus measures assigned to the lighting markets (specified in the *Potential Study*) contributed about 54 percent of Focus

kWh savings in the 12-month period (calendar year 2008). Focus is therefore achieving over 98 percent of the kWh potential.

There are four markets in which Focus had no savings in fiscal year 2008. These also tend to be the markets that are expected to have relatively modest potential, though it is important to note that some measures in markets such as wastewater are captured in other markets such as motors and pumps. A lack of tracked savings in a sector does not indicate that there is no activity. Focus is approaching or has exceeded the estimated annual market potential in seven of the C&I markets. Finally, since the last *Semiannual Report*, Focus has appreciably increased its percentage of savings from the Commercial Chiller and Manufacturing Upgrades markets.

Table 2-25. Comparisons of Focus Electric Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential, Commercial & Industrial Markets

Market ID	Market	Annual kWh Potential - High	% of kWh Potential - High	Net kWh Savings	% of kWh Savings	% of kWh Potential Achieved
1.01	High Performance New Buildings	15,636,000	7.7%	4,195,915	2.5%	26.8%
2.01	Commercial Unitary HVAC Replacement and System Improvements	2,103,000	1.0%	2,908,853	1.7%	138.3%
3.00	C&I Lighting Remodeling and Replacement and Retrofit	93,898,000	46.4%	92,261,456	54.1%	98.3%
4.01	Commercial Boiler Replacement and Systems Improvements	0	0.0%	382,842	0.2%	
6.01	Commercial Chiller Replacement and System Improvements	3,028,000	1.5%	7,534,428	4.4%	248.8%
7.01	Commercial Ventilation System Improvements	5,893,000	2.9%	1,333,699	0.8%	22.6%
8.01	Commercial Refrigeration System Improvements	6,486,000	3.2%	4,050,453	2.4%	62.4%
9.01	Industrial Motors: New, Replacement and Repair Market	3,096,000	1.5%	9,090,220	5.3%	293.6%
10.01	Industrial Compressed Air Systems Improvements	10,988,000	5.4%	15,767,240	9.3%	143.5%
11.01	Industrial Fan and Blower Systems Improvement	4,809,000	2.4%	0	0.0%	
12.01	Industrial Pump Systems Improvement	30,055,000	14.8%	0	0.0%	0.0%
13.01	Manufacturing Process Upgrades	10,154,000	5.0%	8,951,671	5.3%	88.2%
14.01	Municipal Water and Wastewater	4,449,000	2.2%	0	0.0%	
15.01	Agriculture Energy Efficiency	11,843,000	5.9%	9,119,727	5.4%	77.0%
70.00	Commercial Pumps	0	0.0%	1,051,471	0.6%	
71.00	HVAC-Other	0	0.0%	22,064	0.0%	
73.00	Waste Water Treatment	0	0.0%	2,427,571	1.4%	
74.00	Commercial Dehumidification			0	0.0%	
99.02	Savings not Mapped to Market	0	0.0%	11,336,090	6.7%	
	Totals	**202,438,000**	**100.0%**	**170,433,703**	**100.0%**	**84.2%**

Red = Focus net savings are at least 66 percent of the estimated annual achievable potential
Yellow = Focus net savings are realizing 33 percent to 66 percent of the achievable potential
Green = Focus net savings are less than 33 percent of the achievable potential.

Table 2-26 shows natural gas savings and potential for C&I markets. The *Potential Study* estimates that over 79 percent of the achievable potential is represented by "Manufacturing Process Upgrades." For calendar year 2008, 56 percent of Focus savings were obtained from these process upgrades, which represented realizing 110 percent of the annual potential—a strong increase compared to the most recent *Semiannual Report* period. Another important contribution to Focus therm savings was in the market category of "Commercial Boiler Replacement and Systems Improvements," holding approximately steady from the previous

reporting period at 26 percent of therm savings, while the *Potential Study* suggests that about seven percent of annual therm savings potential is achievable in this market.

Table 2-26. Comparisons of Focus Gas Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential, Commercial & Industrial Markets

Market ID	Market	Annual Therm Potential - High	% of Therm Potential - High	Net Therm Savings	% of Therm Savings	% of Therm Potential Achieved
1.01	High Performance New Buildings	562,000	10.5%	49,247	0.6%	8.8%
2.01	Commercial Unitary HVAC Replacement and System Improvements	0	0.0%	233,116	2.8%	
4.01	Commercial Boiler Replacement and Systems Improvements	390,000	7.3%	2,211,156	26.6%	567.0%
7.01	Commercial Ventilation System Improvements	97,000	1.8%	11,096	0.1%	11.4%
8.01	Commercial Refrigeration System Improvements	0	0.0%	1,920	0.0%	
9.01	Industrial Motors: New, Replacement and Repair Market	0	0.0%	14,938	0.2%	
10.01	Industrial Compressed Air Systems Improvements	0	0.0%	119,755	1.4%	
13.01	Manufacturing Process Upgrades	4,229,000	79.2%	4,653,866	56.0%	110.0%
15.01	Agriculture Energy Efficiency	65,000	1.2%	23,629	0.3%	36.4%
70.00	Commercial Pumps	0	0.0%	260	0.0%	
71.00	HVAC-Other	0	0.0%	8,069	0.1%	
99.02	Savings not Mapped to Market	0	0.0%	985,524	11.9%	
	Totals	**5,343,000**	**100.0%**	**8,312,575**	**100.0%**	**155.6%**

Red = Focus net savings are at least 66 percent of the estimated annual achievable potential
Yellow = Focus net savings are realizing 33 percent to 66 percent of the achievable potential
Green = Focus net savings are less than 33 percent of the achievable potential.

B. RESIDENTIAL MARKETS

Table 2-27 presents comparisons of Focus energy impacts and achievable potential for residential electric markets. For electric energy savings, “Incentives for CFLs” continues to be the dominant market for energy savings, accounting for nearly 55 percent of annual achievable potential. Focus savings have exceeded this potential with over 70 percent of energy savings for the 12-month period attributable to incentivized CFLs. The market with the second largest potential, “Retailer Promotion of ENERGY STAR Consumer Electronics” (14.7 percent of total kWh achievable potential), is not currently a market that Focus programs are targeting for savings. Overall, the residential programs have exceeded estimated annual potential in one market—multi-family common area lighting (direct install market). They are capturing a significant proportion of the estimated annual market potential of two other markets (at least 70 percent). “Lighting Fixtures” is a market that was not included in the *Potential Study* but accounts for about four percent of residential programs electricity savings in calendar year 2008.

Table 2-27. Comparisons of Focus Electric Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential, Residential Markets

Market ID	Market	Annual kWh Potential - High	% of kWh Potential - High	Net kWh Savings	% of kWh Savings	% of kWh Potential Achieved
16.01	ENERGY STAR Marketing	417,000	0.2%	0	0.0%	
16.02	Retailer Promotion of ENERGY STAR Consumer Electronics	31,371,000	14.7%	0	0.0%	
17.01	Incentives for CFLs	117,230,000	55.0%	82,477,559	70.2%	70.4%
18.01	Multi-family Common Area Lighting—Direct Install Market	4,744,000	2.2%	7,215,370	6.1%	152.1%
19.01	Incentives For Variable Speed Furnaces	15,242,000	7.2%	12,553,264	10.7%	82.4%
20.00	Central AC/HVAC	4,946,000	2.3%	625,923	0.5%	12.7%
21.00	Multi-family Heating System Replacement			0	0.0%	
22.00	Room AC	1,582,000	0.7%	9,422	0.0%	0.6%
23.00	Homeowner Water Heater Purchases	9,313,000	4.4%	54	0.0%	0.0%
24.01	Incentives for Energy Efficient (EE) New Home Construction	732,000	0.3%	-8,562	0.0%	-1.2%
26.01	Dehumidifier Early Retirement	2,019,000	0.9%	350	0.0%	0.0%
27.00	Direct Install Market	13,713,000	6.4%	3,480,153	3.0%	25.4%
28.00	Shell Improvements including Remodeling (25.01)	4,582,000	2.2%	322,509	0.3%	7.0%
29.01	Incentives for Homeowner Clothes Washer Purchases	4,172,000	2.0%	1,224,323	1.0%	29.3%
30.01	Multi-Family Fuel Switching	2,909,000	1.4%	0	0.0%	
81.00	Refrigerators & Freezers			0	0.0%	
82.00	Lighting Fixtures	0	0.0%	4,393,873	3.7%	
99.00	Savings not Mapped to Market			5,241,885	4.5%	
	Totals	**212,972,000**	**100.0%**	**117,536,122**	**100.0%**	**55.2%**

Red = Focus net savings are at least 66 percent of the estimated annual achievable potential
Yellow = Focus net savings are realizing 33 percent to 66 percent of the achievable potential
Green = Focus net savings are less than 33 percent of the achievable potential.

As shown in Table 2-28, the market cited by the *Potential Study* as having the greatest achievable potential for residential natural gas therm savings is "Incentives for Energy Efficient (EE) New Home Construction," estimated to contribute over 58 percent of total annual therm potential. Based on assignments of Focus measures to *Potential Study* markets, this market is now contributing close to eight percent of the savings attributable to Focus. Focus is also accomplishing significant therm savings with "Shell Improvements including Remodeling," where almost 12 percent of savings for the 2008 calendar year were realized (about 14 percent of the estimated annual potential). Focus is achieving significant savings in the "Direct Install Market," with nearly 31 percent of therm savings in the past 12 months occurring in this market (over 110 percent of the annual achievable potential).

The *Potential Study* suggests that there is important achievable potential in the "Homeowner Water Heater Purchases" market (slightly over 12 percent of total therm savings potential) where for the recent 12-month period less than one percent of Focus residential therm savings were realized.

Table 2-28. Comparisons of Focus Gas Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential, Residential Markets

Market ID	Market	Annual Therm Potential - High	% of Therm Potential - High	Net Therm Savings	% of Therm Savings	% of Therm Potential Achieved
19.01	Incentives For Variable Speed Furnaces	0	0.0%	283,760	12.6%	
21.00	Multi-family Heating System Replacement	833,000	7.1%	0	0.0%	0.0%
23.00	Homeowner Water Heater Purchases	1,344,000	11.5%	7,800	0.3%	0.6%
24.01	Incentives for Energy Efficient (EE) New Home Construction	6,884,000	58.7%	173,163	7.7%	2.5%
27.00	Direct Install Market	630,000	5.4%	693,407	30.8%	110.1%
28.00	Shell Improvements including Remodeling (25.01)	1,897,000	16.2%	265,831	11.8%	14.0%
29.01	Incentives for Homeowner Clothes Washer Purchases	140,000	1.2%	40,078	1.8%	28.6%
99.00	Savings not Mapped to Market			785,343	34.9%	
	Totals	**11,728,000**	**100.0%**	**2,249,383**	**100.0%**	**19.2%**

Red = Focus net savings are at least 66 percent of the estimated annual achievable potential
Yellow = Focus net savings are realizing 33 percent to 66 percent of the achievable potential
Green = Focus net savings are less than 33 percent of the achievable potential.

C. RENEWABLE ENERGY MARKETS

Table 2-29 provides results for comparisons of estimated achievable potential and calendar year 2008 Focus savings for renewable energy markets and their electric energy potential. This potential is dominated by "Agriculture Anaerobic Digestion," contributing almost 60 percent of total achievable potential. The technologies in this market accounted for 77 percent of savings for the past 12 months, but this was about 20 percent of the estimated annual potential. "Customer-sited, Grid-connected Solar Photovoltaics (PV)" showed a slowing since calendar year 2007 with just nearly 21 percent of the kWh savings (from over 29 percent in the previous semiannual report), but still representing almost 265 percent of the annual potential.

Table 2-29. Comparisons of Focus Electric Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential, Renewables Markets

Market ID	Market	Annual kWh Potential - High	% of kWh Potential - High	Net kWh Savings	% of kWh Savings	% of kWh Potential Achieved
31.01	Customer-sited, Grid-connected, Commercial Solar Photovoltaics (PV)	263,000	1.2%	696,469	20.8%	264.8%
32.01	Commercial Solar Thermal (Hot Water)	0	0.0%	-2,398	-0.1%	
33.01	Residential Solar Thermal (Hot Water)	333,000	1.6%	36,430	1.1%	10.9%
35.01	Customer-sited, Gird-connected, Commercial Wind Energy	7,914,000	37.5%	52,864	1.6%	0.7%
36.01	Agriculture Anaerobic Digestion	12,583,000	59.7%	2,561,384	76.6%	20.4%
	Totals	**21,093,000**	**100.0%**	**3,344,749**	**100.0%**	**15.9%**

Red = Focus net savings are at least 66 percent of the estimated annual achievable potential
Yellow = Focus net savings are realizing 33 percent to 66 percent of the achievable potential
Green = Focus net savings are less than 33 percent of the achievable potential.

Focus is obtaining nearly all of its 2008 calendar year therm savings from "Wood Residue for Commercial/Institutional Heat" projects (Table 2-30). Another lesser, but still important, source of therm potential is Commercial Solar Thermal (Hot Water), which is projected to have 22 percent of the annual therm potential, but accounted in 2008 for just two percent of the program savings.

Table 2-30. Comparisons of Focus Gas Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential, Renewables Markets

Market ID	Market	Annual Therm Potential - High	% of Therm Potential - High	Net Therm Savings	% of Therm Savings	% of Therm Potential Achieved
32.01	Commercial Solar Thermal (Hot Water)	212,000	22.0%	13,101	2.1%	6.2%
33.01	Residential Solar Thermal (Hot Water)	26,000	2.7%	3,640	0.6%	14.0%
34.01	Wood Residue for Commercial/Institutional Heat	724,000	75.3%	599,812	97.3%	82.8%
36.01	Agriculture Anaerobic Digestion	0	0.0%	0	0.0%	
	Totals	**962,000**	**100.0%**	**616,553**	**100.0%**	**64.1%**

Red = Focus net savings are at least 66 percent of the estimated annual achievable potential
Yellow = Focus net savings are realizing 33 percent to 66 percent of the achievable potential
Green = Focus net savings are less than 33 percent of the achievable potential.

3. BUSINESS PROGRAMS EVALUATION

3.1 OVERVIEW OF KEY ACTIVITIES

This chapter describes our evaluation of the Business Programs during the 18-month contract period (July 1, 2007, through December 31, 2008). This chapter summarizes the following:

- Reports delivered in the 18-month contract period
- Energy impacts
- Deemed savings review
- Channel studies
- Education and training spillover
- Further Business Programs reading
- Activities postponed to contract year 2009.

3.2 REPORTS DELIVERED IN THE 18-MONTH CONTRACT PERIOD

- Semiannual reports
  - Fiscal Year 07, Year End
  - Second Half of 2007
  - First Half of 2008
  - 18-month Contract Period, Year End
- Deemed savings review
  - Fall 2007: October 24, 2007
  - Spring 2008: May 21, 2008
  - Fall 2008: November 4, 2008
- Abbreviated FY07 Business Programs Impact Evaluation—Final memo, February 18, 2008
- Process Evaluation of the Education and Training Program—Final Report: November 20, 2008
- Impact Evaluation of the Education and Training Program—Final Report: November 20, 2008
- Business Programs Channel Studies–Fiscal Year 2008, Final Report: January 17, 2009
- Business Programs Impact Evaluation Report: First Three Quarters of the 18-month Contract Period–Final Report: January 17, 2009
- Business Programs Impact Evaluation Report: First Five Quarters of the 18-month Contract Period–Final Report: April 2, 2009.

3.3 ENERGY IMPACTS

The evaluation team has implemented eleven rounds of data collection and document review to estimate net energy savings for Business Programs. Three rounds of impact evaluation data collection were conducted during the 18MCP.

- Round 1: FY07 Abbreviated Impact Evaluation. Covers measures implemented during FY07 (July 1, 2006, through June 30, 2007).
- Round 2: First Three Quarters of 18MCP Impact Evaluation. Covers measures implemented during the first nine months for the 18MCP (July 1, 2007, through March 31, 2008). This was a full impact evaluation similar to studies conducted in previous years.
- Round 3: 18MCP Abbreviated Impact Evaluation. Covers measures implemented in the 18MCP between April 1, 2008, and September 30, 2008. This small sample of large measures was combined with the data collected during Round 2 to produce a final set of 18MCP adjustment factors for use in the final 18MCP semiannual report.

The first round of impact evaluation, Round 1, covers measures implemented during FY07. It has been summarized in previous semiannual reports and therefore is not summarized in the final 18MCP Semiannual Report. In this section, we provide a summary of the combined results of the second and third rounds of data collection, Round 2 and Round 3, conducted during the 18MCP. These results were reported in the Business Programs Impact Evaluation Report: First Five Quarters of the 18-month Contract Period–Final Report (April 2, 2009).

Following the impact evaluation summary we also provide estimates of tracked and evaluation verified savings for the program to date.

3.3.1 General approach

The impact analysis determines three adjustment factors to the savings reported by the program:

- Gross savings adjustment factor: This factor adjusts tracking gross savings for installation and changes based on engineering review. Applying the gross savings adjustment factor to tracking gross savings produces the estimate of verified gross savings.
- Attribution factor: This factor adjusts verified gross savings for program attribution.
- Realization rate: This factor combines the gross savings adjustment factor and the attribution factor. (It is the ratio of net savings to tracking gross savings.)

The definitions of these factors and the general methods for producing them have essentially remained the same for each round of impact evaluation for this program area.

3.3.2 18MCP impact evaluation

The final 18MCP impact evaluation included measures implemented between July 1, 2007, and September 2008. Data collection and document review to estimate net energy savings for Business Programs used similar procedures and protocols that have been used in the past. The adjustment factors are calculated separately for each energy unit (kWh, kW, and

therms) in combination with each sector and for Business Programs overall. The calculation of the adjustment factors uses appropriate weights corresponding to the sampling rate within each stratum. The main objective in designing the sample drawn was to provide the best possible estimates for each of the sectors and Business Programs overall.

A. RESULTS

This section provides the final results of the 18MCP impact evaluation. The results are provided by the overall program and each sector for kWh, kW, and therms in the following order.

1. Gross savings adjustment factor
2. Attribution factor
3. Realization rate.

Table 3-4 shows the 18MCP gross savings adjustment factors by sector. The gross savings adjustment factors combine the installation rates and the engineering verification factors to adjust the tracking estimate of gross savings. Overall, the gross savings adjustment factors for therm savings are particularly high this round, with Commercial at 103 percent and Industrial at 95 percent. The Business Programs overall adjustment factors for electrical savings are high, at 93 percent for both kWh and kW.

Table 3-4. 18MCP Gross Savings Adjustment Factors by Sector

	kWh						kW						Therms					
			90% Confidence Interval						90% Confidence Interval						90% Confidence Interval			
Segment	min n	Gross Savings Adjustment Factor	Relative Error (%)	+/-	Lower Bound	Upper Bound	min n	Gross Savings Adjustment Factor	Relative Error (%)	+/-	Lower Bound	Upper Bound	min n	Gross Savings Adjustment Factor	Relative Error (%)	+/-	Lower Bound	Upper Bound
Agriculture	127	95%	4.2%	4.0%	90.5%	98.5%	107	97%	2.7%	2.6%	94.3%	99.5%	25	77%	7.3%	7.3%	70.0%	84.7%
Commercial	133	91%	4.5%	4.1%	86.5%	94.7%	129	95%	4.4%	4.2%	90.9%	99.2%	26	103%	5.2%	5.2%	98.3%	108.7%
Industrial	131	93%	7.1%	6.7%	86.5%	99.8%	121	91%	10.0%	9.1%	81.5%	99.6%	38	95%	6.1%	5.8%	88.8%	100.3%
S&G	77	99%	2.6%	2.6%	96.6%	101.8%	68	95%	4.5%	4.5%	90.3%	99.3%	63	79%	13.0%	10.2%	68.4%	88.9%
Business Programs Overall	470	93%	4.2%	3.9%	89.1%	96.9%	430	93%	4.5%	4.2%	89.1%	97.5%	152	91%	4.9%	4.4%	86.4%	95.2%

The 18MCP attribution factors by sector are provided in Table 3-5. The 18MCP attribution factors for the program overall are 60 percent, 58 percent, and 52 percent for kWh, kW, and therms, respectively. Compared with the FY07 results, the kW attribution adjustment factor for the Schools & Government sector decreased from 85 percent to 46 percent. The therm adjustment factor for the Agriculture sector decreased from 46 percent to 17 percent. These decreases are statistically significant at the 95 percent confidence level. No other sector experienced a statistically significant change from the previous year.

Table 3-5. 18MCP Attribution Factors by Sector

	kWh						kW						Therms					
			90% Confidence Interval						90% Confidence Interval						90% Confidence Interval			
Segment	n	Attribution Adjustment Factor	Relative Error (%)	+/-	Lower Bound	Upper Bound	n	Attribution Adjustment Factor	Relative Error (%)	+/-	Lower Bound	Upper Bound	n	Attribution Adjustment Factor	Relative Error (%)	+/-	Lower Bound	Upper Bound
Agriculture	126	60%	14.2%	8.4%	51.1%	68.0%	107	57%	18.7%	10.6%	46.1%	67.4%	22	17%	8.5%	8.5%	8.1%	25.2%
Commercial	131	70%	12.1%	8.4%	61.1%	77.9%	126	69%	13.9%	9.6%	59.6%	78.9%	26	33%	12.7%	12.7%	20.5%	45.8%
Industrial	130	57%	12.9%	7.4%	49.8%	64.6%	124	54%	14.0%	7.5%	46.2%	61.3%	38	63%	11.6%	7.3%	56.0%	70.7%
S&G	77	43%	26.6%	11.4%	31.5%	54.4%	68	46%	14.1%	14.1%	31.8%	59.9%	62	38%	30.2%	11.5%	26.7%	49.7%
Business Programs Overall	464	60%	8.4%	5.0%	54.6%	64.5%	425	58%	9.0%	5.2%	53.0%	63.4%	148	52%	11.9%	6.2%	46.2%	58.6%

Table 3-6 shows the 18MCP realization rates by sector. The realization rates combine the effect of the gross savings adjustment factors and the attribution factors.

Table 3-6. 18MCP Realization Rates by Sector

	kWh						kW						Therms					
			90% Confidence Interval						90% Confidence Interval						90% Confidence Interval			
Segment	min n	Realization Rate	Relative Error (%)	+/-	Lower Bound	Upper Bound	min n	Realization Rate	Relative Error (%)	+/-	Lower Bound	Upper Bound	min n	Realization Rate	Relative Error (%)	+/-	Lower Bound	Upper Bound
Agriculture	126	56%	14.8%	8.3%	48.0%	64.6%	107	55%	18.9%	10.4%	44.6%	65.4%	22	13%	6.7%	6.7%	6.2%	19.6%
Commercial	131	63%	12.9%	8.1%	54.9%	71.1%	126	66%	14.6%	9.6%	56.2%	75.4%	26	34%	13.2%	13.2%	21.1%	47.5%
Industrial	130	53%	14.8%	7.9%	45.4%	61.1%	121	49%	17.2%	8.4%	40.3%	57.1%	38	60%	13.1%	7.8%	52.1%	67.8%
S&G	77	43%	26.7%	11.4%	31.2%	54.0%	68	43%	13.5%	13.5%	30.0%	57.0%	62	30%	32.9%	9.9%	20.2%	39.9%
Business Programs Overall	464	55%	9.3%	5.2%	50.2%	60.5%	425	54%	10.0%	5.4%	48.9%	59.8%	148	48%	12.8%	6.1%	41.5%	53.7%

3.3.3 Verified tracked energy impacts

The estimates of the adjustment factors by sector are used to calculate verified gross savings and net savings. Multiplying tracking gross savings by the gross savings adjustment factor (which is the product of the installation rate and the engineering verification factor) alone yields verified gross savings.

For the 18-month contract period (July 1, 2007, through December 31, 2008), Table 3-7a gives tracking and verified gross savings and net savings by sector and for Business Programs overall. These estimates are based on the savings tracked for this period with the final 18MCP adjustment factors. That is, the estimates of the adjustment factors by sector reported in the *Business Programs Impact Evaluation Report: First Five Quarters of the 18-month Contract Period–Final Report* (April 2, 2009).

Figure 3-1. Electric Energy Impacts by Program, Business Programs The 18-month Contract Period (July 1, 2007–December 31, 2008)

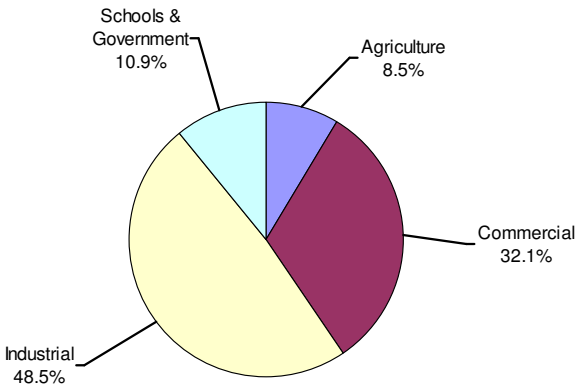


Figure 3-2. Electric Energy Impacts by Program, Business Programs, Program to Date (July 1, 2001–December 31, 2008)

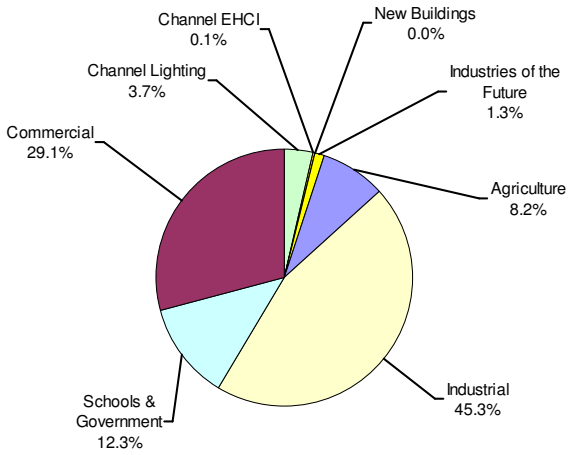


Figure 3-3. Gas Energy Impacts by Program, Business Programs The 18-month Contract Period (July 1, 2007–December 31, 2008)

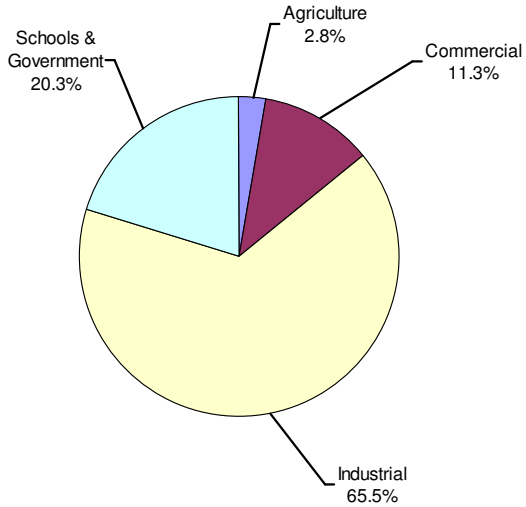


Figure 3-4. Gas Energy Impacts by Program, Business Programs, Program to Date (July 1, 2001–December 31, 2008)

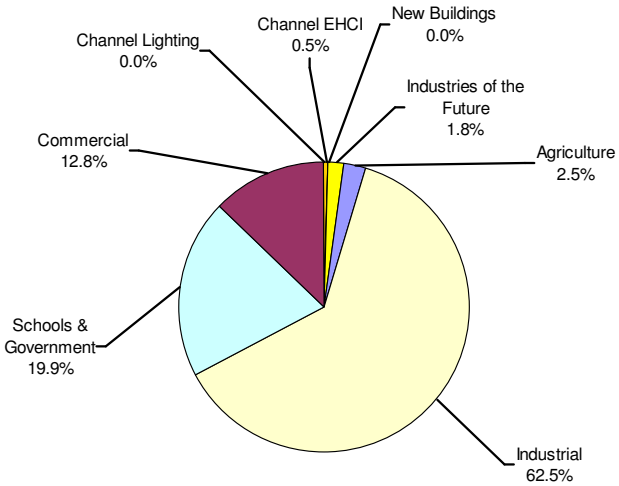


Table 3-7a. All Business Programs: Tracked Energy Impacts
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	36,210,808	9,000	743,242	34,400,760	8,730	572,423	20,282,390	4,950	96,765
Commercial	142,325,359	34,849	2,219,877	129,516,400	33,106	2,286,481	89,666,305	23,000	754,854
Industrial	210,790,015	34,274	13,967,554	196,034,714	31,189	13,269,176	111,718,708	16,794	8,380,532
Schools & Government	44,327,423	13,164	5,215,114	43,884,149	12,362	4,119,940	19,060,792	5,596	1,564,534
Total	**433,653,604**	**91,286**	**22,145,786**	**403,836,023**	**85,387**	**20,248,021**	**240,728,194**	**50,340**	**10,796,685**

Tables 3-7b through 3-7g provide tracking and verified gross savings and net savings by program and for Business Programs overall for FY07 through FY02 (program start through June 30, 2002), respectively. Adjustment factors determined from the earlier rounds of similar data collection and analysis are used to calculate the savings for each of these program years. Estimates of the adjustment factors used to calculate verified gross savings and net savings for the earlier years are provided in the following reports:

- FY02: Volume III, Impact Evaluation of the Business Programs Comprehensive Report, December 23, 2002
- FY03: Business Programs Impact Evaluation Report—Contract Year 2 Complete, January 14, 2004
- FY04: Business Programs Impact Evaluation Report—Year 3, Round 1, June 17, 2004
- FY05: Business Programs Impact Evaluation Report—FY05, Round 1, September 9, 2005
- FY06: Business Programs Impact Evaluation Report—FY06, March 2, 2007
- FY07: Abbreviated FY07 Business Programs Impact Evaluation—Final memo, February 18, 2008.

Table 3-7b. All Business Programs: Tracked Energy Impacts
FY07 (July 1, 2006–June 30, 2007)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	19,695,023	5,304	756,579	16,346,869	4,349	597,698	10,044,462	2,387	272,369
Commercial	51,718,124	11,740	1,489,990	51,200,942	11,740	1,266,491	37,237,049	8,923	566,196
Industrial	62,493,680	10,529	7,828,273	61,868,743	10,423	7,749,990	35,621,398	5,580	4,931,812
Schools & Government	23,223,397	5,887	3,584,081	21,597,759	5,769	1,899,563	15,559,676	4,886	1,039,384
Total	**157,130,223**	**33,460**	**13,658,924**	**151,014,314**	**32,282**	**11,513,743**	**98,462,584**	**21,776**	**6,809,760**

Table 3-7c. All Business Programs: Tracked Energy Impacts
FY06 (July 1, 2005–June 30, 2006)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	10,369,653	2,556	169,600	10,784,342	2,377	162,816	5,495,867	1,048	98,368
Channel EHCI	720,371	650	363,389	719,198	671	336,265	266,434	291	284,833
Channel Lighting	44,213,387	10,825	2,572	40,419,017	10,361	2,526	29,282,846	7,778	1,589
Commercial	25,077,211	3,442	1,400,525	24,973,534	3,523	1,367,959	14,995,143	2,038	694,238
Industrial	36,665,838	6,497	5,203,226	40,408,104	7,000	5,261,531	32,213,745	5,358	1,951,784
Schools & Government	14,865,393	4,397	2,535,132	14,558,875	4,376	2,287,500	9,443,240	2,530	1,334,962
Total	**131,911,853**	**28,366**	**9,674,445**	**131,863,071**	**28,309**	**9,418,597**	**91,697,275**	**19,042**	**4,365,774**

Table 3-7d. All Business Programs: Tracked Energy Impacts
FY05 (July 1, 2004–June 30, 2005)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	15,305,374	3,661	263,585	9,701,733	2,195	262,224	5,629,513	1,059	96,640
Commercial	44,218,407	9,810	1,018,331	30,703,691	6,532	920,120	18,924,532	3,872	275,075
Industrial	67,588,254	9,543	3,982,640	54,234,559	8,270	4,228,658	23,555,437	3,162	2,140,696
Schools & Government	16,595,676	4,068	1,780,566	16,078,481	3,908	1,695,159	7,751,733	1,879	951,559
Total	**143,707,711**	**27,083**	**7,045,122**	**110,718,465**	**20,906**	**7,106,161**	**55,861,214**	**9,972**	**3,463,969**

Table 3-7e. All Business Programs: Tracked Energy Impacts
FY04 (July 1, 2003–June 30, 2004)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	16,000,309	3,541	81,250	11,105,756	2,876	63,415	5,889,700	1,551	53,368
Commercial	42,261,364	9,348	589,867	37,837,194	9,631	589,498	19,906,541	5,516	509,922
Industrial	80,264,260	11,793	8,611,077	69,713,833	7,524	10,127,720	40,260,298	4,114	8,828,403
Schools & Government	17,944,782	3,925	2,357,577	18,707,821	3,513	1,832,653	13,878,904	2,007	1,223,059
Total	**156,470,715**	**28,607**	**11,639,771**	**137,364,604**	**23,544**	**12,613,286**	**79,935,444**	**13,187**	**10,614,752**

Table 3-7f. All Business Programs: Tracked Energy Impacts
FY03 (July 1, 2002–June 30, 2003)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	7,129,148	1,805	61,754	6,716,282	1,722	58,897	3,905,035	1,134	51,166
Commercial	39,232,419	9,479	1,869,698	36,381,429	7,868	1,875,705	17,650,457	4,634	1,550,456
Industrial	54,297,607	7,855	1,686,471	56,649,270	7,697	1,759,518	21,358,513	2,956	915,699
Industries of the Future	15,295,186	1,638	1,190,100	14,262,206	1,628	1,235,975	9,899,931		833,046
Schools & Government	13,860,356	2,576	1,450,431	14,314,442	2,470	1,266,154	9,669,313	1,826	292,211
Total	129,814,716	23,353	6,258,454	128,323,629	21,385	6,196,249	62,483,249	10,551	3,642,577

Table 3-7g. All Business Programs: Tracked Energy Impacts
FY02 (July 1, 2001–June 30, 2002)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
Agriculture	931,679	278	1,319	957,662	249	1,316	438,982	91	466
Commercial	7,989,934	1,947	1,359,460	7,929,764	1,287	491,392	3,949,903	613	173,848
Industrial	16,115,405	2,525	866,495	16,618,938	4,083	631,758	11,800,434	3,027	399,772
New Buildings	143,000	113	18,049	143,000	113	18,049	143,000	46	0
Schools & Government	5,379,917	2,102	515,218	4,882,794	1,304	598,213	2,432,174	621	211,640
Total	30,559,935	6,966	2,760,541	30,532,158	7,036	1,740,729	18,764,493	4,397	785,725

3.3.4 Verified tracked energy impacts by technology/end-use categories and business programs sector (verified gross)

The following tables present the verified gross energy impacts for Business Programs by sector (agricultural, commercial, industrial, and schools/government) for July 1, 2007, through December 31, 2008. The tables also include a column that displays the percentage of total kWh, kW, or therm savings that comes from each technology or end-use category. The tables for each sector break out the savings for that sector by measure category and indicate the percent of savings that measure category accounts for in that sector.

A. AGRICULTURAL

Table 3-8. Agricultural
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Ag Specialty	2,595,169	7.5%	634	7.3%	390,429	68.2%
Air Conditioning Unit	1,399	0.0%	3	0.0%	0	
Appliance-Other	329,459	1.0%	25	0.3%	-119	
Biomass	100,222	0.3%	4	0.0%	0	
Boiler Equipment	61,407	0.2%	4	0.0%	4,623	0.8%
Boiler Service	0		0		156	0.0%
Building Shell	4,540	0.0%	0		7,794	1.4%
Ceiling Fan	333	0.0%	0		0	
CFL	11,206,951	32.6%	2,943	33.7%	0	
Clothes Washers	1,399	0.0%	0		0	
Clothes Washers Tier 2	5,355	0.0%	0		32	0.0%
Clothes Washers Tier 3	4,502	0.0%	0		115	0.0%
Compressor Equipment	146,874	0.4%	37	0.4%	0	
Compressor Service	28,443	0.1%	4	0.0%	0	
Controls	51,624	0.2%	6	0.1%	0	
Custom	41,038	0.1%	29	0.3%	0	
Energy Recovery	2,909,922	8.5%	801	9.2%	17,988	3.1%
Fan	4,113,153	12.0%	1,241	14.2%	0	
Furnace	694	0.0%	0		173	0.0%
Greenhouse	102,124	0.3%	4	0.0%	136,368	23.8%
High Bay Fluorescent	781,505	2.3%	165	1.9%	0	

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Hot Water	999,356	2.9%	143	1.6%	3,320	0.6%
HVAC	1,984,886	5.8%	676	7.7%	-1,465	
Lighting Fixture	56,590	0.2%	15	0.2%	0	
Lighting-Other	1,234,212	3.6%	265	3.0%	0	
Motors & Drives	4,249,110	12.4%	1,145	13.1%	0	
Non-CFL	53,694	0.2%	0		0	
Other	256,060	0.7%	38	0.4%	70	0.0%
Refrigeration	347,606	1.0%	106	1.2%	0	
Renewable	0		0		248	0.0%
Steam Trap	0		0		11,610	2.0%
T8/T5 Fluorescent Lighting	469,490	1.4%	121	1.4%	0	
Timer	4,446	0.0%	0		0	
Water Heating	2,259,196	7%	323	4%	1,081	0%
Total	**34,400,760**	**100%**	**8,730**	**100%**	**572,423**	**100%**

B. COMMERCIAL

Table 3-9. Commercial
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Air Conditioning	166,350	0.1%	11	0.0%	0	
Air Conditioning Unit	1,330,609	1.0%	1,284	3.9%	4,137	0.2%
Air Sealing	0		0		1,684	0.1%
Appliance-Other	657	0.0%	0		23,726	1.0%
Boiler Equipment	69,891	0.1%	0		625,085	27.3%
Boiler Service	0		0		343,850	15.0%
Building Shell	298,317	0.2%	83	0.3%	270,812	11.8%
CFL	51,175,825	39.5%	15,169	45.8%	0	
Chiller Equipment	1,559,158	1.2%	666	2.0%	0	
Chiller Service	2,821,672	2.2%	2,367	7.1%	0	
Clothes Washer	4,543	0.0%	0		295	0.0%
Clothes Washers	1,340	0.0%	0		42	0.0%
Clothes Washers Tier 2	1,450	0.0%	0		50	0.0%
Clothes Washers Tier 3	2,142	0.0%	0		89	0.0%
Compressor Equipment	183,158	0.1%	43	0.1%	0	
Compressor Service	1,239	0.0%	1	0.0%	0	
Controls	13,152,104	10.2%	1,126	3.4%	79,481	3.5%
Dehumidifier	45,635	0.0%	22	0.1%	-2,536	
Economizer	150,993	0.1%	3	0.0%	0	
Energy Recovery	605,013	0.5%	153	0.5%	196,905	8.6%
Fan	30,344	0.0%	34	0.1%	13,913	0.6%
Food Service	838,045	0.6%	158	0.5%	48,434	2.1%
Fuel Switching	52,223	0.0%	0		-2,082	
Furnace	120,169	0.1%	8	0.0%	37,364	1.6%
Geothermal	30,989	0.0%	15	0.0%	20,178	0.9%

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
High Bay Fluorescent	22,290,267	17.2%	5,549	16.8%	0	
Hot Water	208,645	0.2%	19	0.1%	43,923	1.9%
HVAC	2,619,356	2.0%	488	1.5%	213,068	9.3%
Infrared Heater	0		0		7,168	0.3%
Lighting Fixture	223,833	0.2%	67	0.2%	0	
Lighting-LED	850,450	0.7%	99	0.3%	0	
Lighting-Other	9,322,279	7.2%	2,193	6.6%	0	
Motors & Drives	2,127,928	1.6%	331	1.0%	0	
Other	91,380	0.1%	4	0.0%	39,079	1.7%
Pre-Rinse Sprayer	871	0.0%	0		0	
Process	352,031	0.3%	34	0.1%	3,188	0.1%
Reconfigure Equipment	659,381	0.5%	155	0.5%	0	
Refrigeration	9,487,777	7.3%	950	2.9%	0	
Refrigerator / Freezer	98,923	0.1%	46	0.1%	0	
Scheduling	8,713	0.0%	0		0	
Showerhead	40,377	0.0%	0		24,385	1.1%
Steam Trap	58,498	0.0%	11	0.0%	175,688	7.7%
Strip Curtain	90,032	0.1%	0		0	
T8/T5 Fluorescent Lighting	6,635,805	5.1%	1,613	4.9%	0	
Torchiere	2,541	0.0%	0		0	
Unit Heater	0		0		4,290	0.2%
Vending Machine	120,116	0.1%	16	0.0%	0	
Water Heating	29,922	0.0%	3	0.0%	32,296	1.4%
Whole Building	1,546,600	1%	384	1%	77,571	3%
Zoning	8,811	0%	0		4,398	0%
Total	**129,516,400**	**100%**	**33,106**	**100%**	**2,286,481**	**100%**

C. INDUSTRIAL

Table 3-10. Industrial
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Aeration System	4,883,979	2.5%	173	0.6%	0	
Air Conditioning Unit	93,777	0.0%	159	0.5%	11,093	0.1%
Air Curtain	9,516	0.0%	5	0.0%	0	
Appliance-Other	103,872	0.1%	0		0	
Boiler Equipment	-2,862,464		17	0.1%	1,320,068	9.9%
Boiler Service	0		0		436,588	3.3%
Building Shell	48,975	0.0%	0		196,580	1.5%
Burner	0		0		38,936	0.3%
CFL	487,703	0.2%	86	0.3%	0	
Chiller Equipment	3,057,021	1.6%	435	1.4%	0	
Chiller Service	810,084	0.4%	619	2.0%	0	
Compressor Equipment	20,703,863	10.6%	2,977	9.5%	28,603	0.2%
Compressor Service	15,715,569	8.0%	2,273	7.3%	52,262	0.4%

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Computer Management	613,800	0.3%	0		0	
Controls	9,915,259	5.1%	1,438	4.6%	1,333,986	10.1%
Direct Fired Heating	0		0		17,781	0.1%
Door	0		0		12,921	0.1%
Energy Recovery	2,307,919	1.2%	424	1.4%	3,784,912	28.5%
Fan	0		0		1,568	0.0%
Filtration	-588,605		-107		161,009	1.2%
Food Service	1,326	0.0%	0		0	
Furnace	-260,477		-30		473,466	3.6%
Geothermal	-9,494		1	0.0%	1,478	0.0%
High Bay Fluorescent	72,322,442	36.9%	13,642	43.7%	0	
Hot Water	0		0		37,446	0.3%
HVAC	2,825,839	1.4%	420	1.3%	608,225	4.6%
Infrared Heater	0		0		28,214	0.2%
Lighting Fixture	8,160	0.0%	1	0.0%	0	
Lighting-LED	94,256	0.0%	11	0.0%	0	
Lighting-Other	7,132,856	3.6%	974	3.1%	0	
Motors & Drives	30,159,996	15.4%	3,614	11.6%	23,652	0.2%
Other	1,988,044	1.0%	240	0.8%	86,270	0.7%
Process	12,672,700	6.5%	1,380	4.4%	2,977,153	22.4%
Process Heat	-185,483		-61		1,165,659	8.8%
Pulping	1,675,096	0.9%	193	0.6%	0	
Pump	78,755	0.0%	39	0.1%	0	
Reconfigure Equipment	51,450	0.0%	16	0.1%	0	
Refrigeration	3,017,513	1.5%	498	1.6%	0	
Refrigerator / Freezer	645,170	0.3%	72	0.2%	0	
Specialty Pulp & Paper	4,010,210	2.0%	444	1.4%	0	
Steam Trap	9,052	0.0%	2	0.0%	323,637	2.4%
T8/T5 Fluorescent Lighting	3,643,500	1.9%	704	2.3%	0	
Vending Machine	11,702	0%	1	0%	0	
Water Heating	4,291	0%	1	0%	43	0%
Whole Building	837,543	0%	529	2%	147,629	1%
Total	**196,034,714**	**100%**	**31,189**	**100%**	**13,269,176**	**100%**

D. SCHOOLS/GOVERNMENT

Table 3-11. Schools/Government
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Ag Specialty	0		0		1,657	0.0%
Air Conditioning Unit	62,955	0.1%	97	0.8%	932	0.0%
Air Sealing	0		0		386	0.0%
Appliance-Other	46,778	0.1%	20	0.2%	2,597	0.1%
Boiler Equipment	43,531	0.1%	2	0.0%	559,345	13.6%
Boiler Service	0		0		1,966,447	47.7%

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Building Shell	77,685	0.2%	0		310,012	7.5%
CFL	10,853,088	24.7%	2,464	19.9%	0	
Chiller Equipment	1,013,932	2.3%	642	5.2%	0	
Chiller Service	3,343,747	7.6%	2,588	20.9%	0	
Compressor Equipment	26,648	0.1%	4	0.0%	0	
Compressor Service	105,023	0.2%	23	0.2%	0	
Computer Management	99,000	0.2%	0		0	
Controls	2,248,102	5.1%	673	5.4%	207,354	5.0%
Direct Fired Heating	0		0		672	0.0%
Door	0		0		545	0.0%
Energy Recovery	5,470	0.0%	0		17,967	0.4%
Food Service	219,017	0.5%	49	0.4%	14,681	0.4%
Fuel Switching	9,258	0.0%	19	0.2%	-303	
Furnace	20,520	0.0%	1	0.0%	4,749	0.1%
Geothermal	-435,796		19	0.2%	76,237	1.9%
High Bay Fluorescent	6,604,093	15.0%	1,440	11.6%	0	
Hot Water	26,191	0.1%	15	0.1%	14,246	0.3%
HVAC	3,167,690	7.2%	1,414	11.4%	173,566	4.2%
Infrared Heater	0		0		895	0.0%
Lighting Fixture	9,404	0.0%	2	0.0%	0	
Lighting-LED	2,676,739	6.1%	297	2.4%	0	
Lighting-Other	5,314,446	12.1%	1,145	9.3%	0	
Motors & Drives	2,917,968	6.6%	146	1.2%	683	0.0%
Other	59,529	0.1%	26	0.2%	38,930	0.9%
Process	19,768	0.0%	0		0	
Reconfigure Equipment	93,178	0.2%	27	0.2%	60,058	1.5%
Refrigerator / Freezer	18,747	0.0%	2	0.0%	0	
Scheduling	31,139	0.1%	0		5,096	0.1%
Steam Trap	90,110	0.2%	14	0.1%	620,554	15.1%
T8/T5 Fluorescent Lighting	4,714,741	10.7%	1,033	8.4%	0	
Unit Heater	0		0		2,533	0%
Vending Machine	46,092	0%	0		0	
Water Heating	17,623	0%	8	0%	14,744	0%
Whole Building	337,733	1%	190	2%	25,357	1%
Total	**43,884,149**	**100%**	**12,362**	**100%**	**4,119,940**	**100%**

3.3.5 Program targets and accomplishments

Gross program savings as verified by evaluation are shown in the following table along with the program goals and percentage of goal achieved. Savings shown are as of December 31, 2008, the entirety of the 18-month target period. The Table 3-12 presentation of verified net savings includes (for the first time) the untracked attributable savings resulting from the Impact Evaluation of the Education and Training program (see Sections 2.2. and 3.6). These savings are added to the net values for total business programs (i.e., are not broken out by program).

Table 3-12. Net Business Program Savings versus Business Program Portfolio Targets The 18-month Contract Period (July 1, 2007–December 31, 2008)

	kWh			kW			Therms		
Program	Target	Net	% of 18-month Target	Target	Net	% of 18-month Target	Target	Net	% of 18-month Target
Agriculture	30,000,000	20,282,390	68%	6,375	4,950	78%	750,000	96,765	13%
Commercial	87,750,000	89,666,305	102%	18,375	23,000	125%	1,050,000	754,854	72%
Industrial	127,500,000	111,718,708	88%	18,750	16,794	90%	6,000,000	8,380,532	140%
Schools & Government	27,000,000	19,060,792	71%	7,500	5,596	75%	2,700,000	1,564,534	58%
Total Business Programs	**272,250,000**	**249,676,541**	**92%**	**51,000**	**52,787**	**104%**	**10,500,000**	**14,614,956**	**139%**

* The Total Business Programs values for net kWh, kW, and therms include the Education and Training program untracked attributable savings. Thus, the program-specific net values do not sum to the totals.

3.4 DEEMED SAVINGS

The deemed savings work is an ongoing collaborative effort between the Focus Program, KEMA, and the We Energies evaluation team. In 2006, the evaluation teams developed a database of deemed kW and kWh values for prescriptive measures that are included in the statewide programs and We Energies' Nonresidential Prescriptive Rebate and Comprehensive Agriculture programs. Subsequent to this initial effort, KEMA has taken the lead in reviewing measures with therm savings.

Each round prior to the Public Service Commission of Wisconsin's (PSCW) approval of the final database of deemed values, the evaluation teams and the implementers reach consensus on discrepancies that arise during the implementers review of the draft database. Two rounds of deemed savings work was conducted in FY07. The first round was completed in October 2006 and the second in April 2007.

The *Contract Period One Detailed Evaluation Plan* included one round of deemed savings review. This round was planned for fall 2008, with the updated values taking effect on January 1, 2009. Following discussions with the program, the PSCW directed KEMA to implement three rounds of deemed savings review during this 18-month contract period.

- The first round was completed in October 2007, with the values applied retroactively to the start of the current contract period (i.e., July 1, 2007).
- The second round was completed in May 2008, with the values applied to any energy savings measure installed on May 1, 2008, or afterwards.
- The third round was completed in November 2008, with values applied to any energy savings measure installed on February 2, 2009, or afterwards.

Table 3-13 provides a summary of the 247 measures[11] included in the review and approved by the PSC.

[11] A measure is defined at the WISeerts tech code level. WISeerts is the statewide energy efficiency tracking database developed and managed by the PSC.

Table 3-13. Measure Categories Reviewed and Approved by the PSCW

Measure Group	Measure Category	# WISeerts Tech Codes			
		Round 1	Round 2	Round 3	Total
Boilers & Burners	Boiler	15	2	14	31
	Steam Trap		4		4
	Tune-Up		1		1
	Controls			2	2
Food Service	Dishwasher, Commercial		20		20
	Refrigerator / Freezer, Commercial		12		12
	Steamer		1		1
HVAC	Fan		9		9
	Furnace		11		11
	Packaged Terminal Unit (PTAC, PTHP)		16		16
	Rooftop Unit / Split System AC		66		66
	Steam Trap		1		1
Plug Loads	Vending Machine		2		2
Process	Specialty Pulp & Paper		1		1
Refrigeration	Controls		5		5
	Motor		2		2
	Refrigerated Case Door		3	1	4
Lighting	Controls		1	4	5
	Fluorescent, Compact (CFL)		1		1
	Fluorescent, Linear		18	1	19
	High Intensity Discharge (HID)		3		3
	Light Emitting Diode (LED)			2	2
Total		**15**	**179**	**53**	**247**

3.5 CHANNEL STUDIES

The *Channel Studies—Fiscal Year 2008* report (*Channel Studies*) provides baseline estimates for the Focus on Energy Business Program market effect contract metrics and investigates other potential indicators of program market effects.

3.5.1 Metric baseline approach

The program administrator's contract metrics are contractual requirements for the program administrator. The contract metrics have included both operational metrics that can be tracked by the program and verified by evaluation, and market effects metrics. On the operational side, evaluation's primary role is to verify gross savings tracked by the program. Other operational metrics are reported by the program based on their own tracking and are not verified by evaluation. Market effects metrics relate to program effects that are not directly tracked by the program. The attainment of contract market effect metrics provides an indication that the program is on track with its program theory. It is not an indication that there is additional energy savings beyond what is tracked by the program.

The program administrator is focusing on four specific technologies within its channel initiatives. The channels and selected technologies are shown in Table 3-14.

Table 3-14. Contract Metric Channel Technologies

Channel	Technology
Lighting	High bay fluorescent lighting systems
BP HVAC	High efficiency rooftop units
Rotary	VFD controlled compressed air systems
	VFD controlled industrial pumps and fans

KEMA estimated the contract metric baseline values and probed supply-side effects and other forms of spillover using the results of the surveys of key market actors in each channel under consideration. The rationale for the selection of each market actor is provided in Table 3-15.

Table 3-15. Market Actors Surveyed

Channel	Market Actor	Rationale for Selected Market Actor
Lighting	Lighting installation contractors	Contractors were selected because they are more knowledgeable than lighting distributors about where lamps are installed. In addition, contractors can provide better market-level data than can end-users.
BP HVAC	HVAC distributors	Distributors were chosen because they are particularly knowledgeable about rooftop unit (RTU) sales. In a typical year, HVAC contractors are not active enough to provide reliable market penetration estimates and for this reason were not selected as survey subjects.
Rotary	Industrial end users	Distributors are normally unaware of specific VFD applications. While vendors/contractors are more knowledgeable about VFD applications, they are a diverse group and difficult to identify. Only end-users are both knowledgeable about VFD applications and readily identifiable and were therefore selected for surveys.

In order to establish contract metric baseline values, assess significant differences between Wisconsin and Illinois, and conduct preliminary research on supply-side effects, the evaluation team created detailed surveys targeting key market participants. Actors from each channel were surveyed in Wisconsin and Illinois using the computer-assisted telephone interview (CATI) approach, so that a total six surveys were conducted. Although two contract metrics were identified for VFDs, one pertaining to compressed air systems and the other to pump and fan systems, because both concern the rotary channel, a single survey encompassing both metrics was carried out in each state. All six surveys asked respondents about developments over the preceding twelve months, as opposed to the year 2007. This timeframe was selected in order to take advantage of the most recent and accurate market information available.

These six surveys were used to establish baseline values for the contract metrics. KEMA used a ratio estimation approach to estimating market share indicators from contractor and vendor survey results. The basic rationale for this approach is that, for a variety of reasons, there exists large variation in the annual number of projects or unit sales by establishments in a given size stratum (as defined by number of employees). An estimate of market share based simply on the average of responses given (with appropriate stratum weights) would be highly inaccurate. The ratio estimation approach introduces the number of projects completed by the sample establishments directly into the computation of the market share indicator.

This approach permitted comparisons of efficiency improvements between Wisconsin and Illinois, and will permit temporal comparisons to be drawn in the future. The ultimate goal of these measurements is to determine whether the program is making progress along the route mapped out by the program logic.

The surveys were also used to assess indirect market effects generated by the program. Questions were posed to actors in all three channels in an attempt to determine the extent to which the program is having an untracked effect on the market. In conducting research into such indirect impacts, the appropriate first step is to probe the existence and character of any indirect effects occurring in the marketplace, as a prelude to further investigation. Therefore, this component of the evaluation was intended as an exploratory study of potential untracked market effects.

3.5.2 Metric baseline results

Contract metrics were operationalized, measured, and compared for the Lighting, BP HVAC, and Rotary Channels. In what follows, the major findings regarding primary and supplementary metrics are presented.

A. LIGHTING CHANNEL METRIC

The program selected high-bay fluorescent lighting as the subject of the Lighting Channel market effect contract metric. The program has marketed and promoted high-bay fluorescent lighting for the past seven years and plans to continue these efforts. Program activities have included prescriptive incentives, training, and distribution of information. As shown in Table 3-16, the program contract defines the "critical metric" as follows, "Increase in net Wisconsin market share of high-bay fluorescent lighting systems across all market segments compared to any increase in net market share for Illinois baseline, and to standard HID technology." The evaluation developed indicators of this metric through a survey of electrical contractors who install commercial lighting.

Table 3-16. Lighting Contract Metric Baseline Approach

Channel	Critical Metric	Summary of Operational Definition
Lighting	Increase in net Wisconsin market share of high-bay fluorescent lighting systems, across all market segments, compared to any increase in net market share from Illinois baseline, and to standard HID technology.	Percentage of projects installed high-bay lighting Percentage of high-bay *recommended* fluorescent over HID Percentage of high-bay *installed* fluorescent over HID

Tables 3-17 and 3-18 present the metrics baselines estimates for Wisconsin and Illinois, respectively. Table 3-17 shows that, on average, contractors in Wisconsin installed high-bay lighting equipment in 28 percent of the commercial and industrial lighting projects completed over the previous twelve months. Wisconsin lighting contractors recommended fluorescent as opposed to HID fixtures in an average 69 percent of these high-bay lighting projects, and actually installed fluorescent as opposed to HID fixtures in an average 72 percent of such projects.[12]

[12] Installation rates may surpass recommendation rates in cases where customers instruct lighting contractors to install efficient equipment without having received a contractor recommendation.

Table 3-17. Lighting Channel Metric Baselines: Wisconsin

Wisconsin					
				90% Confidence Interval	
Operational Definition	n	Baseline Estimate	Standard Error	Lower Bound	Upper Bound
Percent of C&I lighting projects completed in past 12 months with high-bay lighting installation	60	28%	9.1%	12.9%	43.4%
Percent of high-bay lighting projects for which fluorescent as opposed to HID fixtures were recommended	59	69%	10.4%	52.0%	86.7%
Percent of high-bay lighting projects for which fluorescent as opposed to HID fixtures were installed	59	72%	9.0%	57.3%	87.3%

Table 3-18 indicates that Illinois contractors performed high-bay lighting installations in 25 percent of completed projects. Illinois firms recommended fluorescent fixtures in 51 percent of applicable projects. The rate of fluorescent fixture installation in Illinois was 28 percent.

Table 3-18. Lighting Channel Metric Baselines: Illinois

Illinois					
				90% Confidence Interval	
Operational Definition	n	Baseline Estimate	Standard Error	Lower Bound	Upper Bound
Percent of C&I lighting projects completed in past 12 months with high-bay lighting installation	57	25%	4.5%	17.1%	32.0%
Percent of high-bay lighting projects for which fluorescent as opposed to HID fixtures were recommended	57	51%	11.5%	32.1%	70.7%
Percent of high-bay lighting projects for which fluorescent as opposed to HID fixtures were installed	57	28%	9.2%	12.4%	43.2%

While contract metric baseline values for high-bay lighting installation rates and fluorescent fixture recommendation rates were comparable in Wisconsin and Illinois, baseline values for fluorescent fixture installation rates differed significantly. Specifically, the difference between the states' fluorescent fixture installation rates, with Wisconsin contractors installing efficient fixtures at a 44-percentage-point higher level than Illinois contractors, was statistically significant at the one-percent level (p-value = 0.0005). This stands as strong evidence that fluorescent lighting systems account for a substantially larger share of the high-bay lighting market in Wisconsin than in Illinois. Given that the existence of the Business Programs is one of the major differences between these two markets, it is reasonable to infer that Focus on Energy is at least partially responsible for the higher market share of high-bay fluorescent fixtures in Wisconsin.

B. BP HVAC METRIC

The program selected high efficiency rooftop units as the subject of the BP HVAC Channel market effect contract metric. The program has promoted this technology for many years through prescriptive incentives, training, and the distribution of information. The program decided to intensify its promotion of this technology in FY08 with two important changes. The program tripled the incentive and transferred the focus of its marketing efforts to promote the technology from the end-use customers to the trade allies. As shown in Table 3-19 the program contract defines the "critical metric" as follows, "Increase in net Wisconsin market share of high efficiency rooftop units in commercial, school, and government buildings, in comparison to increase in net market share from [the] Illinois baseline."

Table 3-19. HVAC Contract Metric Baseline Approach

Channel	Critical Metric	Summary of Operational Definition
BP HVAC	Increase in net Wisconsin market share of high efficiency rooftop units in commercial, school and government buildings, in comparison to increase in net market share from Illinois baseline.	Percentage of packaged commercial rooftop HVAC units sold that meet program efficiency standards

Tables 3-20 and 3-21 present the metric baseline estimates for Wisconsin and Illinois, respectively. In Wisconsin, for rooftop units smaller than 65 MBh/5.4 tons, 62 percent of units sold met program efficiency standards. For units between 65 MBh/5.4 tons and 134 MBh/11.25 tons, 41 percent of sales met program efficiency standards. For units between 135 MBh/11.25 tons and 239 MBh/20 tons, 36 percent of units sold met program efficiency standards, and for units between 240 MBh/20 tons and 749 MBh/62.4 tons, 29 percent of sales met program efficiency standards.

Table 3-20. BP HVAC Channel Metric Baselines: Wisconsin

Wisconsin						
					90% Confidence Interval	
Operational Definition	Size Category/ Efficiency Rating	n	Baseline Estimate	Standard Error	Lower Bound	Upper Bound
Percent of sold units that meet program efficiency standards.	<65 MBh or <5.4 tons (11.6 EER or higher)	24	62%	9.2%	46.2%	77.7%
	65 - 134 MBh or 5.4 - 11.25 tons (11.5 EER or higher)	22	41%	9.1%	25.3%	56.7%
	135 - 239 MBh or 11.25 - 20 tons (11.5 EER or higher)	19	36%	4.5%	27.9%	43.3%
	240 - 749 MBh or 20 - 62.4 tons (10.5 EER or higher)	11	29%	7.4%	16.0%	42.6%

In Illinois, for rooftop units smaller than 65 MBh/5.4 tons, 38 percent of units sold met program efficiency standards. For units between 65 MBh/5.4 tons and 134 MBh/11.25 tons, 27 percent of sales met program efficiency standards. Likewise, 27 percent of units sold between 135 MBh/11.25 tons and 239 MBh/20 tons met program efficiency standards, and 32 percent of units sold between 240 MBh/20 tons and 749 MBh/62.4 tons met program efficiency standards.

Table 3-21. BPHVAC Channel Metric Baselines: Illinois

Illinois						
					90% Confidence Interval	
Operational Definition	Size Category/ Efficiency Rating	n	Baseline Estimate	Standard Error	Lower Bound	Upper Bound
Percent of sold units that meet program efficiency standards.	<65 MBh or <5.4 tons (11.6 EER or higher)	25	38%	10.0%	20.9%	55.2%
	65 - 134 MBh or 5.4 - 11.25 tons (11.5 EER or higher)	23	27%	8.4%	13.0%	41.6%
	135 - 239 MBh or 11.25 - 20 tons (11.5 EER or higher)	19	27%	8.5%	12.5%	42.0%
	240 - 749 MBh or 20 - 62.4 tons (10.5 EER or higher)	9	32%	12.1%	10.1%	54.3%

Although the baseline values for Wisconsin reported above were higher than Illinois for three of the four size categories, only one was significant at the ten percent level. The share of high-efficiency sales for the smallest size category, units less than 65 MBh/5.4 tons, was statistically larger in Wisconsin compared to Illinois, at the five percent level (p-value = 0.0463). Models in this size category meet an Energy Efficiency Rating (EER) of 11.6 or greater sold at a 24-percentage-point higher rate in Wisconsin compared to Illinois.

C. ROTARY METRICS

The program selected VFDs as the subject of the Rotary Channel market effects metrics. The program has promoted this technology through custom incentives, training, and the distribution of information since program inception. In FY07, the program started offering prescriptive incentives for VFD controlled compressed air systems and VFD controlled

industrial pumps and fans systems. The *Channel Studies* examined industrial customer adoptions of VFDs in compressed air systems and in pump and fan systems. Table 3-22 shows the critical metrics as they appear in the contract along with a summary of the operational definitions of these metrics.

Table 3-22. Rotary Contract Metric Baseline Approach

Channel	Critical Metric	Summary of Operational Definition
Rotary	Increase in net Wisconsin market share of VFD controlled compressed air systems, compared to increase in net market share from Illinois baseline.	Percentage of compressed air systems controlled by VFDs.
	Increase in net Wisconsin market share of VFD controlled industrial pump and fan flows, compared to increase in net market share from Illinois baseline.	Percentage of fans and blowers controlled by VFDs. Percentage of pumps controlled by VFDs.

Establishing metric baselines for the Rotary Channel proved to be a particularly challenging endeavor, given several aspects peculiar to the market for variable frequency drives (VFDs). First, in contrast to the Lighting and BP HVAC Channels, two distinct contract metrics, one for compressed air systems and the other for industrial pumps and fans, were selected for baseline measurement. Second, from an early stage, the evaluation team recognized that important differences distinguished pump applications from fan applications, so that it was necessary to assess VFD use separately for each of these technologies. In essence, three different VFD applications, for compressed air systems, pumps, and fans, merited investigation, and measuring baseline values for each application required unique calculations and methodological refinements.

Third, due both to the relative importance of the stock of VFD-eligible systems compared to the flow of such systems, and to the projected low incidence of large compressed air systems in Wisconsin and Illinois, the evaluation team gathered additional data on VFD saturation levels for all production motor applications in order to develop a more complete sense of VFD market share. This supplementary metric entailed its own unique methodological approach.

Despite these complications, data were collected and baseline values estimated for a total four metrics (compressed air systems, industrial fans, industrial pumps, overall VFD saturation levels). The baseline values are provided for each of these VFD applications.

i. Compressed Air Systems

Table 3-23 presents the compressed air metrics baseline estimates for Wisconsin and Illinois. For Wisconsin, 18 percent of compressed air systems were fitted with VFDs. For Illinois, 13 percent of systems were fitted with VFDs. The relatively small sample obtained by the surveys, particularly in Illinois (n = 103), effectively precluded disaggregating the results in terms of horsepower size category. Instead, the evaluation team weighted compressors by horsepower in order to take account of size variation.

**Table 3-23. Rotary Contract Metric Baseline:
VFDs in Compressed Air Systems**

VFD Compressed Air Metric	State	n	Baseline Estimate	Standard Error	90% Confidence Interval	
					Lower Bound	Upper Bound
Percent of compressed air system hp fitted with VFDs	Wisconsin	170	18%	6.7%	6.4%	28.7%
	Illinois	103	13%	5.0%	4.8%	21.5%

The metric baselines for VFDs used in compressed air systems in Wisconsin and Illinois are similar. The percentage point difference between these two estimates is not statistically significant at the 10 percent level of significance.

ii. Industrial Fans

Tables 3-24 and 3-25 present fan/blower metrics baselines estimates for Wisconsin and Illinois, respectively. In Wisconsin, there is little variation in the fraction of fans and blowers fitted with VFDs. The baseline estimates range from six percent in the greater than 50 hp size category to 12 percent in the 6–20 hp and 21–50 hp size categories. The Illinois baselines range from two percent in the greater than 50 hp size category to 15 percent in the 6–20 hp size category.

**Table 3-24. Rotary Contract Metric Baseline: Wisconsin
VFDs in Fan and Blower Systems**

Wisconsin						
VFD Fan or Blower System Metric	Size Category	n	Baseline Estimate	Standard Error	90% Confidence Interval	
					Lower Bound	Upper Bound
Percent of fans and blowers fitted with VFDs	1 - 5 hp	99	7%	2.9%	1.9%	11.5%
	6 - 20 hp	100	12%	4.7%	4.3%	20.1%
	21 - 50 hp	97	12%	3.0%	6.7%	16.6%
	> 50 hp	96	6%	3.0%	1.3%	11.3%
	Total	101	8%	2.0%	4.4%	11.2%

**Table 3-25. Rotary Contract Metric Baseline: Illinois
VFDs in Fan and Blower Systems**

Illinois						
VFD Fan or Blower System Metric	Size Category	n	Baseline Estimate	Standard Error	90% Confidence Interval	
					Lower Bound	Upper Bound
Percent of fans and blowers fitted with VFDs	1 - 5 hp	56	11%	8.0%	0.0%	24.5%
	6 - 20 hp	54	15%	7.3%	2.6%	27.1%
	21 - 50 hp	53	5%	5.0%	0.0%	13.7%
	> 50 hp	53	2%	2.3%	0.0%	6.3%
	Total	56	10%	4.7%	2.3%	18.0%

The metric baselines for VFDs used in fan and blower systems in Wisconsin and Illinois are similar. The baseline estimates for each size category and the total are not statistically different from each other at the 10 percent level of significance.

iii. Industrial Pumps

Tables 3-26 and 3-27 present pump metrics baselines estimates for Wisconsin and Illinois, respectively. In Wisconsin, the fraction of pumps fitted with VFDs tends to be larger for the larger pump systems. Twenty-two percent of pumps in the 20–100 hp size category and over half of the pumps in the greater than 100 hp size category are fitted with VFDs. The Illinois baseline estimates have the opposite trend, with less than 1 percent of motors in the greater then 100 hp size category and 29 percent of the pumps in the 1–5 hp size categories.

Table 3-26. Rotary Contract Metric Baseline: Wisconsin
VFDs in Pump Systems

Wisconsin						
					90% Confidence Interval	
VFD Pump System Metric	Size Category	n	Baseline Estimate	Standard Error	Lower Bound	Upper Bound
Percent of pumps fitted with VFDs	1 - 5 hp	94	8%	3.7%	2.2%	14.5%
	6 - 20 hp	94	18%	8.2%	4.7%	32.1%
	21 - 50 hp	92	10%	3.5%	4.1%	15.8%
	50 - 100 hp	92	22%	10.8%	3.5%	39.5%
	> 100 hp	92	52%	19.9%	19.4%	85.4%
	Total	94	15%	4.5%	7.4%	22.2%

Table 3-27. Rotary Contract Metric Baseline: Illinois
VFDs in Pump Systems

Illinois						
					90% Confidence Interval	
VFD Pump System Metric	Size Category	n	Baseline Estimate	Standard Error	Lower Bound	Upper Bound
Percent of pumps fitted with VFDs	1 - 5 hp	67	29%	11.5%	9.6%	48.1%
	6 - 20 hp	65	10%	4.5%	3.0%	18.0%
	21 - 50 hp	65	7%	4.8%	0.0%	15.3%
	50 - 100 hp	65	5%	3.6%	0.0%	11.4%
	> 100 hp	65	0%	0.1%	0.0%	0.4%
	Total	67	16%	4.9%	7.4%	23.8%

The smallest and largest categories are statistically different from each other at least at the 10 percent level of significance. For the 1–5 hp size category, the Illinois baseline estimate is significantly larger, while for the 50–100 hp and the greater than 100 hp size categories the Wisconsin baseline estimates are significantly larger.

3.5.3 Supply-side effects

The transition to net savings goals from gross savings goals has increased the level of attention on net-to-gross adjustments. The PSC, the evaluation team, and the program administrators continue to be motivated to provide a complete assessment of program accomplishments. Evaluation savings adjustments for effects of the program that are not tracked by the program must be considered along with adjustments for measures that would have been implemented without the program. To this end, KEMA added a secondary goal of the *Channel Studies* that was not included in the detailed evaluation plan. This goal is to assess the qualitative evidence to date that there are sizable additional program effects on

the market that are not already being captured by the program tracking and current evaluation activities. The present study was intended to gather and assess preliminary data on indirect program effects, as a prelude to possible future elaboration of formal indicators. The purpose of this secondary effort is not to quantify potential program effects in terms of energy savings.

Earlier in this contract period, the Focus on Energy evaluation team produced a white paper titled, *Integrating Supply-Side Results with End-User Net-to-Gross Self Reports*[13]. This white paper lays out a decision matrix to assist evaluators, policymakers and program administrators in weighing the decision to pursue additional supply–side research for incorporation into end-user self-report based NTG analysis. As stated in the white paper, the decision whether to conduct additional research and develop indicators of supply-side effects should be guided by three key criteria:

1. The existence of a plausible, credible, and specific program theory predicting supply-side program effects, or some other sound logical or empirical basis for believing they are likely to exist

2. Likelihood that predicted effects can be meaningfully assessed through empirical research

3. Likelihood that the needed research can be performed at reasonable cost, relative to the available budget and likely impact.

The secondary goal of the *Channel Studies* focuses of the first of these three criteria. The results of the *Channel Studies* demonstrate that for each Channel the program has had an effect on the market for the technologies under consideration. Results for each channel are presented below.

A. LIGHTING CHANNEL EFFECTS

Results generally support the notion that Focus has affected the market for energy efficient lighting in Wisconsin. To take one example, results indicate that Wisconsin consumers take greater account of multiple lighting equipment characteristics when selecting technology to purchase than do Illinois consumers, as shown in Table 3-28. High awareness and participation levels provide a direct link between the differences in the energy efficient lighting markets of Wisconsin and Illinois and the Focus on Energy Program. Furthermore, we also concluded based on the survey responses that a large fraction of energy efficiency sales are likely to be untracked. Given these findings, KEMA concludes that indirect supply-side effects are likely to exist and recommends the PSC consider additional supply-side research.

[13] Ralph Prahl et al., *Focus on Energy Evaluation: Integrating Supply-Side Results With End-User Net-to-Gross Self-Reports,* Focus on Energy Evaluation, July 2, 2008.

Table 3-28. Importance of Lighting Equipment Characteristics to Customer Selection Decisions, on Scale of 1 (= not at all important) to 10 (= very important)

On a scale from 1 to 10 where 1 is not at all important and 10 is very important, how important do your commercial customers treat the following lighting equipment characteristics when making equipment selection decisions?	State						2-tailed test of significance	
	Wisconsin			Illinois				
	n	estimate (avg)	standard error	n	estimate (avg)	standard error	Sig @ 90%	p-value
Initial cost of ther equipment	59	7.7	0.20	58	7.3	0.52	No	0.3974
Costs of operation	59	7.8	0.27	58	6.1	0.56	Yes	0.0102
Total life cycle costs	59	7.1	0.20	58	6.0	0.59	Yes	0.0979
Quality of light	59	7.8	0.27	58	6.6	0.65	Yes	0.0959
Maintenance of lighting level	59	6.0	0.66	58	5.9	0.70	No	0.9013
Ease of maintenance	59	6.2	0.42	58	5.9	0.59	No	0.7073

B. BP HVAC EFFECTS

Although detailed finding results reveal some unexpected Wisconsin and Illinois comparison results, the Wisconsin distributor results support the existence of supply-side effects. Wisconsin distributors overwhelmingly agreed that energy-efficient equipment sales are important to maintaining their competitive position, as shown in Table 3-29, and that the program has played an important role in the market share of energy efficient units sold. Furthermore, Wisconsin distributors reported increased promotion of high efficiency units and increased sales in the past two years. In addition, we estimate that 70 percent of projects are out-of-program sales. In summary, results support the existence of market effects and therefore KEMA advises the PSC to pursue supplemental supply-side research.

Table 3-29. Importance of Energy-Efficient Equipment Sales in Maintaining Firm's Competitive Position, on Scale of 1 (= not at all important) to 10 (= very important)

Using a scale from 1 to 10 where 1 is not at all important and 10 is very important, how important is the offer of energy efficient equipment in maintaining your firm's competitive position?	State						2-tailed test of significance	
	Wisconsin			Illinois				
	n	estimate (avg)	standard error	n	estimate (avg)	standard error	Sig @ 90%	p-value
Score	25	9.1	0.2	26	7.5	0.5	Yes	0.0140

C. ROTARY EFFECTS

Because the VFD surveys engaged industrial end-users, no data were gathered from the supply-side of the VFD market. However, a number of questions were included in the surveys that probed for nonparticipant spillover effects in the rotary channel. Findings reveal limited nonparticipant spillover effects in the Rotary Channel. Wisconsin end-users take advantage of VFD opportunities at slightly higher rates than Illinois end-users, as shown in Table 3-30, and appear to be better informed about VFD technology than are their Illinois peers. However, despite the enthusiasm of participants, relatively few Wisconsin respondents have actually taken part in specific program measures. In summary, the *Channel Studies* provide enough evidence to pass the white paper's criteria in support for further research. We do recommend additional supply-side research for the VFD market, but less strongly than we do for Lighting and HVAC markets.

Table 3-30. VFD Opportunities Taken Advantage Of

Do you believe that you company has taken advantage of…	State				2-tailed test of significance	
	Wisconsin		Illinois			
	estimate	standard error	estimate	standard error	Sig @ 90%	p-value
All available opportunities to benefit from VFDs	21%	11.3%	9%	3.1%	No	0.3021
Most of those opportunities	14%	5.1%	15%	3.3%	No	0.9492
Some of those opportunities	10%	2.4%	9%	3.0%	No	0.8601
Few of those opportunities	7%	2.1%	6%	2.9%	No	0.8690
None of those opportunities	48%	11.2%	61%	3.2%	No	0.2671
# Respondents	176		122			

3.6 EDUCATION & TRAINING SPILLOVER

In this section, we provide summaries of the Education and Training Impact and Process studies.

3.6.1 Impact evaluation

The primary purpose of the Focus on Energy Business Programs Education and Training (E&T) Program Untracked Savings Study was to estimate untracked[14] attributable savings (UAS) resulting from the E&T Program. These UAS are the E&T-attributable portion of energy savings from projects that do not appear in the Focus WATTS or WISeerts databases and were implemented at the building or facilities of the trainees' companies. We estimated the E&T UAS that occurred in the recent past and used these past energy savings to project 2008 E&T Program UAS. We also showed how these recent UAS can be used to project UAS for future years.

It is important to note that these untracked attributable savings are different from participant spillover savings that we estimated in previous studies. When we estimated participant spillover effects from the Focus on Energy Business Programs in 2005,[15] we were estimating the level of untracked energy savings that had "spilled over" due to the influence of tracked projects. To credit a project with participant spillover energy savings, we had to find a causal link between the older tracked project and the newer untracked project. For example, a program participant might have had a positive experience with a tracked energy-savings project and decided to implement similar projects in their other facilities. Although in most cases such program participants would have also sought Focus financial incentives for these new projects (therefore making them "tracked projects"), sometimes they did not and these were generally the types of projects that produced participant spillover energy savings.

[14] The terms "tracked" and "untracked" indicate whether or not an energy-efficient project appears in the Focus WATTS or WISeerts program tracking databases and therefore were included in the Business Program's *ex ante* gross energy savings claims. In theory any energy-saving project that the Focus program influenced, even if this influence did not include financial incentives, can be claimed in these program tracking databases. In reality, however, the projects listed in these databases are almost exclusively projects that received financial incentives from Focus on Energy.

[15] Miriam L. Goldberg, Christopher Dyson, and Valy T. Goepfrich, KEMA Inc , *Focus on Energy Statewide Evaluation, Business Programs: Participant Spillover Savings Study, Final Report*: December 22, 2005, Evaluation Contractor: PA Government Services Inc.

The untracked attributable savings from the Focus E&T Program are different from the aforementioned participant spillover savings. They do not represent spillover from an earlier tracked project, but are the first effects of a clearly identified program activity (e.g., a company representative took a particular training course).[16] This explicit causal link between an E&T Program training course and a specific energy-saving project also distinguishes the E&T Program untracked energy savings from more loosely defined claims of program market effects where the causal links between program effects and end user behaviors are not clearly defined.

A. METHODOLOGY

The following is a brief summary of the research approach used for this impact evaluation.

i. The CATI Survey of Trainees

The first step in our impact evaluation was to conduct a computer-aided telephone interview (CATI) survey of a sample of E&T Program trainees. The main objectives of this survey were to:

- Identify all energy-saving projects that the trainee's company implemented since the trainee took the course along with some basic information about the project needed for future analysis
- Obtain trainee's estimates of the influence of the training courses as well as the Focus financial incentives on these implemented energy-saving projects.

We completed CATI surveys with 309 trainees who took E&T Program training courses during the 2004–2007 time period.

ii. The Company/Project Database Matching Process

The 309 respondents to the CATI survey identified 593 energy-saving projects that had been completed since taking their training courses. The next step in the analysis was to determine which of these post-training energy-saving projects were actually untracked energy-saving projects that had been influenced by the E&T Program. This was accomplished through a database matching process and survey screening process.

iii. The Engineering Surveys

The next stage of the analysis involved KEMA engineers interviewing trainees to collect additional information. The original purpose of the engineering surveys had been just to collect the project information needed to estimate the gross energy savings for untracked energy-saving projects. Yet the company/project database matching process still left many

[16] This is not to say that the trainees were not influenced by earlier tracked projects. They could have been. But we are assuming that in assigning relative attribution to the training courses, the trainees are accounting for these other influences. So, for example, if an untracked project was mostly influenced by a positive experience with a tracked project and only slightly influenced by a training course, we are assuming that the respondent would capture the lesser influence of the training course in the way that they responded to the program attribution questions. The estimated effects of tracked projects on untracked projects would be captured elsewhere through our estimates of participant spillover.

unconfirmed potential matches between the energy-saving projects identified by the trainees and those we found in WATTS/WISeerts. Therefore, we expanded the scope of the engineers' responsibilities to include clarifying these ambiguities to the degree possible.

iv. Calculating Program Attribution

The E&T Program CATI survey instrument was finalized in April 2008. We used the Business Programs impact evaluation program attribution questions and analysis methodology used at that time.

v. Estimating E&T Program Untracked Energy Savings

Our methodology estimated untracked attributable savings (UAS) for the E&T Program. UAS were defined as savings motivated by the program but not included in program tracking data.

Our methodology counted energy savings in the year in which the project was implemented ("first-year savings"). For the one-time projects, since we knew what year the project was completed, we counted the first-year savings in that program year. To be considered attributable, one-time projects must have been completed in the first four years after the training course.[17]

For the operation and maintenance (O&M) projects, since we did not know what year they were first implemented, we assumed that they were implemented first in the year after the training.[18] Since we were only estimating first-year savings, we made no assumptions about measure life for either the one-time or the O&M projects.

This methodology reported UAS resulting in year X as the result of cumulative influences of E&T Program training in prior years. For example, new project implementation in 2008 due to E&T Program training was the sum of 2004 training influence on adoption four years out, 2005 training influence on adoption three years out, 2006 training influence on adoption two years out, and 2007 training influence on adoption one year out. This savings estimation approach is analogous to counting tracked energy savings implemented in the current year that were the result of multiple years of the program working with the customer on a project.

[17] We chose the four-year limit for two reasons. First, this was within the range of estimates of the duration of training effects as cited by other program evaluations. Second, the large majority of projects that trainees claim to have been training-influenced occur within four years of the training course.

[18] An alternative approach would have been to assume that the O&M projects were initiated at lags varying from one to four years after training. Using this approach, we would have the same total (first-year) O&M savings as the adopted approach, but it would simply be spread out over four years.

B. OUR ESTIMATES OF E&T PROGRAM UNTRACKED ATTRIBUTABLE SAVINGS

Table 3-31 shows untracked attributable savings (UAS) for year 2008 by project type (one-time vs. O&M projects) and savings type.

Table 3-31 Untracked Attributable Savings (UAS) for 2008 by Project Type and Savings Type

Project Type	Savings Type	2008
One-time	kWh	6,149,181
One-time	kW	751
One-time	therms	3,268,883
O&M	kWh	2,799,165
O&M	kW	1,695
O&M	therms	549,388
All	**kWh**	**8,948,346**
All	**kW**	**2,447**
All	**therms**	**3,818,271**

3.6.2 Process evaluation

As mentioned in the previous section the main purpose of the E&T Spillover evaluation was to estimate program-attributable untracked energy savings. However, since we were planning a computer-aided telephone interview (CATI) survey of about 300 trainees for the impact evaluation, we used this opportunity to also collect information from E&T Program trainees on some process-related issues that were of interest to the PSCW and program implementers.

A. APPROACH

The CATI survey was completed with 309 past participants in E&T Program training courses. Past participants were people who had registered for one or more training events between 2004 and 2007. The sample was designed to reflect the range of courses offered through Focus.

The process-related issues covered by this survey included:

- Drivers for and barriers to participation in training courses
- What non-Focus training alternatives were available to participants in the E&T Program
- Why non-Wisconsin-based trainees were taking E&T Program courses and to what degree they applying their learning in Wisconsin locations
- How the E&T Program training as well as other Focus assistance (e.g., financial incentives) influenced the implementation of post-training energy-saving projects
- The level of trainee awareness of Focus bonus incentives available for quick post-training project implementation

- Barriers to post-training project implementation
- How post-training project implementation varied with the type of training course.

B. RESULTS

The results of this survey reveal that while business customers attend Focus on Energy training courses for a variety of reasons, the barriers to increased attendance are fairly consistent—lack of time and lack of money. Not surprisingly, these are also two of the main barriers that prevent attendees from applying what they learned to improve the energy efficiency of their organizations.

Barriers notwithstanding, course attendees stated that these courses have had a considerable impact on their organization. They have helped to implement, and in some cases prompt, energy efficiency projects. These projects have ranged from simple lighting retrofits to major upgrades of HVAC, compressed air, and steam systems.

The impact of training course attendance on projects takes the form of increased knowledge of technology options, increased ability to demonstrate payback, and increased awareness of the assistance available through Focus on Energy. The program's assistance—financial and otherwise—is credited by respondents with making a quarter of the projects that their organizations have done happen.

That said, not all of the assistance the program makes available is used. A prime example are the financial incentives available for training course attendees whose firms complete an energy efficiency project shortly after their course. Only half of attendees are aware these incentives exist, and only a quarter make use of them. Besides lack of awareness, the main obstacles to these incentives being used are the perception that they are too small to be worth the effort, failure to implement a qualifying project, and being outside the state of Wisconsin.

The latter points to a relatively small issue with the training courses that surfaced during this study: not all of the attendees come from Wisconsin or—more importantly—plan to use their training to make Wisconsin businesses more efficient. Indeed, most of the out-of-state attendees plan to use their training back home, but not in Wisconsin. Whether this is a big enough issue to worry about is unclear; the data indicated that only four percent of attendees are from out of state.

A related issue this study examined is the question of alternatives to E&T training events. That is, how many course attendees could have found comparable training outside of the program? Survey responses indicate that many attendees believe there are alternative sources of training, but that they are often viewed as much more expensive or otherwise inconvenient. As a result, it is not obvious that many attendees would have obtained training from other sources even though it might be available.

When we look at specific training courses we see that the impact of training (defined here as the number of related energy efficiency measures adopted by attendees' organizations) varies widely. PEM and BOC courses show the highest level of specific impacts (e.g., energy cost assessments, goal setting, and the development of maintenance checklists and other tools for managing energy use). For more technology-specific courses the rate of related measure adoption ranges from 45 percent for compressed air training to 21 percent for best

practices in ventilation and zero percent for pump training. Direct comparisons, however, are likely to be misleading. Many of the measures reported by attendees of the PEM and BOC courses, for example, are quite a bit less costly than the measures associated with an industrial best practices course. And the payback for specific technology measures can vary dramatically, making the differential implementation rates coming out of different courses quite rational. Finally, some courses (like those focused on pumps) deal more with system assessment than specific energy efficiency measures.

Finally, Focus on Energy training is helping to sell energy efficient equipment as well as encouraging its adoption by end-users. The few trade allies in our sample who took their courses more to become effective sellers than to improve their own energy efficiency are engaged with the program in myriad capacities. And the majority is putting what they learned to use in marketing and selling high efficiency goods and services in Wisconsin.

3.7 FURTHER BUSINESS PROGRAMS READING

For further information, including recommended program improvements, the reader is referred to the following evaluation reports.

Table 3-32. Further Business Programs Reading

Time Period	Date	Title
FY07	4/20/2007	*Business Programs: End-use Specific Attribution Factors - FY06*
	4/13/2007	*Final Deemed Savings for FY08 (Spring 2007)*
	3/2/2007	*Business Programs: Impact Evaluation Report - FY06*
	11/10/2006	*Business Programs: Lighting and Motor/Drive Channel Market Effects Contract Metrics Assessment*
	10/27/2006	*Deemed Savings Resolution (Fall 2006)*
FY06	6/21/2006	*Business Programs: A Behind-the-Scenes Look at Attribution*
	6/12/2006	*Business Programs: Targeted Market Study: HVLS Fans on Wisconsin Dairy Farms*
	4/5/2006	*Business Programs: Recent Customer Experience*
	4/4/2006	*Business Programs: Delivery Review*
	3/16/2006	*Net-to-Gross Method Selection Framework for Evaluating Focus on Energy Programs*
	2/3/2006	*Business Programs: Measure Review*
	12/30/2005	*Focus on Energy Public Benefits Evaluation BP Motors Metric Preliminary Assessment*
	12/22/2005	*Business Programs: Participant Spillover Savings Study*
	10/28/2005	*Business Programs: End-use Specific Adjustment Factors*
	9/9/2005	*Business Programs: Impact Evaluation Report—FY05, Round 1*

3.8 ACTIVITIES POSTPONED TO CONTRACT YEAR 2009

Three 18MCP activities have been postponed to CY09.

- **Benefit-cost Study Inputs:** A benefit-cost analysis is scheduled for all Focus programs in CY09. This task was postponed from 18MCP to allow inclusion of the potential study being conducted by the Energy Center of Wisconsin. Each program is responsible for providing input streams for the benefit-cost analysis. Participant information collected from three rounds of impact evaluation, the Channel Studies, and the Education and Training impact evaluation studies completed during 18MCP will be used to develop Business Programs' input streams. Three benefit-cost

related activities have been postponed to CY09 to accommodate the timing of the potential study and fund 18MCP activities not included in the 18MCP detailed evaluation plan. These activities include:

  - Development of the input streams
  - Development of market effects projections
  - Review of load shapes proposed by WECC for particular categories of measures.

- **Additional Looks at Attribution:** The impact evaluation sample is designed to support the best possible retrospective estimates of gross and net savings by sector and by the Business Programs overall. In previous years the evaluation team has provided additional breakouts of the impact evaluation data to explore attribution issues looking at one variable at a time. The CY09 task will expand on the 18MCP Additional Looks analysis, by adding breakouts and the use of regression analysis to explore multiple variables at the same time.
- **Incremental Cost Study:** Data collection, analysis, and draft report preparation was completed during the 18MCP. The draft report will be distributed, comments will be addressed, and the report will be finalized during CY09.

4. RESIDENTIAL PROGRAMS EVALUATION

This chapter describes the residential program evaluation activities finalized during the period July 1, 2007–December 31, 2008, overall and by individual program area.

- ENERGY STAR® Products (Composed of Residential Lighting and Appliance and Plug Load)
- Wisconsin ENERGY STAR Homes
- Home Performance with ENERGY STAR
- Apartment and Condominium Efficiency Services
- Targeted Home Performance with ENERGY STAR
- Efficient Heating and Cooling (This was made into its own program in July 2006.)
- Head Start CFL (A new program in 2008)
- In addition, a Residential Deemed Savings Review was completed in the second half of 2008.

4.1 OVERALL

The following tables present the gross, verified gross, and net energy savings summary by Residential program area for:

- The 18-month Contract Period: July 1, 2007, through December 31, 2008
- FY07: July 1, 2006, through June 30, 2007
- FY06: July 1, 2005, through June 30, 2006
- FY05: July 1, 2004, through June 30, 2005
- FY04: July 1, 2003, through June 30, 2004
- FY03: July 1, 2002, through June 30, 2003
- FY02: June 1, 2001, through June 30, 2002, (although FY02 of the program covered a 15-month period, significant energy savings were not recognized in the first two months of that period).

The discussion of each individual program includes tables on the energy savings totals and any new research to modify verified gross energy savings or net energy savings numbers.

Figure 4-1. Electric Energy Impacts by Program, Residential Programs The 18-month Contract Period (July 1, 2007–December 31, 2008)

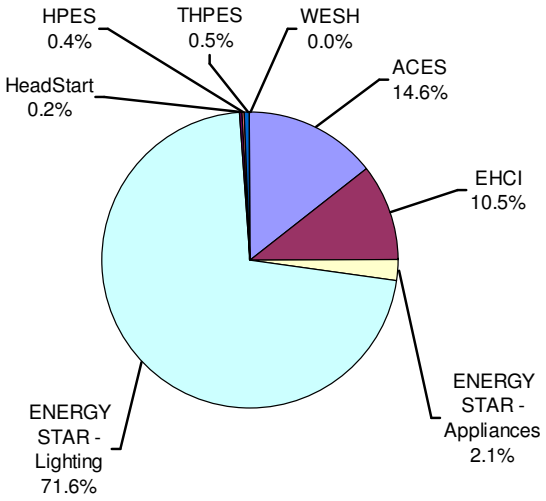


Figure 4-2. Electric Energy Impacts by Program, Residential Programs, The 18-month Contract Period (July 1, 2007–December 31, 2008)

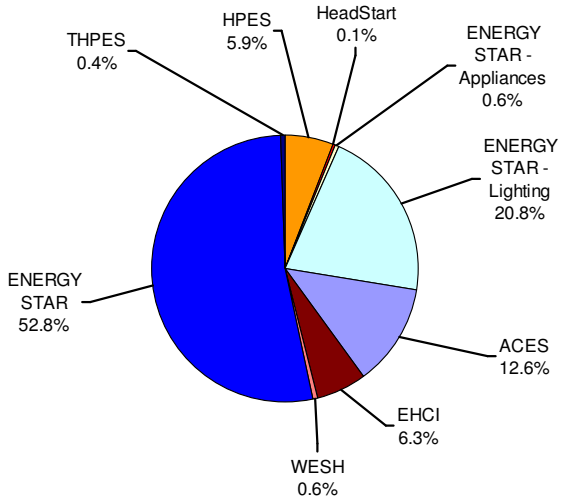


Figure 4-3. Gas Energy Impacts by Program, Residential Programs The 18-month Contract Period (July 1, 2007–December 31, 2008)

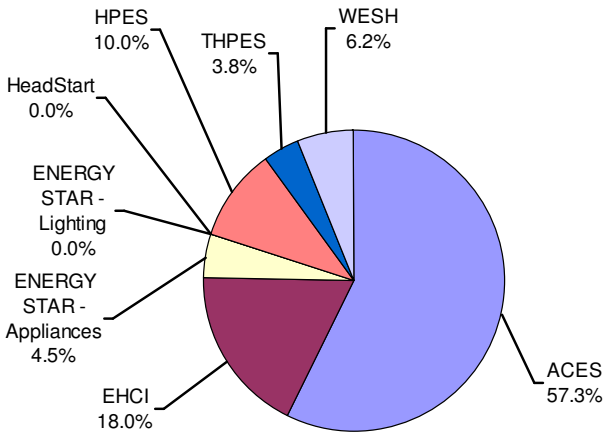


Figure 4-4. Gas Energy Impacts by Program, Residential Programs, Program to Date (July 1, 2001–December 31, 2008)

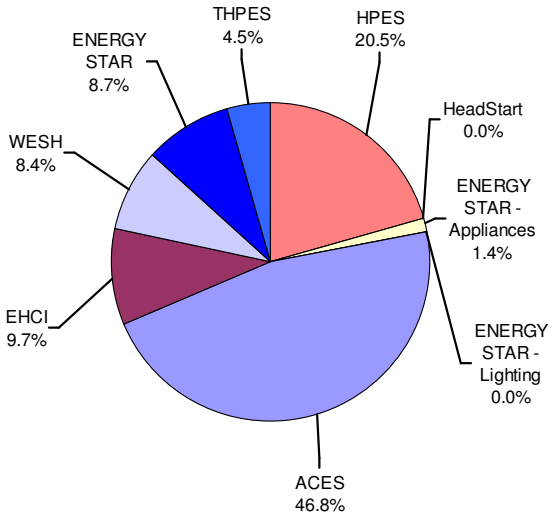


Table 4-1a. All Residential Programs: Tracked Energy Impacts
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	26,175,716	3,102	2,377,692	26,263,382	3,113	2,377,633	19,059,402	2,034	1,532,127
EHCI	18,943,439	5,404	746,241	18,944,726	5,405	746,261	18,944,726	5,405	746,261
ENERGY STAR - Appliances	3,801,592	91	181,384	3,803,688	91	187,999	3,803,688	91	187,999
ENERGY STAR - Lighting	129,140,559	7,483	0	129,109,164	7,486	0	104,952,371	5,805	0
Head Start	402,388	17	0	402,388	17	0	402,388	17	0
HPES	697,882	333	414,564	707,762	334	416,130	671,166	311	394,413
THPES	706,856	152	165,220	970,148	160	159,517	970,148	160	159,517
WESH	-4,062	0	258,495	-4,062	0	258,474	-4,062	0	258,474
Total	**179,864,369**	**16,583**	**4,143,595**	**180,197,195**	**16,606**	**4,146,014**	**148,799,826**	**13,824**	**3,278,792**

Table 4-1b. All Residential Programs: Tracked Energy Impacts
FY07 (July 1, 2006–June 30, 2007)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	1,467,617	413	400,607	1,465,272	413	400,607	1,465,272	413	400,607
EHCI	9,269,479	2,984	274,826	8,901,254	2,189	275,126	7,207,259	1,970	231,410
ENERGY STAR	82,661,232	5,292	283,996	67,459,724	3,946	271,332	54,405,419	3,178	218,254
HPES	392,348	223	345,909	371,121	230	298,510	346,397	214	282,629
THPES	435,080	0	107,675	435,080	77	107,675	435,080	77	107,675
WESH	24,892	1	153,767	24,456	0	153,727	24,032	0	153,715
Total	**94,250,649**	**8,913**	**1,566,780**	**78,656,907**	**6,855**	**1,506,977**	**63,883,459**	**5,852**	**1,394,290**

Table 4-1c. All Residential Programs: Tracked Energy Impacts
FY06 (July 1, 2005–June 30, 2006)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	5,848,481	471	537,436	5,848,481	471	537,436	5,848,481	471	537,436
EHCI	11,430,586	8,388	258,196	10,980,716	7,122	274,194	9,467,141	6,927	235,134
ENERGY STAR	71,461,850	4,816	337,821	55,951,807	3,250	147,449	55,615,488	3,252	120,253
HPES	995,068	377	484,986	734,891	366	374,559	708,195	347	357,685
THPES	371,904	0	92,366	371,904	66	92,040	371,904	66	92,040
WESH	77,532	14	147,666	73,655	12	147,386	66,852	5	147,274
Total	**90,185,421**	**14,066**	**1,858,471**	**73,961,454**	**11,286**	**1,573,064**	**72,078,061**	**11,066**	**1,489,822**

Table 4-1d. All Residential Programs: Tracked Energy Impacts
FY05 (July 1, 2004–June 30, 2005)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	16,663,485	852	790,191	16,663,485	852	790,191	16,663,485	852	790,191
ENERGY STAR	85,086,975	2,485	361,989	55,273,975	3,230	156,529	66,068,342	3,928	126,923
HPES	9,084,502	6,905	582,559	8,804,317	6,948	491,823	8,586,575	6,457	476,796
THPES	593,164	116	167,477	288,278	44	69,503	288,278	44	69,503
WESH	1,507,010	669	221,426	1,236,066	671	217,566	1,198,958	612	217,180
Total	**112,935,136**	**11,027**	**2,123,643**	**82,266,121**	**11,745**	**1,725,612**	**92,805,638**	**11,893**	**1,680,593**

Table 4-1e. All Residential Programs: Tracked Energy Impacts
FY04 (July 1, 2003–June 30, 2004)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	10,794,278	562	510,518	10,636,826	556	512,678	10,636,826	556	512,678
ENERGY STAR	99,142,936	6,510	354,420	64,238,584	4,619	354,516	62,400,894	4,310	354,516
HPES	13,606,210	8,042	554,150	13,557,990	8,063	481,219	13,510,885	8,044	463,522
THPES	708,508	149	220,606	418,020	62	107,214	418,020	62	107,214
WESH	1,615,776	628	185,255	1,623,130	631	184,477	1,623,070	631	184,477
Total	**125,867,708**	**15,890**	**1,824,949**	**90,474,549**	**13,932**	**1,640,105**	**88,589,694**	**13,604**	**1,622,408**

Table 4-1f. All Residential Programs: Tracked Energy Impacts
FY03 (July 1, 2002–June 30, 2003)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	10,460,653	2,279	973,592	14,727,645	2,314	1,268,730	14,727,645	2,314	1,268,730
ENERGY STAR	76,054,781	5,738	180,783	64,996,046	5,429	180,783	55,519,818	3,834	180,783
HPES	9,385,086	5,919	334,938	9,469,824	5,914	288,290	9,446,776	5,905	279,625
THPES	183,949	59	85,943	130,604	42	61,020	130,604	42	61,020
WESH	1,274,434	71	102,037	314,141	89	91,261	306,104	89	91,261
Total	**97,358,904**	**14,066**	**1,677,293**	**89,638,260**	**13,788**	**1,890,084**	**80,130,947**	**12,184**	**1,881,419**

Table 4-1g. All Residential Programs: Tracked Energy Impacts
FY02 (June 1, 2001–June 30, 2002)

Program	Gross kWh	Gross kW	Gross Therms	Verified kWh	Verified kW	Verified Therms	Net kWh	Net kW	Net Therms
ACES	2,577,687	515	382,451	2,437,663	479	382,451	2,437,663	479	382,451
ENERGY STAR	18,295,376	1,806	55,519	20,239,649	2,542	55,519	14,916,810	1,649	55,519
HPES	3,059,372	1,644	404,564	3,059,354	1,644	396,942	2,714,057	1,635	315,322
THPES	15,598	5	6,971	11,075	3	4,949	11,075	3	4,949
WESH	0	0	63,249	204,624	0	72,201	204,624	0	72,201
Total	**23,948,033**	**3,969**	**912,755**	**25,952,365**	**4,668**	**912,062**	**20,284,229**	**3,766**	**830,443**

Gross program savings unadjusted by evaluation results are shown in the following table along with the program targets and percentage of target achieved. Savings shown are as of December 31, 2008, the entirety of the 18-month target period.

Table 4-2. Net Residential Program Savings versus Residential Program Portfolio Targets The 18-month Contract Period (July 1, 2007–December 31, 2008)

	kWh			kW			Therms		
Program	Target	Net	% of 18-month Target	Target	Net	% of 18-month Target	Target	Net	% of 18-month Target
ACES	21,066,233	19,059,402	90%	2,427	2,034	84%	2,099,870	1,532,127	73%
EHCI	13,958,476	18,944,726	136%	4,964	5,405	109%	511,125	746,261	146%
ENERGY STAR - Appliances	2,821,500	3,803,688	135%	105	91	87%	110,250	187,999	171%
ENERGY STAR - Lighting	85,457,267	104,952,371	123%	5,581	5,805	104%	0	0	0%
Head Start	2,160,450	402,388	19%	62	17	27%	0	0	0%
HPES	1,192,994	671,166	56%	476	311	65%	755,303	394,413	52%
THPES	852,280	970,148	114%	136	160	118%	210,925	159,517	76%
WESH	414,449	-4,062	0%	33	0	0%	396,450	258,474	65%
Total Residential Programs	**126,375,000**	**148,799,826**	**118%**	**13,650**	**13,824**	**101%**	**3,903,000**	**3,278,792**	**84%**

4.2 ENERGY STAR PRODUCTS

Evaluation efforts during the second half of 2008 focused on the following:

- FY08 CFL Customer Research
- Second Annual Comprehensive CFL Market Effects Study.

Key findings from evaluation efforts conducted during this reporting period are presented below for each of the following four areas:

- Process findings and issues
- Verified energy impacts
- Market effects
- Program metrics and goals.

4.2.1 Process findings and issues

We did not formally include process related evaluation tasks as part of our *Contract Period One Detailed Evaluation Plan*. The evaluation team, however, stayed abreast of process related issues through monitoring of program changes and issues based on regular communications with the ESP program manager.

4.2.2 Verified energy impacts

Earlier in the 18-month contract period we conducted two research projects to update the energy savings estimates for CFLs. First, the evaluation team analyzed the types of CFLs installed during FY07 to assess if the current estimate of *Delta Watts*—a key input to calculating verified gross energy and demand savings for CFLs rewarded through the Residential Lighting Program (RLP)—is still appropriate. Based on the assessment, we recommended revising the *Delta Watts* estimate from 51.9 W to 53.3 W for CFLs purchased via instant rewards and 55.0 W for CFLs purchased via mail-in rewards.

Second, the evaluation team conducted a CFL installation rate study for CFLs rewarded during FY07. The primary purpose of this installation rate study was to quantify the rate at which CFLs rewarded through the FY07 initiative are being installed in Wisconsin residences. We found that installation rates, currently at 81 percent for instant rewards and 88 percent for mail-in rewards, have significantly improved over the past four years. This improvement would appear to demonstrate that limiting the number of rewarded CFLs an individual can purchase results in higher first year installation rates and, therefore, higher first year energy savings within the state of Wisconsin. The improvement in first year installation rates is also likely to be influenced by the expansion in the types of CFLs available. Thus, consumers today are able to find CFLs for applications where they were not previously available (e.g., globes, a-lines, indoor/outdoor floods). The survey information also indicates that participating Wisconsin residents, the ultimate sponsors of the Focus initiative, continue to be satisfied with the CFLs they have received through the program.

In addition to improving installation rates, the program continues to demonstrate success in reaching a substantial number of Wisconsin residents who never purchased CFLs before. In FY03 and FY05, we found that approximately two-thirds of participants had never purchased a CFL prior to their program involvement. Jumping ahead to this FY07 study, it seems reasonable—relative to the previous studies—to expect decreasing percentages of current year CFL program participants to have never purchased CFLs before. In FY07, we found that this percentage had, indeed, decreased to about 55 percent (i.e., approximately 55 percent of participants had never purchased a CFL prior to their involvement in the FY07 program). However, with 150,000+ program participants, this still means that the program reached over 80,000 households that had not purchased CFLs before.

Like previous studies, this FY07 study also found that the program is reaching a diverse group of purchasers (those with somewhat lower incomes and education) who have been historically under-represented both in CFL programs in particular and in energy efficiency programs in general—again, a significant accomplishment. Finally, like previous studies, we continue to see a substantial amount of CFL purchasing reportedly taking place after participants' recent program experience. This would appear to signal that the program was having some participant market effects—at least in the short-term.

The implication of all this positive outreach is that the program is continuing to broaden the Wisconsin market for CFLs, which would appear to bolster the likelihood of the program having beneficial long-term market effects. However, it is important to keep in mind that the influence the program is having on retailer marketing, CFL stocking, and pricing may be a temporary phenomena. Thus, until rewards are substantially reduced (or ended), or substantial lapses in time occur between reward periods, it will remain difficult to reliably assess lasting long-term market effects.

The tables for each sector presented below break out the savings for that sector by measure category and indicate the percent of savings that measure category accounts for in that sector.

Table 4-3. ENERGY STAR - Lighting Products Program: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Ceiling Fan	45,675	0.0%	0		0	
CFL	123,754,039	95.9%	7,383	98.6%	0	
Lighting Fixture	2,172,456	1.7%	84	1.1%	0	
Lighting-LED	2,537,108	2.0%	0		0	
Lighting-Other	234,832	0.2%	9	0.1%	0	
Torchiere	365,054	0%	10	0%	0	
Total	**129,109,164**	**100%**	**7,486**	**100%**	**0**	

4.2.3 Market effects

In the second half of 2008, we have conducted two studies to provide insights into the CFL market. The first is a Comprehensive CFL Market Effects Study, which has the following primary objectives:

- To determine whether or not (and the extent to which) market effects are occurring in the Wisconsin CFL market
- To help evaluators and program staff understand the mechanisms that are either contributing to or taking away from the program's ability to achieve market effects
- To enhance the evaluation team's ability to provide reliable estimates of the net effects of the overall retail-based CFL initiative in all sectors: residential, commercial, agricultural, and multifamily.

The second is CFL Customer Research, which has the following primary objectives:

- To measure Wisconsin consumers' awareness, use, and purchasing of CFLs and other residential lighting products (e.g., mainly incandescent light bulbs) and compare and contrast this information with that of a control area
- To find out where Wisconsin consumers are currently purchasing lighting products (both incandescents and CFLs) and how these purchasing patterns match the venues through which CFL rewards are being paid
- To explore customer perception of and satisfaction with CFLs, which household member(s) purchase CFLs vs. other types of lighting, and the importance of price (and price sensitivity) in the purchasing process
- To attempt to gather information pertaining to the number of sockets in a home, the number of those sockets that have CFLs installed, and the likelihood that installed incandescents will ever be replaced by CFLs.

The key findings from each of these reports are summarized below.

The Comprehensive CFL Market Effects Study represents the continuation of a multifaceted effort, established in Fiscal Year 2007 by the residential evaluation team, to assess the impact of Wisconsin's retail-based compact fluorescent lighting (CFL) program. The system is

designed to provide a representative picture of Wisconsin retail-based CFL sales through the inclusion of all retail market channels through which CFLs are sold: (1) hardware, (2) home centers, (3) drug, (4) grocery, and (5) mass merchandisers.

In cooperation with residential program staff at WECC, we were able to collect statewide CFL sales data from participating retailers who collectively accounted for 94 percent of all rewards paid during calendar year 2007—representing 515 of the 570 participating retail stores. Similar to last year, we also completed on-site visits to 81 of the 570 participating retail stores for the purpose of recording the number of CFLs on the shelf, the variety of CFLs available, and CFL prices. A parallel effort was undertaken to estimate nonparticipant CFL sales through store-level telephone surveys, on-site visits, and sales data collection. In total, we completed 345 telephone surveys and 151 site visits with a sample of nonparticipating stores within each of the five market channels. During these on-site visits, we collected 2007 CFL sales data (at a store level) from 36 individual store managers and then leveraged this information to estimate sales for all nonparticipating stores.

The system was established during FY07 and continues, in FY08, to provide information to inform three key issues. First, and perhaps most importantly, the national market for CFLs (as discussed in both this and the previous report) appears to be expanding rapidly. As a result, it is important for program staff to have information from which to ensure that paid rewards are creating lift (i.e., additional sales) both across and within individual participating retailers.[19] Second, the impact of the CFL initiative reaches beyond the residential sector into commercial, agricultural, and multifamily buildings and this tracking system allows for a uniform assessment of impacts across these sectors. Third, CFLs have historically made up a significant portion of overall program savings, particularly in the residential sector and, therefore, a comprehensive system to track progress would appear to be a justifiable expenditure of resources.

Results

In 2007, over 8.2 million CFLs were sold through Wisconsin retailers. This represents a monumental jump in sales over 2006, when just shy of 4.4 million were sold statewide. It is noteworthy, however, that this monumental jump in sales over 2006 is also happening in other regions of the U.S. Nearly all of the 2007 sales were made through participating retailers (about 4.5 million) or Wal-Mart (about 3.2 million). With the exception of Wal-Mart, sales among nonparticipating retailers (about 500,000 CFLs in 2007) continue to be modest, with little evidence that the Wisconsin program is having a significant level of influence on them. Among participating retailers, the information collected through this research process suggests that participating hardware stores' CFL sales are likely to drop substantially (perhaps by 50 to 60 percent) if the program ended. In other words, a substantial portion of their program-induced CFL sales do not (at this time) appear to be sustainable. Participating home improvement stores, on the other hand, sell significant numbers of CFLs without reward (both in Wisconsin and other states), and the challenge for the Wisconsin program is to induce these retailers to sell substantially more CFLs than they would have if the Wisconsin promotion was not available.

[19] In the past, there was little evidence to suggest that participating retailers were having success selling large quantities of CFLs in states that were not running Focus-like promotions. The data presented in this report indicates that, for at least some market channels, this is no longer the case.

Overall, the Wisconsin retail-based CFL initiative has been very successful in promoting the purchase and use of CFLs in the residential, commercial, agricultural, and multifamily sectors. During calendar year 2007, over 1.44 million CFLs were rewarded through the program and the program achieved a net-to-gross ratio of 0.76. This means that 76 percent of the 1.44 million CFLs rewarded through the program during 2007 would not have been sold in the absence of the program. However, it is also clear (as evidenced by a decline in the program's net-to-gross ratio from 1.24 in 2005, to 0.81 in 2006, to 0.76 in 2007) that the program may be beginning to lose steam.

Given this information, there appear to be two important questions concerning the CFL initiative moving forward: (1) What is driving the decline in the net-to-gross ratio between 2005 and 2007? and (2) What can be done to reverse this trend? Like the 2006 report, this report continues to document a very big advance in the regional (and likely national) market for CFLs between 2005 and 2007. In particular, home improvement channel CFL sales outside of Wisconsin (in states without CFL initiatives) continue to expand rapidly. This growth in areas not formally touched by a program is undoubtedly a result of long standing efforts to promote CFLs by states such as Wisconsin and California, regional collaborates in the Northwest and Northeast, as well as the national ENERGY STAR program. Now, with the table set by these leaders in the energy efficiency industry, we are continuing to see interest and aggressive promotion by national/regional retailers such Home Depot and Lowes as well as mass merchandising giants such as Wal-Mart and their affiliated Sam's Clubs. All of this points to what this and the previous (2006) analysis found—a dramatic increase in CFL baseline sales (i.e., what we would have expected Wisconsin's 2007 CFL sales to look like if the program had not been offered). And, it continues to be—in many ways—a good news, bad news story. The good news is that the collective efforts by those in the energy efficiency industry (particularly in the Midwest, California, Northeast, and Northwest) have worked—major retailers in the U.S. are getting on board and they are clearly having a huge impact. The bad news (if it should even be worded that way) is that CFL promotional programs (in order to continue to achieve net results) need to remain innovative and stay ahead of regional and national trends.

The second study completed in the most recent reporting period (second half of 2008) is the CFL Customer Research. This report presents the results of a telephone survey designed to address customer awareness, purchase, and use of compact fluorescent lighting (CFL). The primary objective of the research is to explore how documented changes in the supply-side of the market—resulting in dramatic increases in CFL sales both in Wisconsin and nationwide—are impacting residential customer behavior and in-home installations.

In order to address the research objectives, a representative sample of 400 Wisconsin households were surveyed. Additionally, for the purpose of providing a comparison area (or control group), a representative sample of 400 Michigan households were surveyed. The study has a precision of ±5% at the 95% confidence level. When reviewing the survey results, it is important to keep in mind that there are limitations in consumers' ability to self-report their CFL purchases and installations.[20] Additionally, with respect to self-reporting their future purchasing intentions, it is well understood that intentions are notoriously unreliable predictors of behavior. Given this, we think it is most appropriate to view the survey information as

[20] This issue is more fully discussed (with appropriate references) within the *Methodology* section of this report.

indicative (or suggestive) of trends, differences, and impacts rather than an absolute measure of program results.

Results – Awareness and Purchasing

Key findings with respect to consumer awareness and purchasing rates are:

- Both Wisconsin (95 percent) and Michigan (90 percent) consumers are highly aware of CFLs.
- While awareness rates in both states are very high, Wisconsin consumers are significantly more likely to have purchased CFLs in the past year (65 percent Wisconsin versus 55 percent Michigan). However, when they decide to purchase, consumers in both states tend to purchase about the same number—8.6 per household.
- The relatively modest gap between Wisconsin and Michigan awareness and purchase rates is most likely best explained by the tremendous growth that has been observed in the regional and national CFL market over the last several years, resulting in rapid growth within Michigan and other non-program states.
- In the past year, the average Wisconsin household purchased 0.92 more CFLs than the average comparison area (i.e., Michigan) household. Taking into consideration the number of Wisconsin households, this would suggest that, in absence of the ongoing Focus initiative, roughly 1.9 million fewer CFLs would have been sold in Wisconsin in the past year.
- The bulk of all CFL purchases in Wisconsin (as well as the control area) are made either at home improvement centers or Wal-Mart/Sam's Club—underscoring the importance of finding ways to effectively work with these retailers. The need to find ways to effectively work with these retailers is particularly relevant in Wisconsin, given the fact that the home improvement channel, as documented in the *Second Annual Comprehensive CFL Market Effects Study*,[21] has the poorest channel level net-to-gross ratio at 0.27.

Results – CFL Installations and Disposal

Key findings with respect to current CFL installations and disposal practices are:

- Wisconsin consumers are significantly more likely to have CFLs installed—either within or outside their homes—and, when they do have CFLs installed, there are significantly more of them (77 percent of Wisconsin households currently have an average of 9.7 CFLs installed within their homes compared to 63 percent of Michigan households with an average of 8.37 CFLs installed).
- The average Wisconsin household has 41 percent more CFLs installed than the average household in the Michigan control area (a state that has not implemented any serious CFL programs in the past 10 or more years). Taking into consideration the number of Wisconsin households, one could conclude that Wisconsin currently

[21] Rick Winch and Tom Talerico, Glacier Consulting Group. *Focus on Energy Evaluation: Second Annual Comprehensive CFL Market Effects Study. Final*, September 8, 2008.

has about 4.5 million[22] more CFLs installed in residential households than one might have reasonably expected to have been installed in absence of Wisconsin's CFL initiatives.[23] Although a crude measure of overall impacts, dividing the 4.5 million additional CFL installations by the number of CFLs incented since the inception of Focus (just over 8 million) is suggestive of a program inception-to-date net-to-gross ratio of 56 percent.

- The vast majority of Wisconsin and Michigan consumers are disposing of CFLs by throwing then in the garbage/trash. It appears that, despite their mercury content and the call for recycling, relatively few CFLs are being disposed of properly.

Results – Future CFL Purchasing and Installations

Key findings with respect to future CFL purchasing and installations are:

- Wisconsin and Michigan consumers, who are aware of CFLs, are highly likely to purchase them in the future (79 percent WI and 74 percent MI).
- The average Wisconsin household currently has 7.42 CFLs installed and intends to replace an average of 3.52 of their remaining incandescent bulbs. Taking into consideration that intentions are a notoriously poor measure of future behavior, this suggests that the average Wisconsin household can be expected—if present CFL opinions, attitudes, and pricing persist—to have about 22 percent of their light sockets filled with CFLs in the near term (perhaps the next 2–3 years).
- Wisconsin consumers who currently have CFLs installed, currently have an average of 9.7 installed and intend, on average, to replace an additional 4.59 incandescents with CFLs in the future. This information would suggest that, even among the group of people who currently have CFLs installed, we should not expect to see more than about 15 CFLs installed within the average household in the near-future (next two to three years). As a rough estimate, this would mean that (within the average household) CFLs would occupy about 29 percent of the sockets.
- Respondents who intend to keep replacing incandescent light bulbs currently have an average of 9.30 CFLs installed and intend, on average, to replace an additional 8.21 CFLs. Thus, among those customers who are most favorably inclined toward CFLs (i.e., they currently have CFLs installed and intend to continue replacing existing incandescents), it is reasonable to assume, given present opinions and attitudes toward CFLs, that they will have a total of about 18 installed within the next

[22] This was calculated by multiplying the number of Wisconsin households by the difference in the average number of CFLs installed per household between Wisconsin and Michigan [2,084,544 * (7.42 – 5.27)].

[23] As acknowledged in both Comprehensive CFL Market Effects reports, the growth in CFL sales in states and regions not formally touched by a program is undoubtedly a result of long-standing efforts to promote CFLs by states such as Wisconsin and California, regional collaboratives in the Northwest and Northeast, as well as the national ENERGY STAR program. Thus, we acknowledge that it is difficult (if not impossible) to accurately assess the overall impact of the Wisconsin effort as it may have contributed to the growth we see in the Michigan control area—the very area from which we are now trying to draw comparisons for the purpose of understanding Wisconsin program impacts.

several years, which represents about 35 percent of the total number of eligible household sockets.

- The most frequently cited reason (in both Wisconsin and Michigan) for not purchasing in the future is the feeling that CFLs cost too much. Concern about the overall "quality of lighting" is also very real in the minds of a large percentage of consumers in both states.
- Roughly three of every four consumers (in both Wisconsin and Michigan) are willing to pay $2 for a CFL. Given this information, it seems reasonable to conclude that the major barrier to future purchasing (i.e., price) can potentially be overcome by making sure customers are aware of current CFL pricing strategies (both subsidized and unsubsidized prices). Of particular note is the fact that the current unsubsidized market price for CFLs sold in multi-packs (six or more) is already below the $2 level (the current market price (without subsidy) of a CFL sold as part of a six-pack is $1.68).

4.2.4 Program metrics and goals

We address the ESP metric we measured below. We include a brief description of the metric, an overview of our measurement approach, and results.

A. DESCRIPTION

The critical goal is an increase in the number of CFLs sold in Wisconsin compared to 2006. The critical metric associated with this goal is a five percent net increase in the number of CFLs sold in Wisconsin in 2007 compared to 2006.

B. MEASUREMENT APPROACH

The evaluation team measured this metric by applying Wisconsin CFL sales estimated from the 2006 and 2007 CFL Comprehensive Market Effects Studies.

C. RESULTS

Our analysis indicates that RLP has met the goal for this metric. In 2007, we estimated net CFL sales of 1.11 million, compared to a net estimate of 0.95 million CFLs in 2006. This represents a 17 percent increase, which exceeds the metric goal of a five percent increase.

Table 4-4. CFLs Sales by Drug, Grocery, Lighting Showroom, and Mass Merchant Retailer Types

Retailer Type	FY06	FY07
Drug	13	79
Grocery	22,255	45,638
Lighting Showroom	13,041	19,254
Mass Merchant	15,156	19,596
Total	**50,465**	**84,567**

4.2.5 Verified energy impacts for ENERGY STAR Appliances

For the Appliances program, Table 4-5 provides the tracked verified energy impacts (kWh, kW, and therms) by measure category and total for the 18-month Contract Period. As

expected by the program, clothes washers (across the tier types in this measure category) account for about 75 percent of the kWh impacts and about 44 percent of the therm savings.

Table 4-5. ENERGY STAR - Appliances Products Program: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Appliance-Other	862,246	25.2%	61	100.0%	104,340	55.5%
Clothes Washers	1,064,073	31.1%	0		35,198	18.7%
Clothes Washers Tier 2	605,983	17.7%	0		19,858	10.6%
Clothes Washers Tier 3	891,447	26.0%	0		28,529	15.2%
Dehumidifier	850	0.0%	1	1.6%	0	
Refrigerator	66	0.0%	0		0	
Total	**3,424,665**	**100%**	**61**	**100%**	**187,925**	**100%**

4.3 WISCONSIN ENERGY STAR HOMES

Evaluation efforts for the WESH program were conducted earlier in the 18-month target period. Relevant findings from WESH evaluation research are presented below for the each of the following four areas:

- Process findings and issues
- Verified energy impacts
- Market effects
- Program metrics and goals.

4.3.1 Process findings and issues

We did not formally include process related evaluation tasks as part of our *Contract Period One Detailed Evaluation Plan*. The evaluation team, however, stayed abreast of process related issues through monitoring of program changes and issues based on regular communications with the WESH program manager.

4.3.2 Verified energy impacts

We did not plan any energy impact evaluation tasks for the second half of 2008. The table below shows energy impacts for WESH program activity.

Table 4-6. Wisconsin ENERGY STAR Homes: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Building Shell	-5,970		0		257,911	100%
CFL	1,908	-47%	0		0	
Water Heating	0		0		564	0%
Total	**-4,062**		**0**		**258,474**	**100%**

4.3.3 Market effects

The metric measurement process provided some findings related to WESH market effects. These findings are summarized next in the *Program Metrics and Goals* section.

4.3.4 Program metrics and goals

No program metric goals were set for the WESH program in FY08.

4.4 HOME PERFORMANCE WITH ENERGY STAR

Evaluation efforts conducted during this reporting period focused on measuring Home Performance with ENERGY STAR (HPWES) program metrics.[v] Additional research on the Efficient Heating and Cooling (EHC) program efforts is reported below in section 4.7.

Key findings from this effort are presented below for the each of the following four areas:

- Process findings and issues
- Verified energy impacts
- Market effects
- Program metrics and goals.

4.4.1 Process findings and issues

We did not formally include process related evaluation tasks as part of our *Contract Period One Detailed Evaluation Plan*. The evaluation team, however, stayed abreast of process related issues through monitoring of program changes and issues based on regular communications with the program manager.

4.4.2 Verified energy impacts

The table below shows energy impacts for HPWES program activity for the 18-month contract period. Additional elaboration on the furnace impacts are included in section 4.7 (Efficient Heating & Cooling).

Table 4-7. Home Performance with ENERGY STAR: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Building Shell	484,626	68.5%	315	94.3%	390,837	93.9%
HVAC	167,400	23.7%	15	4.5%	13,104	3.1%
Other	0		0		2,349	0.6%
Water Heating	55,736	8%	4	1%	9,840	2%
Total	**707,762**	**100%**	**334**	**100%**	**416,130**	**100%**

4.4.3 Market effects

The metric measurement process provided some findings related to market effects. These findings are summarized next in the *Program Metrics and Goals* section.

4.4.4 Program metrics and goals

We measured one contract metric for HPWES for FY08. For this metric we include a brief description of the metric, an overview of our measurement approach, and results.

i. Description

The critical goal is an increase in the number of measures implemented per project completion compared to FY07. The critical metric associated with this goal is that the percentage of multiple installations of major measures per household will increase by five percent by the end of FY08.

ii. Measurement Approach

The evaluation team measured this metric by analyzing the program database to assess the number of measures installed per project completion in FY07 and FY08.

iii. Results

Our analysis indicates that HPWES has not met the goal for this metric. During FY07, 88 percent of projects in which one or more major measures were installed involved the installation of multiple measures, compared to 85 percent during FY08.[24] This represents a three percentage point decrease, which does not meet the metric goal of a five percentage point increase. While the metric goal was not met, HPWES did achieve a seven percentage point increase from FY07 to FY08 in the percent of projects involving four or more measures (29 percent to 36 percent). Air sealing and attic insulation are the most common two measure combination; air sealing, attic insulation, and sidewall insulation are the most common three measure combination; and air sealing, attic insulation, and sidewall insulation in combination with one or more of the other measures are the most common four or more measure combination.

4.5 APARTMENT AND CONDOMINIUM EFFICIENCY SERVICES

The Apartment and Condominium Efficiency Services (ACES) program consists of a whole building existing and a new construction component. Each component contains both prescriptive and custom incentives. The custom incentive structure has two tiers for both existing building and new construction projects, with the Tier 2 incentives based on implementation of multiple incentive categories to encourage more comprehensive installations. In June 2008, the Residential Housing Energy Efficiency Program (RHEEP) for two-to three-unit rental properties started site assessments under the ACES umbrella.

Through December 31, 2008, ACES accounted for 47 percent of the total net therm savings for all of the residential programs combined, 14 percent of the net kW, and 12 percent of the net kWh savings. In terms of ACES program targets, through December 31, 2008 (twelve months through the 18-month period) ACES had achieved the following net savings as a percent of its program target: kWh 85 percent, kW 78 percent, and therms 68 percent (Table 4-2).

[24] Major measures include the following: air sealing, attic insulation, chimney liners, exhaust fans, floor insulation, foundation insulation, sidewall insulation, sillbox insulation, and water heaters.

Evaluation efforts through December 2008 focused on reviewing and finalizing deemed savings values and their underlying assumptions for the following measures:

- Whole Building Existing, In Unit Direct Install—CFL replacement
- Whole Building Existing, In Unit Direct Install—Low-flow showerheads
- Whole Building Existing, In Unit Direct Install—Faucet Aerators
- Whole Building Existing, Whole Building—Prescriptive CFL, cold cathode, or LED lamp replacement
- Whole Building Existing, Whole Building—90+ efficiency modulating boiler replacements
- New Construction—Common Area Lighting
- New Construction—90+ efficiency modulating boiler replacements
- The evaluation efforts also included designing and submitting a participant survey to the PSCW and WECC for review and comment. This instrument addressed both process and impact issues.

Key findings efforts are presented below for each of the following four areas:

- Process findings and issues
- Verified energy impacts
- Market effects
- Program metrics.

4.5.1 Process findings and issues

We did not formally include process related evaluation tasks as part of our *Contract Period One Detailed Evaluation Plan*, although we did include process questions in the participant surveys.

Participants were most likely to hear of the program through ACES or Focus staff. Participants most frequently cited ACES or Focus staff when asked how they heard about the program. Participants also mentioned other property owners, mailings, and contact with the utility as other sources of information.

The primary program benefit perceived by participants was reduced energy costs. When asked what benefits they have realized at their property(s) as a result of participating in the program, participants most often cited reduced energy costs. Longevity or reliability of equipment, tenant goodwill, better understanding of energy efficiency options, and increased tenant comfort were other benefits mentioned frequently.

Participants said they would participate again. Over 95 percent of participants said they would participate in the program again. Additionally, a majority of participants (over 80 percent) said they have already recommended the program to other owners and building managers.

Respondents provided several areas for improvement for the program and discussed barriers to program participation. Finances and need for technical assistance were among the issues denoted. Participants had few suggestions for program changes. The few that were mentioned included a larger incentive or rebate, less paperwork, fewer requirements to get into the program, and more guidance and assistance from ACES representatives. Barriers participants reported when considering or seeking approval for new projects are budget and lack of capital. Direct install participants also cited lack of access to the units and time constraints as barriers.

4.5.2 Verified energy impacts

WECC is applying deemed savings from their other business and residential programs to similar measures installed under the prescriptive track. Savings for measures installed under the custom/whole building track are being calculated by the implementation contractors. During the fourth quarter of 2007 and continuing into 2008, the evaluation team obtained the deemed savings estimates and their underlying assumptions from WECC and reviewed the savings being used to estimate gross energy impacts for major prescriptive measures listed earlier. The final deemed savings evaluation report was submitted in June 2008. WECC implemented the recommended deemed savings amounts in their database in June 2008, retroactive beginning May 1, 2008. The following measure values were changed as a result of the deemed savings review:

- Direct install CFLs: No change in the deemed savings value of 43.5 kWh/year. The rate of 3.1watts/lamp for peak demand load reduction should be increased to 4.2 watts/lamp.
- Low flow showerheads: Increase therm savings from 25 to 27.2 therms/year and decrease kWh from 553 to 544.8 kWh/year. These adjustments reflect the changing baseline assumptions and the inclusion of the average multi-family household size to estimate the number of showers daily.
- Faucet aerators: Both kWh and therm savings were revised as shown below.

Table 4-8. Changes to Default Deemed Savings for Low Flow Faucet Aerators

Application	Prior Annual Default Energy Savings	Revised Annual Default Energy Savings
Faucet Aerator - Bath – Electric	160.8 kWh	127.1 kWh
Faucet Aerator - Bath – Gas	10 therms	6.3 therms
Faucet Aerator - Kitchen – Electric	158.8 kWh	223.1 kWh
Faucet Aerator - Kitchen – Gas	10 therms	11.1 therms

- Prescriptive lamp replacements: The prior energy savings value used by ACES was 215 kWh/year/lamp, and these savings were not differentiated among the lighting types. The revised energy savings differentiate by lighting type as follows:
  - For direct replacement of incandescents with CFLs in common areas, the revised default deemed savings value was increased to 407 kWh/year and the default peak demand load reduction was reduced from 47 to 41.5 watts/lamp.
  - For replacement of incandescent or standard fluorescent exit signs with LED or other low-energy types, the revised deemed savings value is 272 kWh/year and the peak demand load savings is 31 watts/fixture.

- For all other retrofits, it was recommended that the savings be calculated based on the actual reduction in watts achieved per fixture (DW) and either 12 or 24 hours/day operation depending on whether the application was daylight controlled. The deemed savings would be either 4.38 x DW (kWh/yr) or 8.76 x DW (kWh/yr) accordingly. The peak load demand reduction would be either zero or DW.

- 90% modulating boiler replacements: Calculation of a single deemed savings value for multi-family building boiler replacements would be highly uncertain without good statistical data on the sizes of boilers being installed. We recommended using a Deemed Savings Multiplier (DSM) to convert the installed boiler capacity to a deemed savings (see Table 2-3 in the *ACES Default Deemed Savings Review* report[25] for these multipliers). We are working with WECC to determine how this can be applied based on data in the database.

The verified tracked energy impacts by program initiative and measure category for July 1, 2007, through December 31, 2008, are shown in Table 4-9.

Table 4-9. Apartment and Condominium Efficiency Services: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Air Conditioning	183,831	0.7%	261	8.4%	0	
Boiler/Other Heating	420,624	1.6%	308	9.9%	1,015,547	42.7%
Building Shell	441,745	1.7%	335	10.8%	130,376	5.5%
CFL	1,393,384	5.3%	216	6.9%	-788	
Clothes Washer	287,881	1.1%	0		19,044	0.8%
Dehumidifier	350	0.0%	0		0	
Dishwasher	167,878	0.6%	0		8,607	0.4%
ECM Furnace	6,859	0.0%	1	0.0%	1,953	0.1%
Freezer	3,859	0.0%	0		0	
HVAC	35,167	0.1%	0		148,528	6.2%
Lighting-LED	846,530	3.2%	150	4.8%	0	
Lighting-Other	13,645,174	52.0%	1,238	39.8%	0	
Motors & Drives	131,877	0.5%	35	1.1%	0	
Other	275,568	1.0%	176	5.7%	30,856	1.3%
Refrigerator	130,676	0.5%	18	0.6%	0	
Water Heating	8,291,979	31.6%	375	12.0%	1,023,509	43.0%
Total	**26,263,382**	**100%**	**3,113**	**100%**	**2,377,633**	**100%**

The attribution rate was calculated using participant self-reports through telephone interviews and on-site visits. The methodology for calculating program attribution is very similar to the Year 1 Net Savings approach (Y1NS) approach applied by KEMA as described in the memorandum *Business Programs Life Cycle Attribution Analysis Results* of December 2, 2008, but with one key difference. The efficiency attribution is either full attribution or no attribution. The majority of respondents who said less efficient could not describe the efficiency of equipment that they would have installed in the absence of the program.

[25] Ron Swager and Chris Burger, Patrick Engineering, Focus on Energy Evaluation, *ACES: Default Deemed Savings Review,* June 24, 2008.

Therefore, all respondents that said the equipment they would have purchased would have been less efficient received 100 percent attribution for efficiency.

PA Consulting Group interviewed 90 respondents, representing 127 individual projects between September 11 and October 7, 2008. In addition, Patrick Engineering conducted site visits to sixteen projects. When possible, the attribution survey was also completed at the time of the site visits (10 attribution surveys were completed through the on-site inspections with 10 respondents).

For program participants through March 31, 2008, the overall net-to-gross ratio for the ACES program was 77.4 percent of the kWh savings and 67.4 percent of the therms savings. The direct install program component has the highest net kWh and therms ratios. The attribution rates for each of the ACES program components were calculated using participant self-reports through telephone interviews and the on-site visits (Table 4-10). The adjustment factors have been applied at the program component level to determine the net energy impacts for the 18MCP.

Table 4-10. Attribution Rate for ACES by Program Component

Program Component	Projects Surveyed/ Project Population	Measures	Project kWh Attribution Rate	90% Confidence Interval	Project Therms Attribution Rate	90% Confidence Interval
Direct install	59/271	112	85.7%	± 6.6%	88.0%	± 6.2%
New construction	13/22	63	63.6%	± 14.0%	43.0%	± 14.4%
Whole building	65/141	71	53.3%	± 7.5%	49.8%	± 7.5%
Overall	137/434	246	77.4%	± 4.9%	67.4%	± 5.4%

Data is weighted by savings and non-response.

4.5.3 Market effects

Supply side research was not included as part of our *Contract Period One Detailed Evaluation Plan*. We will examine this in the next contract period.

The participant telephone surveys also explored participant spillover. The telephone survey suggests there is some evidence of spillover, although the savings cannot be calculated since the equipment was not inspected after the telephone survey. Of the 71 percent of respondents who had other properties in Wisconsin, 20 percent reported installing energy efficient equipment on their own, although participants' reports of program influence were mixed. The 2009 ACES detailed evaluation plan (DEP) will include a task to attempt to quantify this spillover.

4.5.4 Program metrics

ACES has no program contract metrics.

4.6 TARGETED HOME PERFORMANCE WITH ENERGY STAR

The Targeted Home Performance with ENERGY STAR (THP) program provides Wisconsin residents who have limited incomes and resources (set as households between 150% and 200% of the federal poverty level) the opportunity to increase the energy efficiency,

affordability, safety, durability, and comfort of their homes through whole house energy efficiency services.

THP set aggressive 18-month program goals that increased its participation goals by more than 50 percent over prior levels. By December 31, 2008, THP had weatherized 593 homes reaching 83 percent of their total goal of 715. The program had the highest number of completions in December 2008 in the program history. Eighty (80) homes were served through the program in December 2008.

- Evaluation efforts through December 31, 2008, focused on an interim process evaluation to assist THP in reaching its program goals and reviewing THP participants' savings values.

Key findings efforts are presented below for each of the following four areas:

- Process findings and issues
- Verified energy impacts
- Market effects
- Program metrics.

4.6.1 Process findings and issues

The evaluation team stayed abreast of process related issues through monitoring of program changes and issues based on communications with the THP program manager. In June 2008, evaluators conducted interviews with 15 of the 19 THP service providers. The primary objective of the interviews was to provide concrete recommendations to help THP achieve its production goals[26]

4.6.2 Verified energy impacts

THP energy impacts are based on whole house savings for a program-served home. The basis of the reported energy impacts is a billing analysis of fiscal year (FY) 2002–2004 THP served home[27]. Evaluators conducted the billing analysis in FY2004.[28]

The FY2004 billing analysis is the best estimate available for THP given the fact that it is based on actual billing data; however, the analysis was based on served homes in the first three years of the program. Additionally, the billing analysis does not capture any modifications to measure installation practices that may have taken place after FY2004, such

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[26] Lark Lee, PA Consulting Group, *Targeted Home Performance with ENERGY STAR Service Provider Interview Results,* February 16, 2009

[27] A home is counted as a one dwelling unit (i.e. a duplex counts as two homes)

[28] Lark Lee, Pamela Rathbun, and Laura Schauer, PA Government Services, Inc. *Low-income Public Benefits Evaluation Year 3 Low-income Program Evaluation—Volume III. Other Evaluation Deliverables: Technical Appendices D–H, Appendix F,* September 17, 2004.

as the addition of measures, increase or decrease of incidence of measures being installed, or increase in the number of certain measures being installed (e.g., CFLs).

This issue was raised in 2005 and evaluators reviewed THP's program tracking data to identify any programmatic changes and resulting modifications in per home savings to the FY2004 billing analysis. The analysis compared the average home savings per the deemed savings reported by the program during the period of the impact analysis against the results of the billing analysis. From this comparison, evaluators recommended an adjustment factor, or realization rate, which accounted for the difference in the deemed savings and billing analysis while taking into consideration the additional measures installed through the program not included in the billing analysis.

This adjustment factor was then applied to the deemed savings reported by the program in subsequent program years. This approach allowed THP energy impacts to be based on the findings of the billing analysis, yet still recognized changes the program has made to increase savings per home. The reader is referred to the memorandum *Recommendation Adjusting Targeted Home Performance Energy Impacts* dated June 20, 2005, for a detailed discussion about this analysis.

The program has continued to make minor program modifications since 2005. In 2008, the PA evaluator, THP program manager, and the Public Service Commission of Wisconsin (PSCW) evaluation manager discussed and decided that the FY2004 billing analysis was still the best estimate of program savings since the program was still essentially the same in its approach and targeted the same customer segment. However, it was also agreed that an updated analysis of program measures was needed to capture changes in the program since 2005.

Based on a detailed analysis of the 2008 THP program[29], evaluators recommend that the deemed savings per home in the THP program be updated to 1,636 kWh savings and 269 therms. This is an increase from the current per home values of 1,192 kWh and a slight decrease from the 295 therms being reported based on the 2005 memorandum.

For the electric impacts, the number of CFLs per home has risen dramatically, and accounts for much of the increase in electric impacts. For the gas impacts, the changes have not been as significant.

Table 4-11. Targeted Home Performance with ENERGY STAR: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Other	970,148	100%	160	100%	159,517	100%
Total	970,148	100%	160	100%	159,517	100%

4.6.3 Market effects

The evaluation is not quantifying market effects from the program.

[29] Bryan Ward, Lark Lee, and Sandra Duerst, PA Consulting Group. *Recommendations for Targeted Home Performance with Energy Star Impacts,* April 2009.

4.6.4 Program metrics

THP does not have contract metrics.

4.7 EFFICIENT HEATING AND COOLING

4.7.1 Verified energy impacts

Earlier in the 18-month target period we conducted two studies to address ECM furnace impacts during the first half of 2008. The first was ECM furnace fan operation research, which updated research conducted previously in FY04 to assess furnace fan operation among participants who installed ECM furnaces rewarded through EHC. This research is important because the way in which people operate their furnace fans has significant ramifications on ECM furnace impacts. The second was a net-to-gross savings adjustment for ECM furnaces, which focused on updating (and improving) the net-to-gross estimates of energy and demand savings for ECM furnaces established as part of previous evaluation activities.

The key results for the ECM furnace fan operation research show that a considerable number of homeowners who purchase ECM furnaces significantly increase the frequency with which they operate their furnace fan subsequent to the installation of the ECM furnace. In particular, these homeowners switched their fan operation behavior from never running their furnace fan independent of the operation of the furnace or CAC (setting the fan switch on their thermostat to “auto”) to running their furnace fans 24 hours per day, every day depending on the time of the year (setting the fan switch on their thermostats to “on”).

The root cause for switching fan operation behavior has substantial ramifications on ECM furnace savings estimates. At one extreme, if switching is due entirely to installation of the ECM furnace (technology-induced), then the savings from the installation of the ECM furnace are entirely negated and energy use actually increases. This is because the increase in operating hours from switching more than offsets the increase in efficiency of the ECM furnace over the non-ECM furnace. At the other extreme, if switching is due entirely to the installation of new furnaces in general and independent of the installation of an ECM furnace (naturally occurring), then savings from the installation of the ECM furnace increase. This is because these homeowners would have switched behavior even if they had installed a non-ECM furnace. Therefore, the degree to which switching fan operation behavior is technology-induced or naturally occurring is crucial for determining ECM furnace savings estimates.

Based on the information we have, namely the practices of participants before and after installation and the practices of a control group before and after installation, we considered using three different baseline scenarios from which to calculate ECM savings for participants who switched fan operation behavior subsequent to the ECM furnace. The first is to use practices of participants before the installation as the baseline. This assumes that all switching is technology-induced. The second is to use the practices of participants after the installation as the baseline. This assumes that all switching is naturally occurring. The third is to use changes in practices among a control group to understand naturally occurring changes in practices. This assumes that the incidence of changes in practices among the control group is representative of changes in practices that are naturally occurring due to the installation of new furnaces in general.

We recommend using the savings estimates based on the control group baseline assumption. This results in a savings estimate of 733 kWh for existing homes.

For the net-to-gross savings adjustment for ECM furnaces, our key conclusions and recommendations are summarized as follows. Our opinion is that the contractor self-report approach provides a reasonable picture of baseline market share in the program's absence and that the resulting attribution estimate is consistent with FACTS data showing ECM market share flattening subsequent to 2005. Therefore, we recommend use of the adjustment from the contractor self-report approach going forward. Applying the precedent established in previous years of using the *Scenario 2–Mid Point* estimate, this means a net-to-gross adjustment of 38 percent. This result is significantly lower than the previous estimate of 80 percent, but this result does not mean that the program should be terminated nor does it imply that past program efforts have not yielded positive effects on the market for ECM furnaces.[30]

While the upcoming Potential Study will address potential market share for ECM furnaces that can be achieved through program efforts, our opinion is that market shares well in excess of the 20 percent range should be a reasonable goal in the near- to mid-term and that efforts should be made to investigate modifications to the ECM program's design and delivery so that it can create momentum to increase market share at an increasing rate, and, with this momentum, achieve more favorable attribution rates.

4.7.2 Program metrics and goals

EHC - FY08 METRIC

Description

The critical goal is an increase in market share for 90+ furnaces with ECM. The critical metric associated with this goal is a two percentage point increase in market share of ECM 90+ AFUE furnaces compared to FY07 baseline.

Measurement Approach

The evaluation team measured this metric by analyzing trends in annual ECM furnace market share as reported by information in the Energy Center of Wisconsin's (ECW) Furnace and AC Tracking (FACTS) reports. These reports provide market-based information on current and historic sales trends of residential furnaces sold in Wisconsin by distributors who agree to provide data to ECW.[31] Because data for the 2nd quarter of 2008 (the last quarter of FY08) is

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[30] The net-to-gross estimate accounts for what the market would have looked like in the absence of the program in 2007 given that the program had been implemented in years prior to 2007. Regarding the effects of past program efforts, growth in market share is a market effects indicator, and the stagnant market share in recent years, as indicated by FACTS, would seem to suggest that to the extent past efforts have yielded market effects, they were probably caused by the early years of the program. This is supported by the characterization of EHC efforts by program staff. Staff stated that the $150 incentive is the driving force for ECM sales, but said that when EHC first started the program had a role in helping distributors work with their contractors to overcome hesitancy to sell ECMs because ECMs were a relatively new technology. Since then, according to staff, the distributors have been doing much of the legwork and the program has not had to provide much marketing or sales support.

[31] An inherent disadvantage to FACTS is that not all distributors in Wisconsin provide data, resulting in coverage of only 50–60 percent of the Wisconsin market. For the purposes of measuring this metric, we assume that the market share of ECM furnaces sold by distributors outside of FACTS is the same

not available yet, we had to choose different pre- and post-periods on which to base the analysis. We decided to move the pre- and post- periods up one quarter and compare the year beginning with the 2nd quarter of 2007 and ending with the 1st quarter of 2008 (post) to the year beginning with the 2nd quarter of 2006 and ending with the 1st quarter of 2007 (pre).

Results

Our analysis indicates that EHC has not met its goal for this metric. During the pre period, ECM market share was 26.4 percent, compared to 28.1 percent during the post period (Table 4-12). This represents a 1.7 percentage point increase, which does not meet the metric goal of a two percentage point increase.[32]

Table 4-12. ECM Furnace Market Share

Period	ECM Furnaces	All Furnaces	Market Share
Pre (2006-Q2 thru 2007-Q1)	13,693	51,936	26.4%
Post (2007-Q2 thru 2008-Q1)	14,443	51,430	28.1%

Table 4-13. Efficient Heating and Cooling: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
Adjustment	-8,259		2	0.0%	2,675	0.4%
Air Conditioning	1,052,880	5.6%	2,268	42.0%	0	
Boiler/Other Heating	0		0		278,326	37.3%
ECM Furnace	17,900,105	94.5%	3,136	58.0%	399,740	53.6%
HVAC	0		0		65,520	8.8%
Total	**18,944,726**	**100%**	**5,405**	**100%**	**746,261**	**100%**

4.8 HEAD START CFL

Table 4-14. Head Start CFL: Tracked Energy Impacts The 18-month Contract Period (July 1, 2007–December 31, 2008)

Measure Category	Verified kWh	kWh %	Verified kW	kW %	Verified Therms	Therm %
CFL	402,388	100%	17	100%	0	
Total	**402,388**	**100%**	**17**	**100%**	**0**	

as that sold by distributors involved with FACTS. We recommend a continuation of the efforts to improve the market coverage of FACTS.

[32] It is important to note that the metrics measurement process is ***not*** assessing attribution. It simply involves measuring the total change in ECM furnace market share. Separating the change in ECM furnace market share into its component pieces (i.e., program-induced versus naturally occurring) is addressed through the net-to-gross analysis.

5. RENEWABLE ENERGY PROGRAM EVALUATION

5.1 OVERVIEW/KEY ACTIVITIES

This chapter describes the evaluation activities for the Renewable Energy Program conducted between July 1, 2007, and March 31, 2009. This chapter summarizes the following:

- Reports
- Gross energy impacts
- Net energy impacts.

5.1.1 Reports delivered July 2007 through March 2009

During this contract period, the Renewable Energy evaluation team submitted the following reports:

- Semiannual Report (Fiscal Year 07, Year End)
- Semiannual Report (October 2008)
- Renewable Energy Program Standard Calculation Recommendations (September 2008)
- Renewables: Impact Evaluation Report 18-month Contract Period (Draft Report: March 2009).

5.2 GROSS ENERGY IMPACTS

5.2.1 Program activities

In this section, we discuss the projects implemented for the period from July 1, 2007, to December 31, 2008[33], referred to as the 18-month Contract Period (18 MCP). In the 18 MCP, the Program completed a total of 450 renewable energy projects; 144 nonresidential and 306 residential installations. This represents a substantial increase in the number and rate of installation of program renewable energy systems. The increase in the number of installations (328 additional projects in the 18 MCP) is due in part to a contract period that was 50 percent longer and in part to the inclusion of Residential Solar Water Heating[34] (160 projects in the 18 MCP) in the Renewable Program.

[33] In addition to providing cash back rewards and grants for installation of renewable energy systems, the Renewable Program completed 14 feasibility studies, 10 business and marketing projects and 773 site assessments.

[34] Prior to the 18 MCP Solar Water Heating was offered as part of the Focus on Energy Residential program.

The Program increased the rate of installation for all technology types except Thermal Bioenergy. On an annualized basis, the Renewable Program increased installations 146 percent; 123 percent in the nonresidential sector and 158 percent in the residential sector. Excluding Residential Solar Water Heating, the Renewable Program increased installations by 58 percent; 123 percent in the nonresidential and 23 percent in the residential sectors. The largest increases in the rate of installation were in Solar Water Heating, Solar Electric, and Wind Machines in the nonresidential sector.

The mix of projects has changed somewhat in this 18-month period. Solar Electric systems still comprise the largest number and greatest percentage of projects, comprising 47 percent of all installations. Solar Water Heating now comprises a substantial portion of Renewable projects, representing 44 percent of all projects installed in the last 18 months. This is due mostly to the inclusion of Residential Solar Water Heating in the Program, and partly due to the increase in the number of Nonresidential Solar Water Heating projects.

Table 5-1. Projects Implemented by Type and Contract Year

Technology	Completed Projects						
	FY02/FY03 Mar 02–Jun 03	FY04 Jul 03–Jun 04	FY05 Jul 04–Jun 05	FY06 Jul 05–Jun 06	FY07 Jul 06–Jun 07	18 MCP Jul 07–Dec 08	Program To Date
Nonresidential Projects							
Biogas	0	1	4	7	2	6	20
Thermal Bioenergy	0	3	7	16	14	18	58
Solar Electric	3	3	9	9	18	78	120
Solar Water Heating	0	0	4	5	6	38	53
Wind Machine	2	2	5	1	1	4	15
Hydroelectric	1	0	1	0	0	0	2
Other	0	0	1	1	2	0	4
All Nonresidential	**6**	**9**	**31**	**39**	**43**	**144**	**272**
Residential Projects							
Solar Electric (PV)	20	40	35	48	74	133	350
Solar Water Heating[a]	-	-	-	-	-	160	160
Wind Machine	1	8	2	5	5	13	34
Other	0	0	1	1	0	0	2
All Residential	**21**	**48**	**38**	**54**	**79**	**306**	**546**
All Projects	**27**	**57**	**69**	**93**	**122**	**450**	**818**

[a] Residential Solar Water Heating was included and tracked in the Focus on Energy Residential program until the 18 MCP. This table includes only those projects completed through the Focus Renewable Energy program.

5.2.2 Program-reported gross energy impacts

The Program tracks gross energy savings (generation) for all projects completed that receive a Cash-Back Reward or a grant that has associated energy impacts. Table 5-2 shows the program-reported gross impacts by technology and segment for FY06, FY07, and the period from July 1, 2007, to December 31, 2008.

Primarily due to changes in how the program tracks electric impacts, the annualized Program-reported gross electric impacts for the 18 MCP are slightly lower than FY07 rates despite an increase in the number of electric projects. Annualized program-reported gross kW and kWh

savings for the 18 MCP are 24 and 11 percent lower than FY07 totals respectively. The reduction in reported kW savings is due partly to a change in the definition of kW savings for the Renewable Program. In previous years, the Program was reporting the renewable system's capacity. In the 18 MCP, the Program began reporting kW peak savings, which is consistent with the kW estimates for the other Focus on Energy Programs. In the 18 MCP, the Program also began tracking parasitic electric loads. Parasitic electric loads account for approximately a 5 percent reduction in both kW and kWh impacts.

Program-reported gross therms impacts for the 18 MCP are 133 percent higher (on an annualized basis) than FY07. This is primarily due to the large increase in therm savings from Biomass projects, which represent 92 percent of the Program therm savings.

Table 5-2. Renewable Energy Program-reported Gross Impacts[35] by Segment and Technology

Segment	Technology	Energy Impacts	Completed			
			FY06 Jul 05–Jun 06	FY07 Jul 06–Jun 07	18 MCP Jul 07–Dec 08	Program To Date
Nonresidential	Biogas	Kilowatts	1,586	1,045	1,180	6,111
		Annual kilowatt-hours	12,366,960	8,238,780	10,159,791	49,692,737
		Annual therms	75,488	0	138,637	247,290
	Thermal Bioenergy	Kilowatts	0	0	-66	-66
		Annual kilowatt-hours	0	0	-329,413	-329,413
		Annual therms	1,982,546	684,448	2,213,364	5,376,046
	Solar Electric*	Kilowatts	24	124	307	519
		Annual kilowatt-hours	29,643	153,422	778,759	1,044,861
		Annual therms	0	0	0	1,283
	Solar Water Heating	Kilowatts	0	0	-13	-13
		Annual kilowatt-hours	0	0	-19,107	-19,107
		Annual therms	13,708	2,697	48,752	85,637
	Wind Machine	Kilowatts	65	90	17	498
		Annual kilowatt-hours	83,600	109,560	127,249	799,423
		Annual therms	0	0	0	0
	Hydroelectric	Kilowatts	0	0	0	1,300
		Annual kilowatt-hours	0	0	0	6,473,600
		Annual therms	0	0	0	0
	Other	Kilowatts	0	14	0	14
		Annual kilowatt-hours	0	29,973	0	29,973
		Annual therms	102	1,480	0	2,638
	All Nonresidential	**Kilowatts**	**1,675**	**1,273**	**1,425**	**8,364**
		Annual kilowatt-hours	**12,480,203**	**8,531,735**	**10,717,278**	**57,692,073**
		Annual therms	**2,071,844**	**688,625**	**2,400,753**	**5,712,894**

[35] Gross energy impacts are those reported in the program tracking system maintained by WECC.

Segment	Technology	Energy Impacts	Completed			
			FY06 Jul 05– Jun 06	FY07 Jul 06– Jun 07	18 MCP Jul 07– Dec 08	Program To Date
Residential	Solar Electric*	Kilowatts	135	224	263	778
		Annual kilowatt-hours	177,638	290,398	681,074	1,358,272
		Annual therms	0	0	0	3,776
	Solar Water Heating[36]	Kilowatts	-	-	28	28
		Annual kilowatt-hours	-	-	140,187	140,187
		Annual therms	-	-	8,371	8,371
	Wind Machine	Kilowatts	106	40	27	297
		Annual kilowatt-hours	123,346	51,353	278,909	649,283
		Annual therms	0	0	0	0
	Other	Kilowatts	0	0	0	0
		Annual kilowatt-hours	-15,545	0	0	-15,545
		Annual therms	1,881	0	0	2,253
	All Residential	**Kilowatts**	**241**	**264**	**319**	**1,102**
		Annual kilowatt-hours	**285,439**	**341,751**	**1,100,170**	**2,132,196**
		Annual therms	**1,881**	**0**	**8,371**	**14,400**
TOTAL	**All Projects**	**Kilowatts**	**1,916**	**1,537**	**1,743**	**9,466**
		Annual kilowatt-hours	**12,765,642**	**8,873,486**	**11,817,448**	**59,824,270**
		Annual therms	**2,073,725**	**688,625**	**2,409,124**	**5,727,294**

* In FY03 and FY04, "Solar Electric" included a few projects that combined solar electric and solar thermal technologies. The therm savings are from combined projects or solar electric installations that were off-grid and displacing fossil fuel generators on-site.

5.3 NET ENERGY IMPACTS

5.3.1 Approach

The evaluation team estimates net energy savings for the Renewable Energy Program on an annual basis. The most recent round of completed data collection to determine net energy savings included renewable energy projects installed between July 1, 2007, and December 31, 2008 (18 MCP).

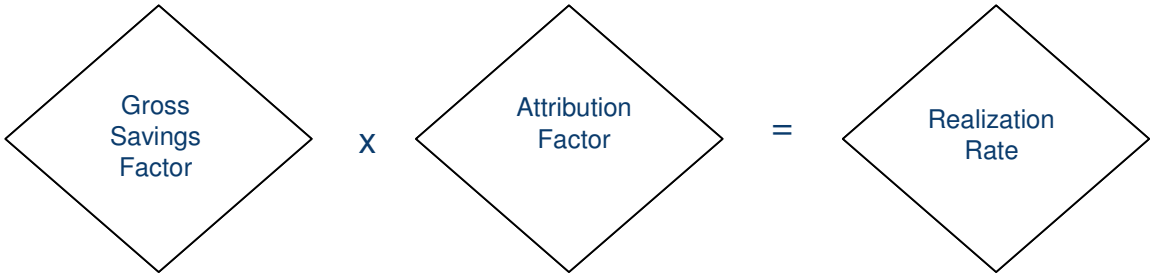
The impact analysis determines three adjustment factors to the gross savings reported by the Program:

- *Gross savings adjustment factor*: This factor adjusts tracked gross savings for installation and changes based on engineering review. Applying the gross savings adjustment factor to tracking gross savings produces the estimate of verified gross savings.
- *Attribution factor*: This factor adjusts verified gross savings for program attribution.

[36] Solar Water Heating projects were switched from the Residential to the Renewable Program beginning in FY07.

- *Realization rate*: This factor combines the gross savings adjustment factor and the attribution factor. (It is the ratio of net savings to tracked gross savings.)

Figure 5-1. Realization Rate Calculation



The definitions of these factors and the methods for producing them are the same as in all previous renewable impact evaluations[37]. The reporting of the results in this semiannual report are the same as in the previous two rounds of impact evaluation for the Renewable Program. This section includes results detailed in the *Renewable: Impact Evaluation Report 18-month Contract Period*.

[37] For the 18 MCP the attribution questions for the participant surveys were modified. The revised survey is included in the Appendices of *Renewable: Impact Evaluation Report 18-month Contract Period* (Draft Report: March 2009, final April, 2009)

5.3.2 Overall findings

Table 5-3. Renewable Energy Program-Reported Gross, Evaluation-Verified Gross, and Verified Net Impacts

Time Period	Kilowatt-hours			Kilowatts			Therms		
	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net
FY02: Mar 02–Jun 02	536	545	440	0.48	0.41	0.32	0	0	0
FY03: Jul 02–Jun 03	3,659,120	3,718,437	3,005,052	707	604	478	1,686	1,713	1,385
FY04: Jul 03–Jun 04	516,495	484,151	448,980	217	220	195	106,943	213,834	199,754
FY05: Jul 04–Jun 05	22,191,543	21,909,710	4,256,338	3,343	3,261	984	447,192	343,622	88,276
FY06: Jul 05–Jun 06	12,765,642	13,042,016	2,350,819	1,916	1,874	386	2,073,725	2,066,494	459,285
FY07: Jul 06–Jun 07	8,873,486	8,515,648	420,003	1,539	1,871	350	688,625	673,425	315,121
18MCP: Jul 07–Jun 08	11,817,448	6,998,114	3,914,269	1,743	1,190	702	2,409,124	2,219,576	684,193
Total	**59,824,270**	**54,668,622**	**14,395,901**	**9,466**	**9,020**	**3,097**	**5,727,294**	**5,518,665**	**1,748,013**

5.3.3 Final 18 MCP net energy Impacts

This section presents the results of the 18 MCP impact evaluation.

The objective of this analysis was two-fold. The first objective was to verify the data that had been entered into the program tracking database to produce *gross savings adjustment factors*. Gross savings factors are based on verification of installation (installation rate) and an engineering review (resulting in an engineering verification factor) of the reported savings for projects installed between July 1, 2007, and December 31, 2008.

The second objective was to determine the *realization rate* for the Program. The realization rate is the percentage of program reported impacts that can be attributed to the Program. The realization rate is a function of the gross savings adjustment factor combined with the attribution factor, which subtracts out estimated free-ridership. Free-ridership calculations are based on participant reports of Program effect on their decision to install a renewable energy system. For instance, the Program could have:

- Been the main factor in the decision to install
- Accelerated the timing of the installation
- Changed the size of the system installed
- Had no impact on a pre-existing intention to install the measure.

Data used in the net impact analysis came from several sources.

Program Tracking Database. We obtained Program-reported savings for each measure directly from the Renewable Energy Program tracking database.

Project Documentation Files. The evaluation team requested additional information from program staff for each completed measure. This included detailed paperwork associated with the project application; estimates of program savings; Project Impact Statements (if completed); and documentation of correspondence. The evaluation team then followed-up with program staff to clarify some information. We used this information to provide a basis for the engineering verification and to inform the interviewer regarding project details and Focus on Energy project involvement.

Participant Telephone Surveys. We conducted telephone interviews with a stratified random sample of participants completing 14 percent of the projects and representing 87 percent of kWh, 70 percent of kW, and 92 percent of therms savings reported by the Program. These are very high proportions of savings. The interviews verified installation details, assessed the extent to which the project implementation was attributable to the Focus Renewable Energy Program, and covered some general issues associated with participating in the Program and installing a renewable energy measure. KEMA completed interviews with 65 of 69 participants, sampled for a response rate of 94 percent.

As part of the telephone survey the interviewer verified the information provided in the program documentation (measure, size, and other key variables). An engineer then reviewed the engineering calculations for reasonableness and consistency. We discuss the engineering calculations in more detail below.

A. INSTALLATION RATE

We confirmed the installation of 100 percent of the equipment for the sample.

B. ENGINEERING VERIFICATION FACTOR

The engineering verification factors are the ratio of verified to installed savings. Because we confirmed installation of 100 percent of the sampled projects, the engineering verification factor is equal to the verified gross installed (VGI) factor. The Renewable Program overall engineering verification factors are high for therm savings and lower for electrical energy and demand savings. Program level engineering verification resulted in 93 percent for therms, 56 percent for kWh, and 64 percent for kW. We provide the engineering verification factors for each of the technology categories in Table 5-4. The low verification factors for electrical energy and demand are primarily due to low biogas and wind verified gross savings.

Table 5-4. Engineering Verification Factors by Technology*

Technology	Verified Gross Installed		
	kWh	Peak kW	Therm
Biogas	**57%**	**56%**	**0%**
Biomass	**169%***	**134%***	**98%**
Solar Electric	**99%**	**99%**	
Solar **Electric** - Residential	100%	99%	
Solar **Electric** - Non-residential	99%	99%	
Solar Hot Water	**48%**	**23%**	**105%**
Solar Hot Water - Residential	51%	26%	109%
Solar Hot Water - Non-residential	69%	30%	105%
Wind	**60%**	**108%**	
Wind - Residential	59%	128%	
Wind - Non-residential	62%	76%	
Overall	**56%**	**64%**	**93%**

* Biomass kWh and peak kW factors are parasitic loads and have little impact on overall savings

The Program's tracked savings for Solar Electric were consistent with KEMA verified savings as calculated based on the 2008 Standard Calculation Recommendations.[38] KEMA's verification of tracked savings for other technologies identified some generic issues with savings calculations, as well as some issues associated with specific technologies. These are summarized below and described in more detail in the *Renewables: Impact Evaluation Report 18-month Contract Period*.

Incomplete Documentation: The Program can improve documentation of assumptions and calculations. Examples include documenting the assumptions for hot water usage for solar hot water systems (when they differ from RETScreen assumptions based on number of people in the household), providing supporting documentation for biogas calculations, and providing supporting documentation for assumptions used in estimating the impacts of biomass projects.

Reliance on Contractor Energy Production Estimates: The Program in many cases accepted contractor estimates of energy savings (or generation) without verifying calculations or underlying assumptions. Initial Program verification of contractor estimates (especially for large or complex projects) improves Program tracking estimates, and sets the participant's savings expectations at more realistic levels. For the current and future contract periods, consistent Program verification of estimates will assure compliance with the standard calculation and documentation guidelines.[39]

[38] B. Tannenbaum, D. Kneale, and B. Dunn. *Standard Calculation Recommendations for Focus on Energy Evaluation Renewable Energy Program Final Report,* KEMA Inc. and PA Consulting Group Inc., 2008.

[39] Ibid

Wind Energy Overestimation: Based on metered energy production, the Program substantially overestimated energy production from wind systems. Overestimation of small wind system production is a problem in the industry, and not specific to Focus calculations. KEMA identified this issue as we developed the Standard Calculations and continues to recommend that the Program apply a 0.65 derating factor to kWh estimates based on current calculation approaches.

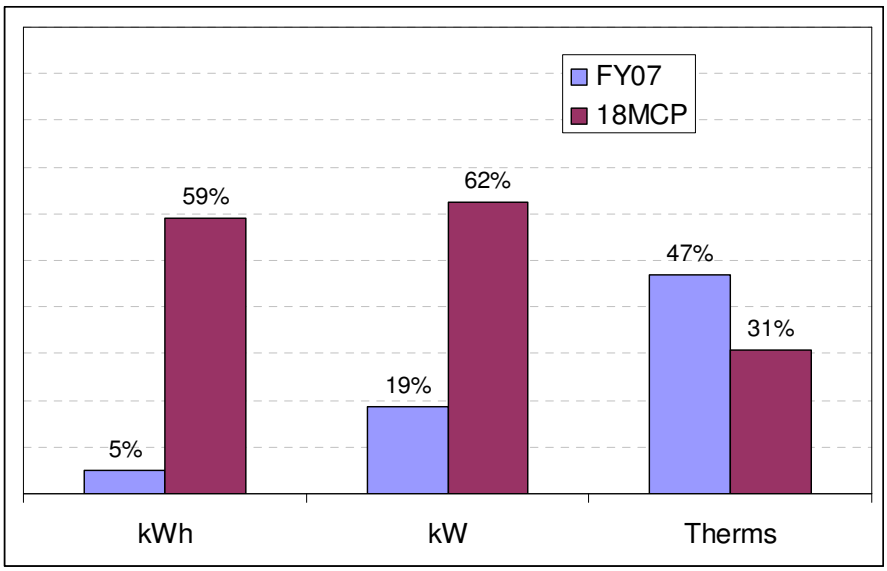
i. Verified Gross Installation

The gross savings adjustment factor is the product of the installation rate and the engineering verification factor. Since we confirmed 100 percent of installation, the gross savings adjustment factors are equal to the engineering verification factors. The gross savings adjustment factor is also called Verified Gross Installation (VGI).

C. ATTRIBUTION

Attribution is the percent of tracked savings that is directly attributable to the program. The 18MCP attribution factors for the program overall are 59 percent, 62 percent, and 31 percent for kWh, kW, and therms, respectively, as show in Figure 5-2. This represents a substantial increase in attribution for electric projects, and a decline in attribution for projects displacing therms. While the majority of the therm projects are for solar water heating, the majority of the tracked therm savings is for biogas and biomass. Most biomass systems had very low attribution factors.

Figure 5-2. Attribution Factors



D. REALIZATION RATE

Table 5-5 below reports the overall final adjustment factors for the 18 MCP. These factors are based on a sample of projects completed between July 1, 2007 and December 31, 2008. The gross savings adjustment factors combined with the attribution factor are used to determine the net program impacts. These numbers were calculated by technology, then aggregated to program level factors for electric energy (kWh), electric demand (kW), and natural gas

(therms). The calculation of the technology and overall program factors is weighted by the size of the project, so projects (and technologies) that account for a large amount of savings count more than projects that have small savings. The resulting net adjustment factors were then applied to all projects completed in the 18 MCP, resulting in the final net energy impacts of the Focus Renewable Program for the period between July 1, 2007, and December 31, 2008.

Table 5-5. Final Net Adjustment Factors for 18 MCP

	kWh				kW				Therms			
			Margin of Error				Margin of Error				Margin of Error	
Adjustment Factor	n[a]	Estimate	18 MCP	Extra-polated	n[a]	Estimate	18 MCP	Extra-polated	n[a]	Estimate	18 MCP	Extra-polated
Installation Rate	58	100%	+/- 0.0%	+/- 0.0%	50	100%	+/- 0.0%	+/- 0.0%	25	100%	+/- 0.0%	+/- 0.0%
Engineering Verification Factor	62	56%	+/- 2.6%	+/- 24.1%	59	64%	+/- 3.6%	+/- 22.1%	25	93%	+/- 3.7%	+/- 8.9%
Gross Savings Adjustment Factor	58	56%	+/- 2.6%	+/- 24.1%	50	64%	+/- 3.6%	+/- 22.1%	25	93%	+/- 3.7%	+/- 8.9%
Attribution Factor	59	59%	+/- 5.3%	+/- 40.2%	56	62%	+/- 7.8%	+/- 29.6%	23	31%	+/- 27.2%	+/- 43.0%
Realization Rate	58	33%	+/- 3.3%	+/- 26.6%	50	40%	+/- 5.5%	+/- 23.6%	23	29%	+/- 25.4%	+/- 40.3%

[a] The gross savings adjustment factor and the realization rate are not calculated directly but are products of other adjustment factors. Therefore, sample sizes reflect the minimum sample size used in calculating these two adjustment factors.

Due to the engineering verification factors discussed above, the final 18 MCP gross savings adjustment factors for electric measures are lower than in previous years at 56 percent and 64 percent, for energy (kWh), demand (kW), respectively. Therms remained high at 93 percent. Final FY07 net verified energy impacts improved substantially over FY07. The realization rates used to calculate program estimated impacts are 33 percent for energy (kWh), 40 percent for demand (kW), and 29 percent for therms. These realization rates are a result of improved attribution factors and lowered engineering verification factors.

For all energy types the installation rate was 100 percent. The engineering verification factor was lower than in previous years for overall electrical measures, but remained close to 100 percent for therm measures. The free-ridership rates for electric measures have improved greatly; however, free-ridership on therms projects, primarily biomass, remain high. Free-ridership is estimated at 41 percent for kWh (energy), 38 percent for kW (demand), and 69 percent for therms. That is, the analysis indicates that 41 percent of the electric energy savings, 38 percent of the demand savings, and 69 percent of the therm savings would have occurred without the Program. Though these free-ridership rates are higher than ideal, the Program has shown significant progress in reducing free-ridership since FY07. We anticipate realization rates continuing to improve in the current program period as the current downturn in the economy makes the Program's financial incentives relatively more important to participants.

Gross program savings as verified by evaluation are shown in the following table along with the program goals and percentage of goal achieved. Savings shown are as of December 31, 2008, the entirety of the 18-month target per5mgiod.

Table 5-6. Net Renewable Program Savings versus Renewable Program Portfolio Targets The 18-month Contract Period (July 1, 2007–December 31, 2008)

	kWh			kW			Therms		
Program	Target	Net	% of 18-month Target	Target	Net	% of 18-month Target	Target	Net	% of 18-month Target
Total Renewable Programs	**10,125,000**	**3,914,269**	**39%**	**1,875**	**702**	**37%**	**624,000**	**684,193**	**110%**

6. FOCUS ON ENERGY BIBLIOGRAPHY

6.1 REFERENCES

6.1.1 Technical information to support evaluation results

Mike Sherman, Lisa Petraglia, and Glen Weisbrod; Economic Development Research Group, Inc. PA Government Services Inc. *Economic Development Benefits: Interim Economic Impacts Report.* March 31, 2003.

Nick Hall, TecMarket Works, LLC. David Sumi, PA Government Services Inc. *Environmental Research Program: Detailed Evaluation Plan–[FY04] Contract Year 3*, October 9, 2003.

Nick Hall, TecMarket Works, LLC. "Non-energy Benefits: Detailed Evaluation Plan–Year 3," Memo, October 8, 2003.

Nick Hall and Johna Roth, TecMarket Works, LLC. *Non-energy Benefits to Implementing Partners from the Wisconsin Focus on Energy Program: Final Report*, October 20, 2003.

Bobbi Tannenbaum and Ryan Barry, KEMA Consulting and Adam Serchuk, Serchuk and Associates, *Renewable Energy Program: Spring 2004 Impact and Linkage Evaluation,* July 19, 2004.

Bobbi Tannenbaum, *Wisconsin LIHEAP Performance Measures: Working Group Report.* Energy Center of Wisconsin. 2000.

Jeff Erickson with Carmen Best, David Sumi, Bryan Ward, Bryan Zent, and Karl Hausker; PA Government Services Inc*., Estimating Seasonal and Peak Environmental Emissions Factors*.. Report for the Wisconsin Department of Administration, Division of Energy. Focus on Energy statewide evaluation. May 2004.

EPA's *E-Grid 2000 database* with data for the MAIN and MAPP NERC regions from 1998.

APPENDIX A: GEOGRAPHIC DISTRIBUTION OF DIRECT ENERGY IMPACTS

This appendix presents the geographic distribution of direct energy impacts. Also note that information on participant avoided costs, that are used to value the energy savings in these map, may be found in Table A-17.

A.1 INTRODUCTION

The following appendix sections provide tables and maps that show annual energy savings achieved through resource acquisition activities of Focus on Energy programs. This version of the report does not provide observations, comments, or analysis of the data—which is largely the domain of the respective program evaluation leads. It is expected that evaluation team leads may integrate some of this information in the relevant evaluation reports and make the relevant analysis integrating it with other evaluation results and analysis.

Note: A change in the type of energy impacts data used for the maps. The data reported in all of the maps in this report are *lifecycle verified gross* energy impacts— a recently introduced (for Focus) type of reported energy impacts. As in the past, these are impact estimates based on evaluation work done to establish verified gross for specific programs and/or program areas. However, as discussed in Section 1.1, *lifecycle verified gross* is defined as:

> Energy savings, expressed as *verified gross*, that explicitly incorporate measure life.

The reader should be aware of this shift since it has the effect of diminishing the levels of reported savings (compared to verified gross savings). This is because verified gross savings do ***not*** consider either the lifecycle effects (i.e., the median operating life of energy efficiency measures, such as CFLs) that may cause energy savings to end.

In order to provide some continuity in this transition in the basis for the mapped energy impacts, the tables that accompany the maps include a column for verified gross impacts—as in past reports—though these are *lifecycle* verified gross impacts, and will therefore show some differences from past reports. Additional discussion of lifecycle and persistent savings is provided above in Section 2.1 and Section 2.8.

Normalizing data for the maps. As in the past, the maps that represent impacts by "*County*" and *"Utility Territory*" have been normalized, while the maps that represent impacts by "*Senate District*" and "*Assembly District*" show total energy impacts. The primary reason the Senate District and Assembly District data has not been normalized is because of difficulty in estimating the number of eligible participants in those regions due to issues with the nonparticipating utility territories. Some options are being considered for establishing those estimates for use in future reports.

For the county maps, an effort was made to estimate the number of eligible participants (excluding the relevant customers of nonparticipating utilities). For the utility maps, this was not an issue—since by definition their customers are eligible to participate in the program, therefore the number of customers reported by the utilities was used. Although, it should be noted there are likely some differences in the definition of rate classes from utility to utility that may cause anomalies in the *"per capita"* values. This will be most notable in the Industrial Sector. There are some differences in the numbers of eligible customers using these two

methods. These differences are primarily due to the definition of a *"customer,"* since the utilities define customers by *service addresses or meters*; the method used for the county maps defined eligible customers as *households* (using U.S. Census data) for the residential segment *and business addresses* for the business segment (using Dun & Bradstreet data).

The maps are based on the "Dollars Saved per Customer" column in the tables for the county and utility territory maps. This represents the annuals dollars in energy bill savings realized by program participants divided by the total number of customers in the county or utility territory. The senate and assembly district maps present the information shown in the "Annual Dollars Saved" column of the tables. This represents the annual dollars in energy bill savings realized by program participants. The energy bill savings are calculated using the average retail price of energy for the state of Wisconsin for each rate class (commercial, industrial, and residential). Comparisons cannot be made between maps, because both the definition of per capita and energy savings scales vary by program.

A.2 BUSINESS PROGRAMS

This section presents tables and maps that show energy savings achieved through participation in Focus on Energy Business Programs. These impacts are broken out for the Commercial and Industrial sectors.

Note: A change in the type of energy impacts data used for the Business Programs maps. As explained in the Introduction to this Appendix (above), the data reported in all of the maps in this report are *lifecycle verified gross* energy impacts— a recently introduced (for Focus) type of reported energy impacts. As in the past, these are impact estimates based on evaluation work done to establish verified fross for specific programs and/or program areas. However, as discussed in Section 1.1, *lifecycle verified gross* is defined as:

> Energy savings, expressed as *verified gross*, that explicitly incorporate measure life.

The reader should be aware of this shift since it has the effect of diminishing the levels of reported savings (compared to verified gross savings). This is because verified gross savings do ***not*** consider the lifecycle effects (i.e., the median operating life of energy efficiency measures, such as CFLs) that may cause energy savings to end.

In order to provide some continuity in this transition in the basis for the mapped energy impacts, the tables that accompany the maps include a column for verified gross impacts—as in past reports—though these are *lifecycle* verified gross impacts, and will therefore show some differences from past reports. Additional discussion of lifecycle and persistent savings is provided above in Section 2.1 and Section 2.8.

The *"Number of Customers"* presented for each of the counties in Table A-1 ("eligible participants") and Table A-5 are based on the number of customers in industries targeted by the program administrator in the respective programs who are in participating utility territories in that county. The number businesses in participating utility territories in each county were estimated by determining the proportion of businesses in the State of Wisconsin Department of Workforce Development Standard Name and Address Program (SNAP) covered by Wisconsin's Unemployment Insurance Law. It was determined, based on geographic location, whether each business was in a utility territory of a utility participating in the Focus on Energy program. Then for each industry (at the two-digit SIC level) in each county, the proportion of the businesses that were in a participating utility territory was determined. Because the SNAP

database is not fully representative of all of the businesses in the state, this ratio was applied to the number of businesses in that industry in that county reported by Dun and Bradstreet.

An analysis of the industries of the businesses that have had energy savings potential identified by the program administrator was conducted to determine which of the industries were being targeted by the program administrator. This analysis resulted in the identification of 23 of the 82 two-digit SIC codes as being targeted by the industrial programs and 28 of the 82 two-digit SIC codes as being targeted by the commercial programs, with eight industries (as identified by the two-digit SIC code) being targeted by both the industrial and commercial programs. The 23 codes identified as being targeted by the industrial programs account for about 33 percent of Wisconsin businesses, while the 28 codes identified as being targeted by the commercial programs account for about 79 percent of Wisconsin businesses.

The *"Number of Customers"* presented for each of the participating utilities in Table A-4 and Table A-9 are based on the number of customers reported by the utilities in 2005 and 2006, respectively.

A.2.1 Commercial Programs

Figure A-1.
Commercial Programs
Per Capita Energy, Electric or Gas Bill Savings by County
July 1, 2001–December 31, 2008

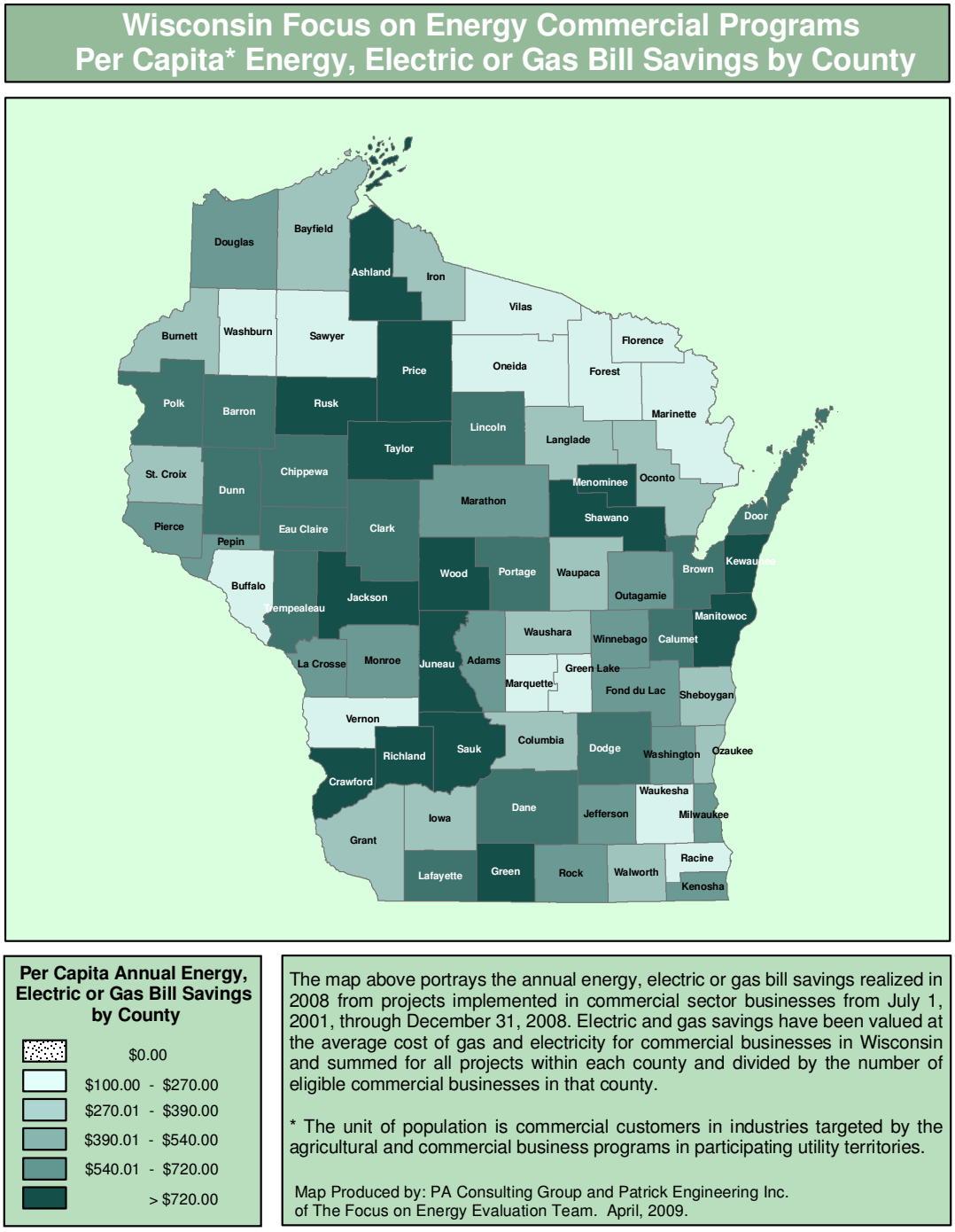


Table A-1. Commercial Program Energy Impacts
(By County)
(July 1, 2001–December 31, 2008)

County	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms	Eligible Participants
Adams	$503	1,126,538	264	32,386	556,272	132	15,375	258
Ashland	$814	4,336,271	1,190	180,957	2,321,303	630	84,381	690
Barron	$645	4,361,917	996	215,945	2,286,984	512	102,624	933
Bayfield	$315	1,534,369	423	46,956	787,731	221	19,163	571
Brown	$710	39,365,418	11,267	1,869,866	22,572,808	6,519	1,035,581	7,532
Buffalo	$182	384,855	104	39,835	231,930	62	17,376	417
Burnett	$390	1,267,395	188	66,624	705,357	106	28,985	460
Calumet	$655	4,954,522	1,010	99,874	2,683,076	535	41,870	800
Chippewa	$641	7,504,448	1,613	395,161	4,206,434	906	172,346	1,657
Clark	$664	5,136,137	1,258	198,389	2,755,362	687	92,080	975
Columbia	$383	4,309,424	1,075	322,307	2,454,726	593	141,937	1,868
Crawford	$1,020	7,427,129	1,455	25,683	3,207,720	723	11,150	637
Dane	$614	59,623,963	13,344	2,895,742	33,027,661	7,604	1,094,537	13,302
Dodge	$565	8,609,874	1,900	540,700	4,717,480	1,037	213,970	2,326
Door	$570	5,475,300	1,504	88,039	3,352,555	934	38,249	974
Douglas	$474	3,623,037	937	345,244	1,939,606	564	163,988	1,441
Dunn	$613	4,382,603	955	285,256	2,591,698	571	127,813	1,109
Eau Claire	$574	14,065,168	4,475	664,745	7,490,448	2,424	279,219	3,325
Florence	$205	56,466	8	1,108	26,835	4	562	29
Fond Du Lac	$423	9,971,488	2,466	392,176	5,526,167	1,328	154,452	2,991
Forest	$108	417,757	91	4,712	242,672	53	2,121	373
Grant	$281	3,395,068	876	66,802	1,879,515	483	32,897	1,273
Green	$1,182	8,017,435	1,990	157,699	4,359,426	1,068	63,334	714
Green Lake	$111	1,318,903	314	47,470	718,178	172	18,490	1,461
Iowa	$304	2,547,974	615	74,472	1,368,744	318	30,547	972
Iron	$359	932,010	204	33,670	467,100	97	14,755	320
Jackson	$3,641	1,549,829	434	70,861	754,631	223	31,523	57
Jefferson	$508	6,036,501	1,563	419,560	3,207,821	777	153,168	1,902
Juneau	$765	1,145,659	218	94,471	594,682	111	36,653	261
Kenosha	$408	10,204,476	1,745	439,652	5,637,622	974	191,168	3,276
Kewaunee	$808	4,536,068	1,078	190,155	2,509,731	575	61,873	728
La Crosse	$490	14,628,167	4,374	523,867	8,173,822	2,544	211,691	3,669
Lafayette	$598	1,677,127	419	86,601	896,707	215	52,891	394
Langlade	$384	2,656,624	970	107,375	1,430,030	513	36,859	886
Lincoln	$673	6,504,482	1,736	182,460	3,214,122	882	68,022	1,107
Manitowoc	$1,681	8,503,741	1,865	491,048	4,679,525	990	216,446	744
Marathon	$495	17,224,864	4,329	560,320	10,278,228	2,507	227,841	4,154
Marinette	$261	3,789,826	958	99,970	2,070,024	515	45,365	1,636
Marquette	$208	894,975	223	22,644	437,529	112	10,586	479
Menominee	$761	262,390	61	18,813	140,727	43	6,743	56
Milwaukee	$498	75,578,950	16,050	4,310,215	41,152,790	8,791	1,957,160	22,188

County	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms	Eligible Participants
Monroe	$463	3,688,344	819	323,555	2,004,782	441	140,940	1,435
Oconto	$376	2,475,298	836	59,591	1,273,265	430	28,492	725
Oneida	$269	3,830,674	797	206,603	2,160,225	470	82,432	2,034
Outagamie	$510	20,239,495	4,431	765,207	10,730,613	2,403	316,652	4,966
Ozaukee	$326	6,195,479	1,514	237,915	3,201,861	836	104,895	2,391
Pepin	$393	973,467	293	52,371	557,587	151	24,635	354
Pierce	$448	2,617,580	607	64,152	1,453,022	327	30,085	646
Polk	$594	6,439,731	1,685	199,706	3,243,280	840	83,149	1,277
Portage	$687	11,496,699	2,695	465,585	6,323,767	1,470	194,912	2,146
Price	$1,014	1,023,222	211	375,652	542,784	109	112,577	491
Racine	$190	7,148,945	1,617	326,241	3,914,089	894	135,498	5,028
Richland	$1,938	2,488,544	632	18,537	1,311,875	326	11,204	118
Rock	$444	14,256,272	3,081	793,690	7,966,325	1,733	393,544	4,646
Rusk	$1,433	5,787,667	1,468	142,032	2,933,197	747	49,383	447
Sauk	$810	11,580,534	2,632	354,861	6,749,452	1,512	148,358	1,678
Sawyer	$260	2,018,109	397	43,543	1,153,682	224	18,689	832
Shawano	$925	4,793,337	1,171	73,683	2,422,960	588	33,784	521
Sheboygan	$351	7,523,403	1,920	320,831	4,102,009	1,073	138,297	2,801
St. Croix	$385	4,021,967	1,036	189,767	2,368,239	602	82,198	1,417
Taylor	$7,796	4,022,446	982	112,301	1,751,807	428	51,439	59
Trempealeau	$573	975,905	323	85,169	563,413	198	35,352	306
Vernon	$262	1,820,737	468	54,808	917,593	241	24,103	812
Vilas	$197	1,924,944	537	22,460	1,025,650	290	10,422	943
Walworth	$390	10,049,986	2,645	350,255	5,760,221	1,539	168,884	3,147
Washburn	$262	1,262,455	186	46,368	676,704	111	18,956	598
Washington	$400	9,960,643	2,219	276,225	5,421,709	1,217	123,449	2,842
Waukesha	$252	28,219,553	7,050	745,902	16,029,349	4,009	339,713	12,615
Waupaca	$367	5,629,354	1,440	86,891	2,956,491	780	28,780	1,543
Waushara	$326	2,003,368	488	64,713	1,067,979	262	32,287	732
Winnebago	$534	18,685,704	4,731	733,736	10,188,748	2,662	302,208	4,436
Wood	$1,444	6,516,802	1,246	250,141	3,905,761	716	99,693	568
Not mapped*		14,470,068	4,264	20,138	9,677,775	2,844	4,806	

* *Unknown County*: The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-2.
Commercial Programs
Implemented Energy, Electric or Gas Bill Savings by Senate District
(July 1, 2001–December 31, 2008)

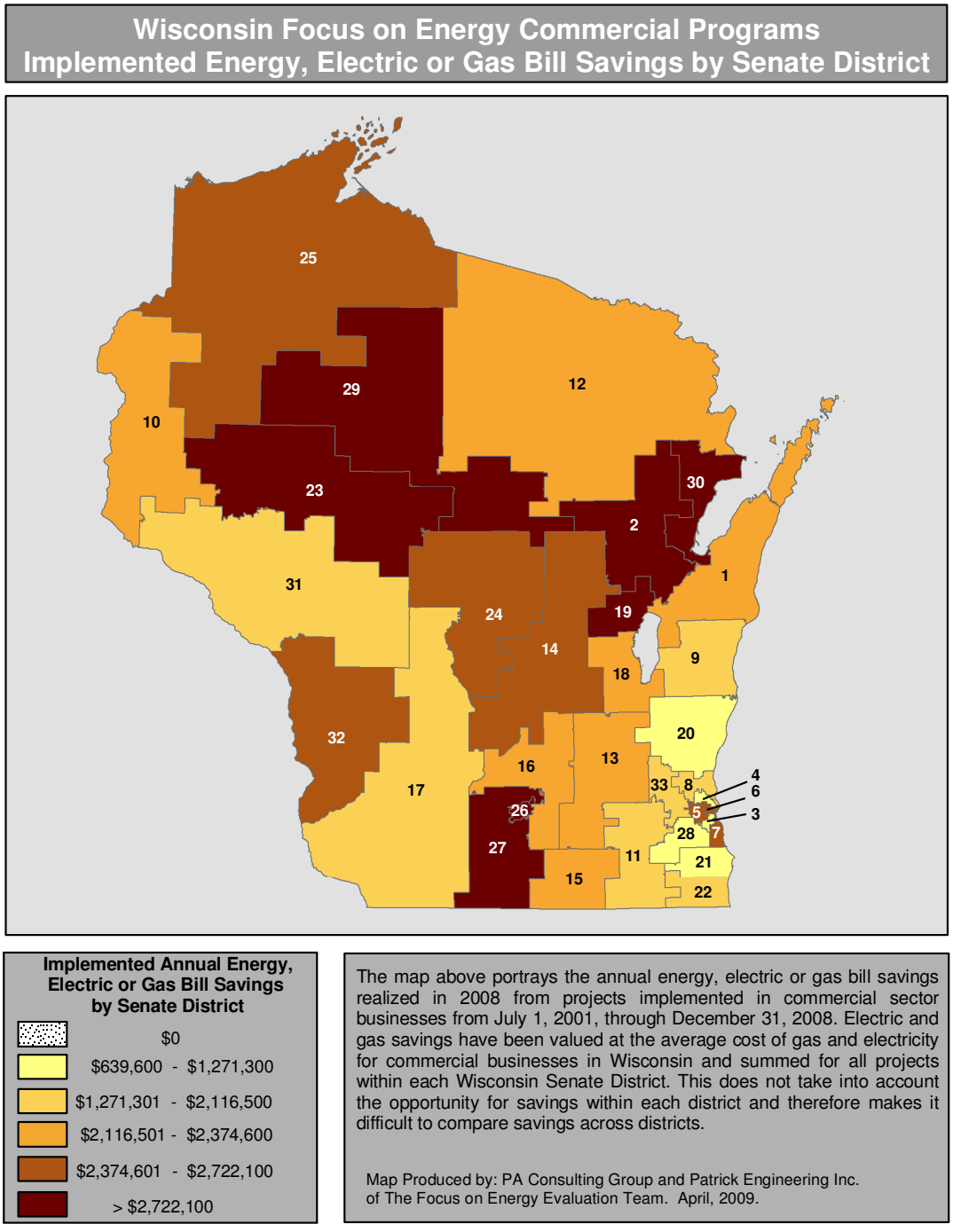


Table A-2. Commercial Program Energy Impacts
(By Senate District)
(July 1, 2001–December 31, 2008)

Senate District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
1	$2,374,503	21,403,813	5,318	530,969	12,243,604	3,022	221,328
2	$2,729,564	23,074,636	5,974	726,973	12,776,506	3,302	334,970
3	$1,200,394	5,650,011	1,190	662,557	3,108,927	666	309,071
4	$639,604	4,342,481	874	251,492	2,539,384	522	107,790
5	$2,719,523	16,774,911	3,494	1,198,054	9,369,990	1,988	514,943
6	$2,580,106	18,698,363	3,714	924,456	9,622,205	1,847	477,781
7	$2,546,231	21,032,922	4,638	715,642	11,934,702	2,701	328,783
8	$1,855,267	13,903,947	3,415	629,788	7,505,102	1,910	256,408
9	$2,116,442	16,285,233	3,633	686,128	8,935,379	1,980	294,792
10	$2,125,566	15,945,991	3,915	720,297	8,738,267	2,133	312,221
11	$1,830,639	14,801,031	4,234	538,974	8,323,904	2,359	253,125
12	$2,263,841	19,263,847	5,269	593,312	10,057,913	2,801	229,124
13	$2,191,668	15,059,217	3,406	848,098	8,215,676	1,846	323,870
14	$2,436,972	20,204,696	4,750	679,270	11,531,709	2,720	286,148
15	$2,269,427	16,070,937	3,524	841,794	8,939,591	1,952	415,622
16	$2,279,650	17,148,449	3,567	768,966	9,825,482	1,984	307,622
17	$1,775,195	14,918,283	3,677	479,539	7,942,323	1,923	214,441
18	$2,273,158	18,451,218	5,045	663,744	10,037,324	2,796	252,408
19	$3,091,493	23,765,416	5,024	1,003,941	12,803,829	2,778	430,839
20	$1,271,209	9,175,280	2,090	458,322	5,001,636	1,149	206,536
21	$806,559	6,348,702	1,398	250,612	3,502,952	773	97,789
22	$1,446,598	10,548,771	1,845	513,357	5,795,068	1,023	227,867
23	$3,368,129	24,887,555	6,480	1,170,347	13,726,144	3,558	512,832
24	$2,448,240	19,397,833	4,299	751,039	10,917,666	2,360	313,020
25	$2,476,208	17,619,360	4,232	912,083	9,402,604	2,310	422,510
26	$4,102,054	25,961,537	5,586	1,756,897	13,349,081	3,067	637,497
27	$2,968,686	25,901,195	6,498	729,286	14,926,422	3,769	296,269
28	$1,189,131	10,826,630	2,472	257,688	5,808,620	1,308	108,316
29	$3,387,118	26,101,746	6,522	1,095,084	14,484,205	3,561	397,199
30	$3,296,773	21,727,722	6,745	1,346,232	12,332,276	3,884	787,743
31	$2,092,496	13,909,868	3,809	845,391	7,394,752	2,056	367,354
32	$2,722,091	24,598,184	6,453	604,028	12,655,906	3,583	246,162
33	$1,710,687	15,224,520	3,612	397,445	8,590,501	2,051	178,201
Not mapped*	$1,232,607	14,455,577	4,260	20,652	9,672,344	2,843	5,026

* *Unknown District*: The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-3.
Commercial Programs
Implemented Energy, Electric or Gas Bill Savings by Assembly District
(July 1, 2001–December 31, 2008)

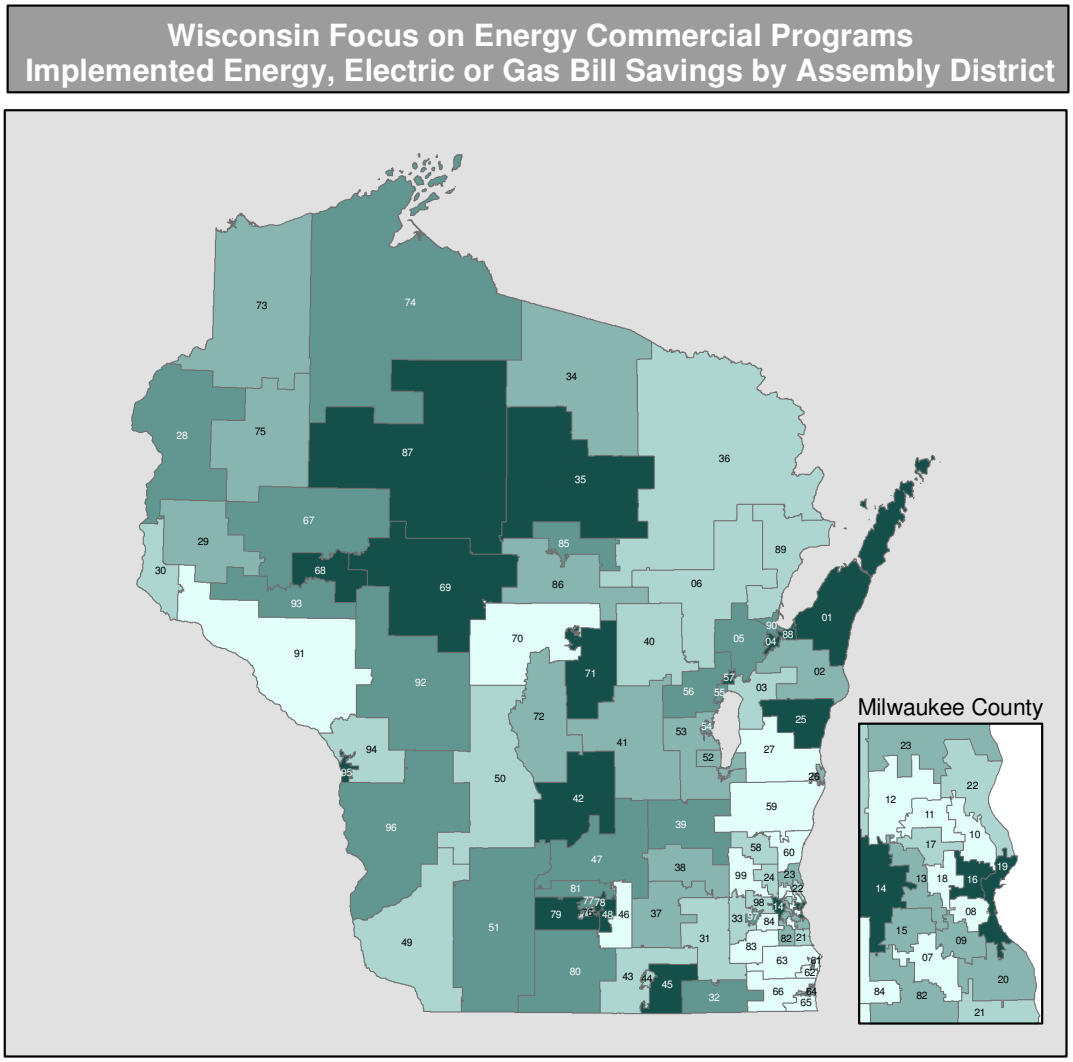


Table A-3. Commercial Program Energy Impacts
(by Assembly District)
(July 1, 2001–December 31, 2008)

Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
1	$1,100,287	10,542,899	2,716	198,403	6,172,189	1,585	81,796
2	$762,023	5,962,151	1,524	239,519	3,321,173	840	95,120
3	$512,192	4,898,764	1,078	93,047	2,750,243	597	44,413
4	$1,306,934	10,019,760	2,688	426,484	6,010,317	1,612	201,473
5	$844,751	7,740,143	1,965	179,327	4,046,772	1,032	77,850
6	$577,879	5,314,732	1,320	121,162	2,719,417	658	55,647
7	$250,227	1,336,734	347	125,995	691,741	191	62,188
8	$349,351	2,043,971	437	162,360	1,093,740	237	84,408
9	$600,816	2,269,307	406	374,203	1,323,445	238	162,474
10	$316,390	1,370,726	346	183,662	839,425	219	77,416
11	$106,509	1,030,979	183	18,411	577,868	107	8,323
12	$216,705	1,940,776	345	49,419	1,122,092	197	22,051
13	$626,838	3,383,850	840	312,942	1,811,439	474	128,555
14	$1,466,602	10,893,449	2,081	505,301	6,260,136	1,209	204,659
15	$626,083	2,497,612	574	379,811	1,298,414	305	181,730
16	$1,898,480	14,636,438	2,755	613,306	7,643,459	1,351	327,329
17	$442,384	3,334,193	768	148,736	1,594,711	391	70,880
18	$239,241	727,732	192	162,413	384,036	105	79,572
19	$1,305,846	11,256,400	2,519	331,225	6,383,140	1,538	167,085
20	$683,112	5,198,764	1,289	225,843	2,790,532	696	92,114
21	$557,273	4,577,757	830	158,575	2,761,030	468	69,584
22	$529,227	2,488,561	603	292,290	1,404,503	361	103,330
23	$773,398	6,491,068	1,645	209,559	3,216,334	846	94,824
24	$552,642	4,924,318	1,167	127,939	2,884,264	703	58,255
25	$1,060,182	7,442,459	1,466	398,222	4,168,776	784	170,173
26	$629,010	5,395,977	1,330	161,537	2,937,270	745	72,306
27	$427,250	3,446,797	837	126,369	1,829,333	452	52,313
28	$968,837	7,878,875	1,992	281,763	4,028,919	1,006	120,553
29	$693,158	4,063,352	975	321,544	2,344,151	564	141,573
30	$463,570	4,003,764	949	116,990	2,365,198	564	50,095
31	$543,011	3,358,906	1,073	238,498	1,722,546	516	99,856
32	$792,723	7,145,080	1,878	177,304	4,301,230	1,176	93,336
33	$494,906	4,297,045	1,283	123,172	2,300,128	667	59,933
34	$726,372	5,697,243	1,318	227,243	3,158,468	752	92,082
35	$1,089,377	9,284,962	2,744	284,359	4,689,520	1,411	101,644
36	$447,932	4,279,731	1,206	81,711	2,208,603	638	35,399
37	$599,258	3,959,475	981	243,943	2,094,032	513	85,267
38	$611,436	4,159,277	887	239,803	2,234,920	471	107,086
39	$980,974	6,940,465	1,538	364,351	3,886,724	862	131,517
40	$562,388	5,608,204	1,427	84,683	2,964,325	780	28,647
41	$658,590	4,254,746	976	275,471	2,316,371	537	106,513

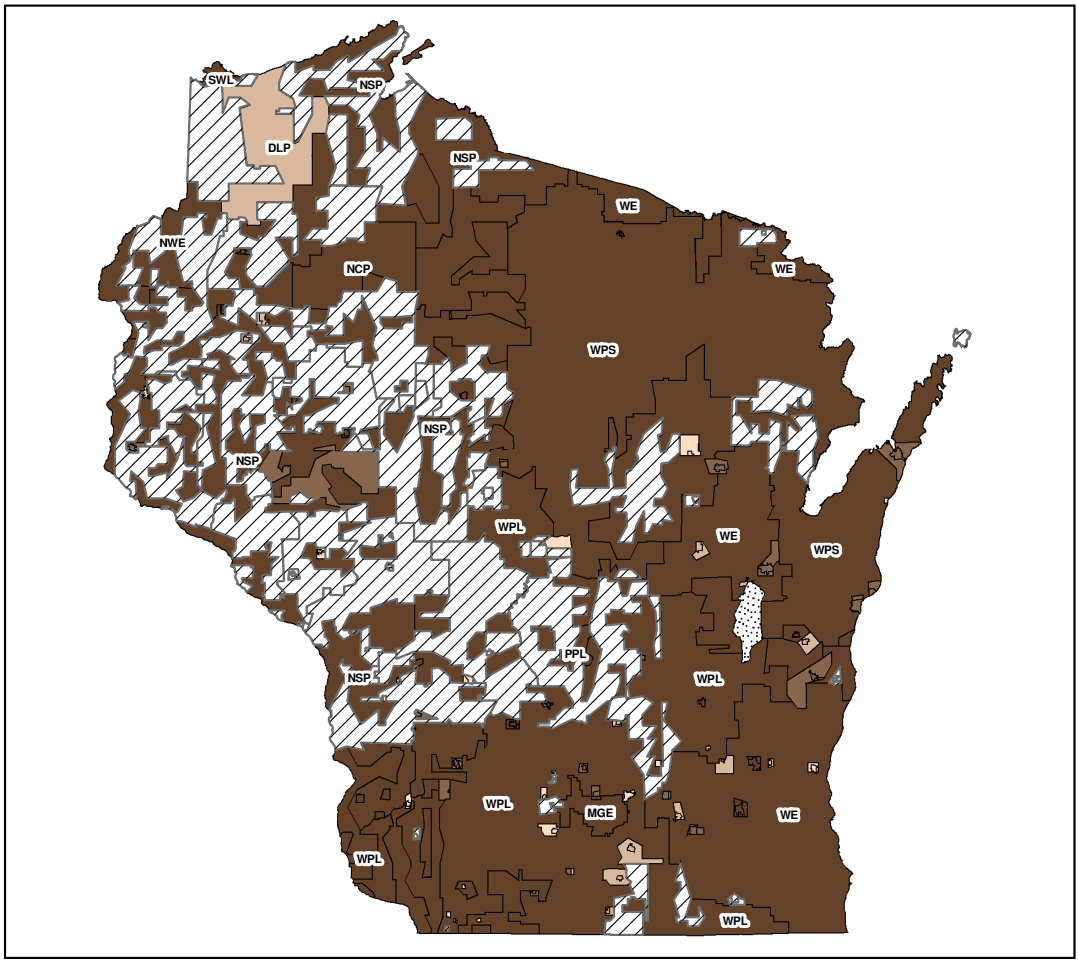
Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
42	$1,215,994	10,341,746	2,347	319,116	6,251,013	1,403	150,988
43	$477,181	4,125,464	1,059	120,109	2,249,304	561	53,881
44	$567,933	4,773,079	898	153,394	2,712,966	534	68,174
45	$1,224,313	7,172,394	1,567	568,291	3,977,321	858	293,566
46	$414,235	2,255,524	676	205,326	1,293,672	397	92,873
47	$792,957	6,209,273	1,399	248,854	3,395,876	729	107,355
48	$1,072,458	8,683,653	1,492	314,787	5,135,935	858	107,394
49	$436,504	4,326,265	1,079	67,756	2,376,269	588	33,576
50	$542,651	3,993,087	1,006	189,826	2,057,359	517	68,450
51	$796,040	6,598,931	1,591	221,957	3,508,695	817	112,415
52	$637,700	5,315,340	1,396	175,598	3,081,482	784	71,753
53	$697,172	6,139,946	1,498	166,902	3,071,254	743	66,363
54	$938,286	6,995,932	2,151	321,245	3,884,588	1,269	114,292
55	$897,880	6,075,099	1,283	354,639	3,387,380	724	160,536
56	$775,910	8,583,790	1,589	52,320	4,664,559	891	15,410
57	$1,417,702	9,106,528	2,152	596,982	4,751,890	1,163	254,893
58	$573,286	4,266,535	835	196,883	2,353,764	458	89,225
59	$318,900	2,430,639	603	105,151	1,311,951	312	48,536
60	$379,022	2,478,106	652	156,289	1,335,921	380	68,774
61	$264,614	2,684,409	604	36,365	1,407,504	325	12,675
62	$351,426	1,826,539	398	180,824	1,051,829	228	71,767
63	$190,519	1,837,754	396	33,424	1,043,619	219	13,348
64	$766,253	5,461,289	820	281,551	2,962,712	450	131,564
65	$392,321	3,085,825	588	122,074	1,782,257	343	47,246
66	$288,024	2,001,657	437	109,732	1,050,099	230	49,058
67	$964,817	6,893,671	1,541	353,203	3,931,614	874	157,861
68	$1,303,939	9,996,416	3,098	425,536	5,541,764	1,707	178,034
69	$1,099,374	7,997,468	1,841	391,608	4,252,767	976	176,936
70	$346,045	3,127,000	756	76,790	1,689,590	390	30,479
71	$1,442,492	11,145,775	2,633	464,108	6,122,801	1,431	198,243
72	$659,702	5,125,058	910	210,141	3,105,275	539	84,298
73	$706,807	3,915,065	987	345,278	2,106,513	593	164,005
74	$1,045,396	8,487,065	2,167	305,126	4,560,481	1,148	136,989
75	$724,005	5,217,230	1,078	261,678	2,735,610	569	121,516
76	$511,390	3,354,357	828	210,045	1,787,990	471	69,002
77	$881,535	6,631,955	1,441	297,304	3,302,354	765	109,594
78	$2,709,129	15,975,224	3,317	1,249,547	8,258,737	1,832	458,902
79	$1,174,648	10,084,183	2,415	301,095	6,186,047	1,546	105,093
80	$1,018,131	9,661,272	2,454	190,785	5,230,122	1,312	79,541
81	$775,907	6,155,740	1,629	237,406	3,510,253	912	111,635
82	$589,112	5,319,786	1,190	131,008	2,787,748	613	54,395
83	$295,113	2,477,969	627	79,879	1,272,738	328	34,339
84	$304,905	3,028,875	655	46,802	1,748,134	367	19,582
85	$965,381	8,657,990	2,123	219,223	5,397,671	1,248	85,542
86	$770,156	5,975,912	1,614	245,877	3,532,728	967	98,257

Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
87	$1,651,741	11,469,755	2,785	629,984	5,555,129	1,347	213,399
88	$1,976,524	10,517,007	3,687	998,407	5,816,073	2,091	638,517
89	$505,922	4,015,427	1,288	154,673	2,195,112	688	63,936
90	$814,326	7,195,288	1,770	193,152	4,321,090	1,104	85,290
91	$425,628	2,709,290	818	181,112	1,540,727	465	78,893
92	$847,877	4,847,641	1,147	402,668	2,567,987	610	175,696
93	$818,991	6,352,937	1,845	261,612	3,286,038	981	112,765
94	$567,630	5,828,818	1,780	72,639	3,284,976	963	18,040
95	$1,246,712	8,998,960	2,608	449,453	4,979,166	1,587	192,369
96	$907,749	9,770,405	2,065	81,936	4,391,764	1,032	35,752
97	$790,195	6,299,355	1,418	239,471	3,714,001	828	108,041
98	$513,169	4,949,602	1,045	90,062	2,894,860	638	39,649
99	$407,322	3,975,563	1,149	67,912	1,981,640	585	30,512
Not mapped*	$1,232,607	14,455,577	4,260	20,652	9,672,344	2,843	5,026

* *Unknown District*: The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-4.
Commercial Programs
Per Capita Energy, Electric Bill Savings by Electric Utility Territory
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Commercial Programs
Per Capita* Energy, Electric Bill Savings by Utility Territory



Per Capita Annual Energy Electric Bill Savings by Utility Territory

- $0
- $0.20 - $22.00
- $22.01 - $42.50
- $42.51 - $103.40
- > $103.40
- Non Participating Utility Territories

The map above portrays the annual energy, electric bill savings realized in 2008 from projects implemented in commercial sector businesses from July 1, 2001, through December 31, 2008. Electric savings has been valued at the average cost of electricity for commercial businesses in Wisconsin and summed for all projects within each utility territory and divided by the number of commercial business customers in that utility territory

* The unit of population is commercial customers as reported by the utilities in 2007.

Map Produced by: PA Consulting Group and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. April, 2009.

Table A-4. Commercial Program Electric Impacts
(By Participating Electric Utility)
(July 1, 2001–December 31, 2008)

Utility Name	Map Code	Annual Dollars Saved	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Algoma Utility Commission		$3,809	$11	45,503	6	26,800	6	362
Alliant Energy	WPL	$8,686,199	$156	103,777,763	13,784	57,431,788	13,784	55,701
Arcadia Electric & Water Utility		$255	$1	3,045	1	1,992	1	239
Barron Light And Water Utility		$8,212	$26	98,107	13	64,905	13	316
Black River Falls Municipal Electric & Water		$17,346	$34	207,246	36	111,906	36	511
Bloomer City Of Electric Utility		$66,845	$179	798,631	32	478,071	32	373
Boscobel Municipal Utilities		$2,908	$9	34,741	5	18,663	5	314
Brodhead Water And Light Commission		$10,013	$33	119,625	11	60,928	11	305
Cashton Municipal Electric And Water Utility		$3,841	$33	45,895	6	24,976	6	116
Cedarburg Light And Water Commission		$13,941	$16	166,562	29	102,144	29	847
Centuria Municipal Electric Utility		$1,820	$26	21,739	2	10,060	2	71
City of Argyle		$1,949	$22	23,286	2	10,704	2	88
City of Kiel		$11,586	$32	138,425	25	89,021	25	362
City of Lodi		$13,082	$45	156,291	22	75,982	22	290
City of Muscoda		$14,346	$71	171,402	22	78,776	22	201
City of New Richmond		$2,614	$4	31,226	4	15,656	4	588
City of Westby		$1,317	$7	15,736	2	8,040	2	189
Columbus Water And Light Dept		$8,931	$22	106,700	11	70,505	11	411
Consolidated Water Power Company	CWP	$708	$4	8,459	2	5,847	2	189
Cornell Municipal Water And Electric Utility		$13,887	$101	165,912	24	78,529	24	138
Cuba City Electric & Water Utility		$107	$1	1,274	0	882	0	141
Cumberland Municipal Utility		$119,241	$540	1,424,621	205	743,088	205	221
Dahlberg Light And Power Company	DLP	$33,789	$31	403,688	44	220,699	44	1,107
Eagle River Light And Water Commission		$22,295	$42	266,372	60	167,395	60	531
Eau Claire Electric Cooperative	C-8	$40,983	$73	489,646	88	269,210	88	561
Elroy Municipal Electric And Water Utility		$1,994	$14	23,819	3	10,610	3	143
Evansville City of Water & Light		$18,417	$33	220,042	26	134,348	26	556

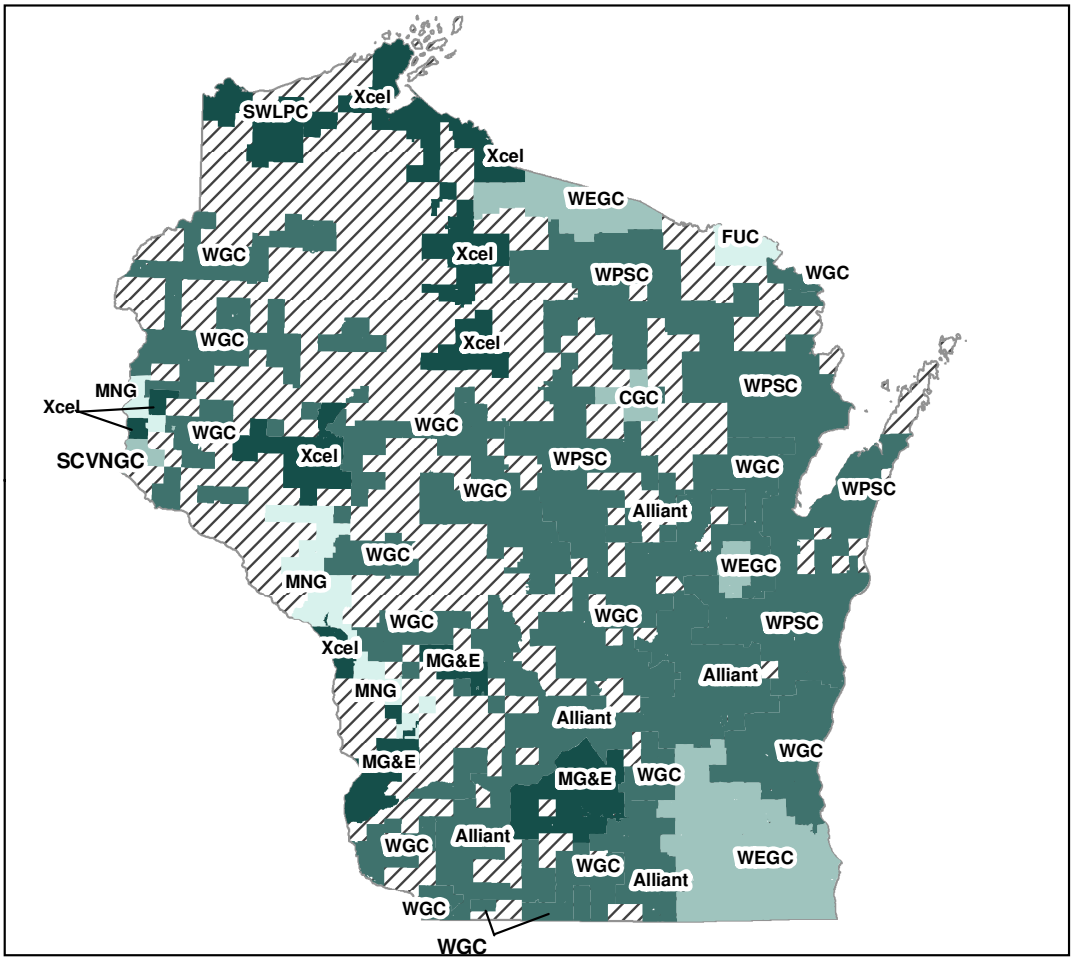
Utility Name	Map Code	Annual Dollars Saved	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Florence Utility Commission		$3,913	$22	46,751	2	21,392	2	178
Hartford City Of Utilities		$169,690	$213	2,027,361	285	983,196	285	796
Hustisford Utilities		$5,880	$30	70,249	9	34,905	9	194
Jefferson Utilities		$53,834	$103	643,183	69	276,023	69	521
Juneau Utility Commission		$5,944	$32	71,013	9	36,096	9	184
Kaukauna Utilities		$110,524	$69	1,320,476	195	705,326	195	1,593
La Farge Municipal Electric Utility		$7,977	$71	95,307	13	58,735	13	113
Lake Mills Light And Water Dept		$13,538	$31	161,744	14	85,314	14	441
Madison Gas And Electric Company	MGE	$3,817,727	$206	45,612,026	5,238	24,882,624	5,238	18,553
Manitowoc Public Utilities		$133,086	$63	1,590,033	212	933,987	212	2,121
Mazomanie Electric Utility		$2,468	$22	29,488	4	13,856	4	114
Medford Electric Utility		$226,902	$411	2,710,894	289	1,156,628	289	552
Menasha Electric & Water Utilities		$27,669	$32	330,571	42	168,502	42	854
Mount Horeb Electric Utility		$4,484	$9	53,572	7	26,803	7	491
New Glarus Light And Water Works		$9,982	$51	119,264	19	68,926	19	197
New Holstein Public Utility		$38,793	$120	463,478	62	222,783	62	324
New London Electric & Water Utility		$18,229	$37	217,791	24	114,268	24	499
North Central Power Company Inc	NCP	$78,273	$183	935,166	76	465,972	76	427
Northwestern Wisconsin Electric Co	NWE	$226,565	$154	2,706,866	318	1,381,454	318	1,470
Oconomowoc City Of Utilities		$139,138	$126	1,662,346	264	914,900	264	1,103
Oconto Falls Water And Light Commission		$12,776	$48	152,646	26	99,441	26	267
Pierce-Pepin Electric Cooperative	C-14	$30,416	$95	363,396	68	169,802	68	320
Pioneer Power & Light Company	PPL	$27,967	$217	334,134	30	160,987	30	129
Plymouth Utilities		$46,967	$50	561,141	101	329,008	101	947
Polk-Burnett Electric Cooperative	C-15	$210,501	$207	2,514,947	315	1,258,718	315	1,015
Price Electric Cooperative Inc	C-16	$47,462	$202	567,049	62	285,332	62	235
Princeton Municipal Water & Electric Utility		$11,265	$74	134,591	19	73,600	19	153
Reedsburg Utility Commission		$84,143	$126	1,005,293	146	541,619	146	667
Rice Lake Municipal Water & Electric Utility		$32,277	$37	385,625	47	200,606	47	876
Richland Center Electric Utility		$55,815	$90	666,846	96	325,961	96	623
Richland Electric Cooperative	C-17	$78,230	$425	934,646	122	511,560	122	184

Utility Name	Map Code	Annual Dollars Saved	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
River Falls Municipal Utility		$42,584	$63	508,766	60	263,789	60	675
Riverland Energy Cooperative	C-18	$12,842	$12	153,429	18	74,086	18	1,107
Rock County Electric Cooperative	C-19	$31,369	$61	374,775	83	173,112	83	511
Scenic River Electric Cooperative	C-20	$198,604	$268	2,372,805	362	1,314,292	362	741
Shawano Municipal Utilities		$117,960	$92	1,409,323	196	758,785	196	1,280
Sheboygan Falls Utilities		$5,365	$12	64,102	9	31,087	9	462
Shullsburg Electric Utility		$2,393	$12	28,596	4	13,758	4	203
Slinger Utilities		$13,883	$42	165,862	43	81,864	43	327
Spooner Municipal Utilities		$51,671	$149	617,339	57	329,444	57	347
Stoughton Electric Utility		$22,752	$28	271,830	52	160,454	52	827
Stratford Municipal Water & Electric Utility		$15,654	$101	187,022	24	99,954	24	155
Sturgeon Bay Utilities		$120,774	$80	1,442,939	198	810,573	198	1,509
Sun Prairie Water & Light Commission		$35,412	$20	423,083	56	251,571	56	1,740
Superior Water Light And Power Company	SWL	$266,143	$138	3,179,723	515	1,700,011	515	1,930
Two Rivers Water & Light Utility		$27,049	$46	323,170	46	179,674	46	592
Village of Belmont		$794	$6	9,482	1	6,163	1	131
Village of Benton		$2,746	$33	32,811	3	14,061	3	82
Village of Cadott		$12,783	$710	152,722	18	89,862	18	18
Village of Gresham		$2,084	$12	24,902	3	11,788	3	168
Village of Pardeeville		$3,377	$24	40,350	8	27,840	8	140
Village of Prairie Du Sac		$6,540	$26	78,133	10	37,217	10	254
Village of Viola		$2,608	$30	31,163	3	13,536	3	88
Village of Waunakee		$36,319	$65	433,917	123	225,239	123	556
Waterloo Water And Light Commission		$26,139	$89	312,295	41	171,541	41	295
Waupun Public Utilities		$57,966	$111	692,547	91	340,357	91	524
We Energies	WEP	$14,687,531	$138	175,478,272	21,130	95,710,450	21,130	106,693
Whitehall Municipal Electric Utility		$780	$4	9,322	1	4,910	1	199
Wisconsin Dells Municipal Electric Utility		$44,146	$65	527,434	86	293,708	86	681
Wisconsin Public Service Corporation	WPS	$9,539,172	$179	113,968,601	17,133	64,311,396	17,133	53,383
Wonewoc Electric & Water Utility		$19	$0	232	-	80	-	91
Xcel Energy	NSP	$5,843,671	$146	69,816,859	10,455	38,050,779	10,455	39,918
Not mapped*		$2,753,263		32,894,422	5,051	19,640,766	5,051	

* *Unknown Utility:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-5.
Commercial Programs
Per Capita Energy, Gas Bill Savings by Gas Utility
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Commercial Programs
Per Capita* Energy, Gas Bill Savings by Gas Utility Territory



Per Capita Annual Energy, Gas Bill Savings by Utility Territory

- $0
- $9.90 - $39.20
- $39.21 - $128.10
- $128.11 - $204.00
- >$204.00
- Non Participating Utility Territories

The map above portrays the annual energy, gas bill savings realized in 2008 from projects implemented in commercial sector businesses from July 1, 2001, through December 31, 2008. Gas savings has been valued at the average cost of gas for commercial businesses in Wisconsin and summed for all projects within each utility territory and divided by the number of commercial business customers in that utility territory

* The unit of population is commercial customers as reported by the utilities in 2007.

Map Produced by: PA Consulting Group and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. April, 2009.

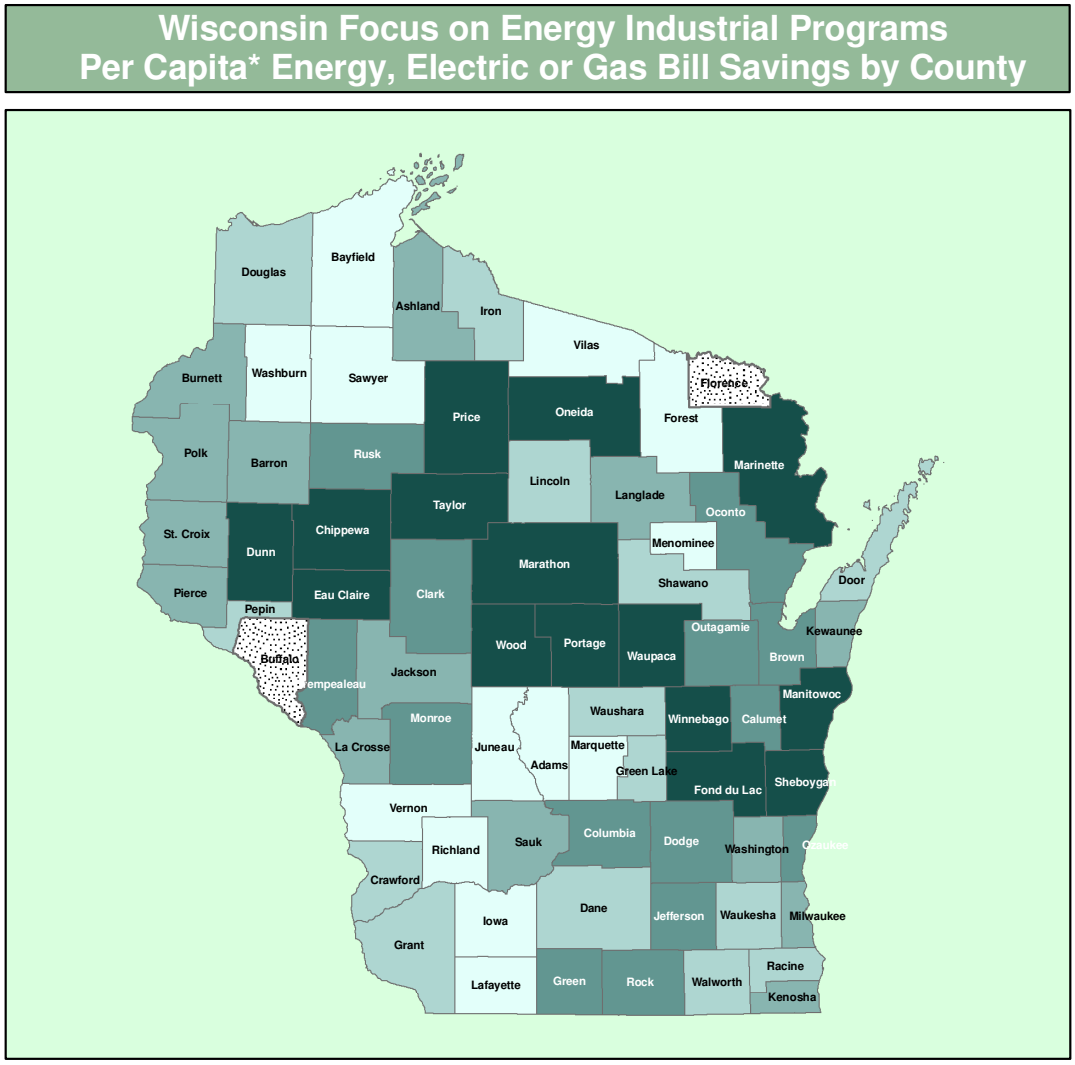
Table A-5. Commercial Program Gas Impacts
(By Participating Gas Utility)
(July 1, 2001–December 31, 2008)

Utility Name	Map Code	Annual Dollars per Capita	Annual Dollars Saved	Lifecycle Verified Gross Therms	Persistent Net Therms	Number of Customers
Alliant/Wisconsin Power & Light	Alliant	$160	$2,970,890	2,705,729	1,172,603	18,567
City Gas Company	CGC	$128	$74,037	67,429	26,955	578
Florence Utility Commission	FUC	$10	$1,216	1,108	562	122
Madison Gas and Electric	MG&E	$225	$3,075,276	2,800,797	1,047,797	13,686
Midwest Natural Gas Inc.	MNG	$39	$58,226	53,029	27,995	1,488
St Croix Valley Natural Gas Company	SCVNGC	$54	$32,978	30,035	15,061	616
Superior Water Light And Power Company	SWLPC	$334	$379,078	345,244	163,988	1,136
Wisconsin Electric Gas Operations	WEGC	$106	$3,817,368	3,476,655	1,513,792	35,927
Wisconsin Gas Company	WGC	$131	$6,575,639	5,988,742	2,796,311	50,301
Wisconsin Public Service Corporation	WPSC	$204	$5,277,468	4,806,437	2,217,349	25,876
Xcel (Northern States Power Company)	Xcel	$225	$2,509,040	2,285,100	937,635	11,170
Not mapped*			$2,209,345	2,012,154	755,559	

* *Unknown Utility:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

A.2.2 Industrial Programs

Figure A-6.
Industrial Programs
Per Capita Energy, Electric or Gas Bill Savings by County
(July 1, 2001–December 31, 2008)



The map above portrays the annual energy, electric or gas bill savings realized in 2008 from projects implemented in industrial sector businesses from July 1, 2001, through December 31, 2008. Electric and gas savings have been valued at the average cost of gas and electricity for industrial businesses in Wisconsin and summed for all projects within each county and divided by the number of eligible industrial businesses in that county.

* The unit of population is industrial customers in industries targeted by the industrial programs in participating utility territories.

Map Produced by: PA Consulting Group and Patrick Engineering Inc.
of The Focus on Energy Evaluation Team. April 2009.

Table A-6. Industrial Program Energy Impacts
(By County)
(July 1, 2001–December 31, 2008)

County	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms	Eligible Participants
Adams	$44	87,518	18	0	53,401	12	0	116
Ashland	$575	2,385,163	388	22,357	1,127,804	172	11,155	283
Barron	$684	2,854,983	479	156,016	1,621,498	263	67,248	481
Bayfield	$74	172,986	28	10,992	98,683	15	4,085	289
Brown	$867	38,973,255	6,315	1,400,265	20,785,211	3,164	760,495	4,303
Burnett	$385	1,485,632	142	0	649,427	65	0	226
Calumet	$1,055	4,236,528	670	131,378	2,217,395	332	66,392	364
Chippewa	$2,258	15,301,063	2,100	865,988	8,423,987	1,100	480,400	794
Clark	$814	3,385,687	518	173,214	1,883,401	265	68,683	464
Columbia	$726	5,916,149	898	230,973	3,587,425	522	144,491	807
Crawford	$220	859,690	120	2,799	599,374	80	1,153	242
Dane	$223	17,437,836	3,019	537,565	9,312,627	1,644	302,773	7,083
Dodge	$757	7,207,409	1,132	414,682	3,860,084	573	276,549	1,125
Door	$210	1,017,232	138	41,464	470,341	62	23,862	487
Douglas	$307	1,518,175	484	124,068	784,489	246	76,820	708
Dunn	$2,005	9,358,343	1,427	411,574	5,218,760	731	275,685	486
Eau Claire	$1,495	14,817,529	1,790	1,447,074	7,669,325	878	856,755	1,584
Fond Du Lac	$1,627	31,326,834	4,801	512,269	14,059,898	2,076	252,545	1,453
Forest	$68	279,545	70	0	143,572	34	0	240
Grant	$333	618,438	22	156,595	297,082	-3	77,681	596
Green	$947	5,114,131	836	33,943	3,169,586	492	23,438	353
Green Lake	$316	891,736	167	155,138	487,391	86	97,982	675
Iowa	$31	210,767	47	2,116	101,290	20	1,336	471
Iron	$154	427,143	27	0	187,466	14	0	162
Jackson	$643	318,866	61	0	181,720	33	0	29
Jefferson	$1,030	6,669,675	1,127	660,487	3,333,238	583	409,527	1,044
Juneau	$138	352,126	65	0	163,195	28	0	149
Kenosha	$396	6,638,379	1,167	264,761	3,690,294	610	149,013	1,673
Kewaunee	$631	1,282,222	213	144,234	698,788	105	86,517	356
La Crosse	$683	12,900,298	2,197	480,145	6,024,553	1,074	316,971	1,835
Lafayette	$78	279,760	53	0	177,260	29	0	211
Langlade	$370	1,520,198	196	63,930	886,126	110	31,663	420
Lincoln	$182	1,018,897	155	42,540	554,090	79	26,564	569
Manitowoc	$1,547	5,152,657	940	374,457	2,894,138	504	234,224	446
Marathon	$1,644	28,632,367	4,750	1,843,731	15,865,991	2,494	1,124,934	2,182
Marinette	$2,129	1,769,244	413	1,581,468	1,010,583	219	993,120	819
Marquette	$91	275,966	49	0	164,674	28	0	177
Menominee	$54	29,712	6	0	16,251	3	0	32
Milwaukee	$658	42,557,630	6,268	4,790,717	21,666,252	3,094	2,197,080	11,329
Monroe	$1,201	6,639,270	613	356,028	3,763,063	332	167,659	631
Oconto	$865	1,018,909	263	233,647	597,521	166	141,498	349
Oneida	$3,621	3,116,046	527	3,382,157	1,742,472	290	2,507,784	1,019

County	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms	Eligible Participants
Outagamie	$1,202	36,114,639	4,976	1,077,614	19,134,993	1,657	644,589	2,687
Ozaukee	$805	8,540,082	1,026	659,539	4,000,459	452	336,232	1,470
Pepin	$295	449,504	85	10,715	247,043	43	6,761	127
Pierce	$453	1,431,856	231	60,650	701,066	103	28,554	324
Polk	$500	4,732,108	1,441	43,351	2,493,250	723	25,742	644
Portage	$4,868	19,301,215	2,203	3,765,488	10,284,898	1,098	1,958,317	1,034
Price	$25,383	11,478,118	1,396	4,982,213	5,772,229	667	3,232,320	230
Racine	$317	7,136,201	1,278	481,038	3,559,341	615	283,205	2,886
Richland	$0	67	1	0	38	0	0	46
Rock	$800	11,428,937	1,795	1,036,533	5,866,883	852	647,940	2,178
Rusk	$863	2,477,318	334	35,800	1,177,244	149	19,037	211
Sauk	$381	5,048,057	1,004	2,578	2,300,590	496	1,440	782
Sawyer	$0	1,805	0	0	1,029	0	0	423
Shawano	$204	1,050,880	170	0	596,309	91	0	301
Sheboygan	$4,143	24,897,255	3,435	4,105,385	13,330,256	1,769	2,795,243	1,379
St. Croix	$448	4,997,280	825	99,758	2,614,277	406	52,797	883
Taylor	$4,164	1,035,873	190	102,170	577,959	98	59,679	40
Trempealeau	$999	1,375,293	193	108,266	758,994	100	54,744	193
Vernon	$153	754,830	104	3,495	419,685	56	1,646	313
Vilas	$79	601,962	62	0	327,804	35	0	445
Walworth	$320	6,586,012	1,211	132,991	3,639,524	635	66,005	1,634
Washburn	$55	287,068	56	611	158,338	29	215	318
Washington	$388	6,700,805	1,198	285,811	3,638,027	614	146,093	1,775
Waukesha	$334	23,856,563	3,643	1,322,010	12,300,545	1,858	817,387	8,283
Waupaca	$1,773	3,092,242	506	1,179,816	1,752,156	267	806,093	792
Waushara	$253	573,136	153	44,160	312,881	74	19,657	313
Winnebago	$1,489	25,959,674	3,921	1,787,072	13,720,657	2,009	1,072,361	2,264
Wood	$6,432	11,780,451	1,476	1,698,431	6,085,528	663	1,195,039	381
Not mapped*		2,008,098	197	190,061	1,137,047	106	119,793	

* *Unknown County:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-7.
Industrial Programs
Implemented Energy, Electric or Gas Bill Savings by Senate District
(July 1, 2001–December 31, 2008)

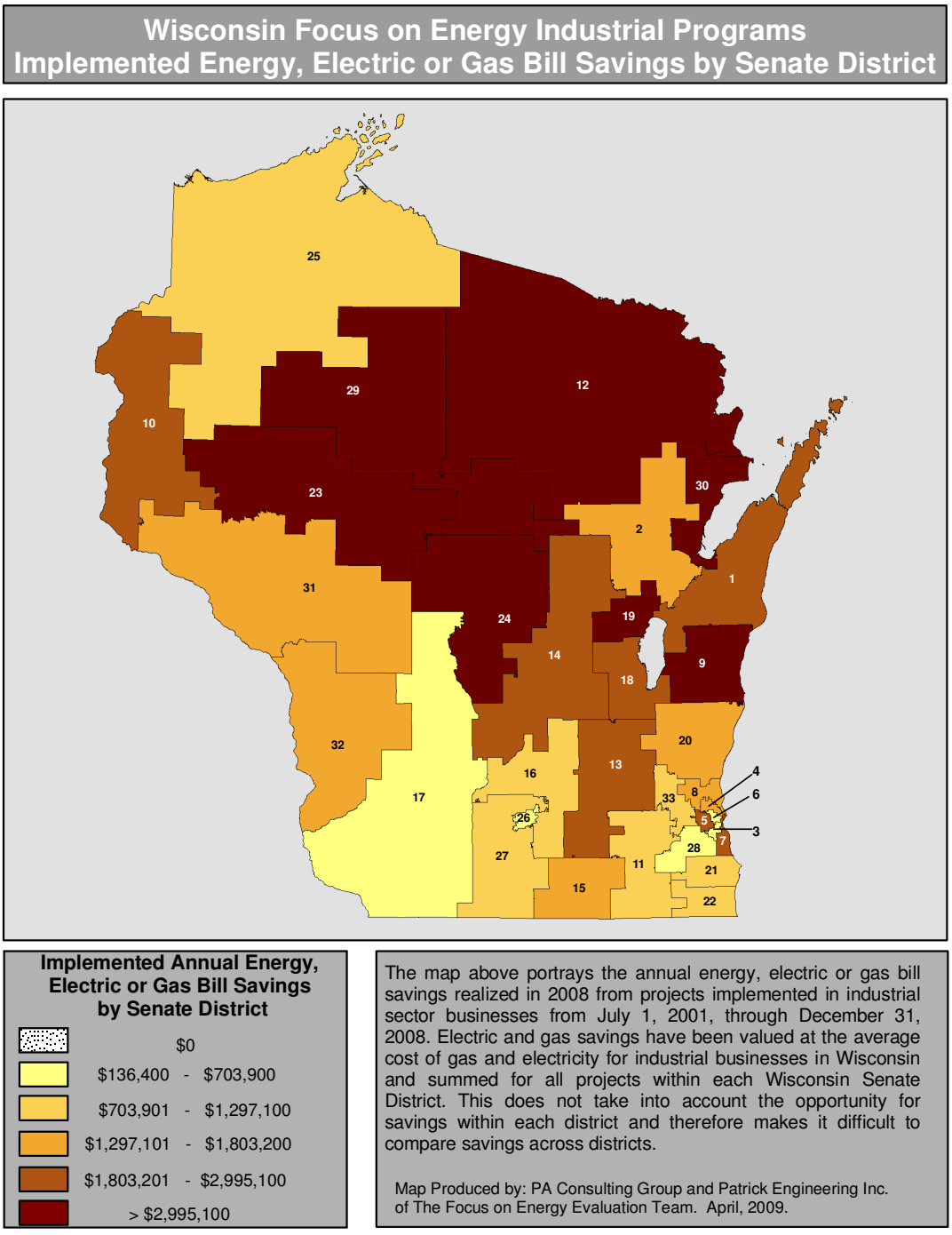


Table A-7. Industrial Program Energy Impacts
(By Senate District)
(July 1, 2001–December 31, 2008)

Senate District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
1	$2,437,348	22,182,354	2,942	1,099,017	10,757,197	1,390	645,412
2	$1,493,638	16,414,108	2,781	514,380	8,628,524	1,349	288,486
3	$136,447	1,833,332	342	28,155	1,032,651	183	12,429
4	$1,384,423	8,474,981	1,428	856,930	4,722,643	762	395,895
5	$2,043,211	13,114,638	1,444	1,230,477	5,354,210	604	584,257
6	$211,334	1,980,869	222	92,047	1,056,539	115	43,419
7	$2,642,199	7,502,145	1,196	2,124,709	4,399,279	645	871,983
8	$1,554,554	17,401,875	3,067	517,400	9,164,235	1,521	318,156
9	$6,210,428	28,663,423	4,186	4,371,859	15,699,944	2,201	2,994,267
10	$1,913,449	21,800,833	4,015	615,333	11,568,479	2,003	382,778
11	$1,297,022	8,053,225	1,450	796,440	4,497,921	782	481,998
12	$4,125,235	7,544,332	1,071	3,552,450	4,257,304	581	2,610,677
13	$1,845,025	13,559,609	2,192	1,014,260	6,926,680	1,108	684,485
14	$2,296,392	13,485,547	2,806	1,453,701	7,780,387	1,471	963,814
15	$1,777,521	12,010,890	1,970	1,036,533	6,126,868	919	647,940
16	$796,438	7,707,777	1,236	333,205	4,219,799	650	192,416
17	$389,059	3,803,441	421	160,615	1,497,311	155	80,220
18	$2,995,014	41,154,505	6,079	566,514	19,154,754	2,771	283,476
19	$4,087,656	34,991,018	5,245	1,967,870	19,479,495	1,884	1,186,805
20	$1,803,150	13,913,518	1,783	953,914	6,703,527	823	446,623
21	$802,647	6,475,804	1,154	408,691	3,185,626	550	251,924
22	$765,022	7,101,566	1,253	337,108	3,951,621	655	180,294
23	$4,030,518	29,187,527	3,989	2,240,161	15,565,343	2,021	1,249,276
24	$7,497,457	31,305,513	3,725	5,463,919	16,512,844	1,790	3,153,356
25	$777,694	7,727,030	1,472	314,043	4,012,754	744	159,524
26	$527,291	5,438,382	754	201,683	2,721,203	436	114,053
27	$1,000,234	12,438,151	2,312	262,875	7,334,289	1,304	162,640
28	$703,894	6,520,648	1,092	310,932	3,633,958	582	151,488
29	$9,702,421	42,725,092	6,492	6,946,001	22,898,622	3,317	4,427,935
30	$4,071,668	23,105,217	3,957	2,622,964	12,543,929	2,074	1,551,931
31	$1,598,241	14,219,805	1,607	739,038	7,984,461	853	393,761
32	$1,353,555	14,514,819	2,420	486,440	7,043,612	1,210	319,770
33	$1,139,413	11,418,685	1,509	454,600	5,610,891	733	295,691
Not mapped*	$313,079	1,982,670	192	190,061	1,121,875	104	119,793

* *Unknown District*: The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-8.
Industrial Programs
Implemented Energy, Electric or Gas Bill Savings by Assembly District
(July 1, 2001–December 31, 2008)

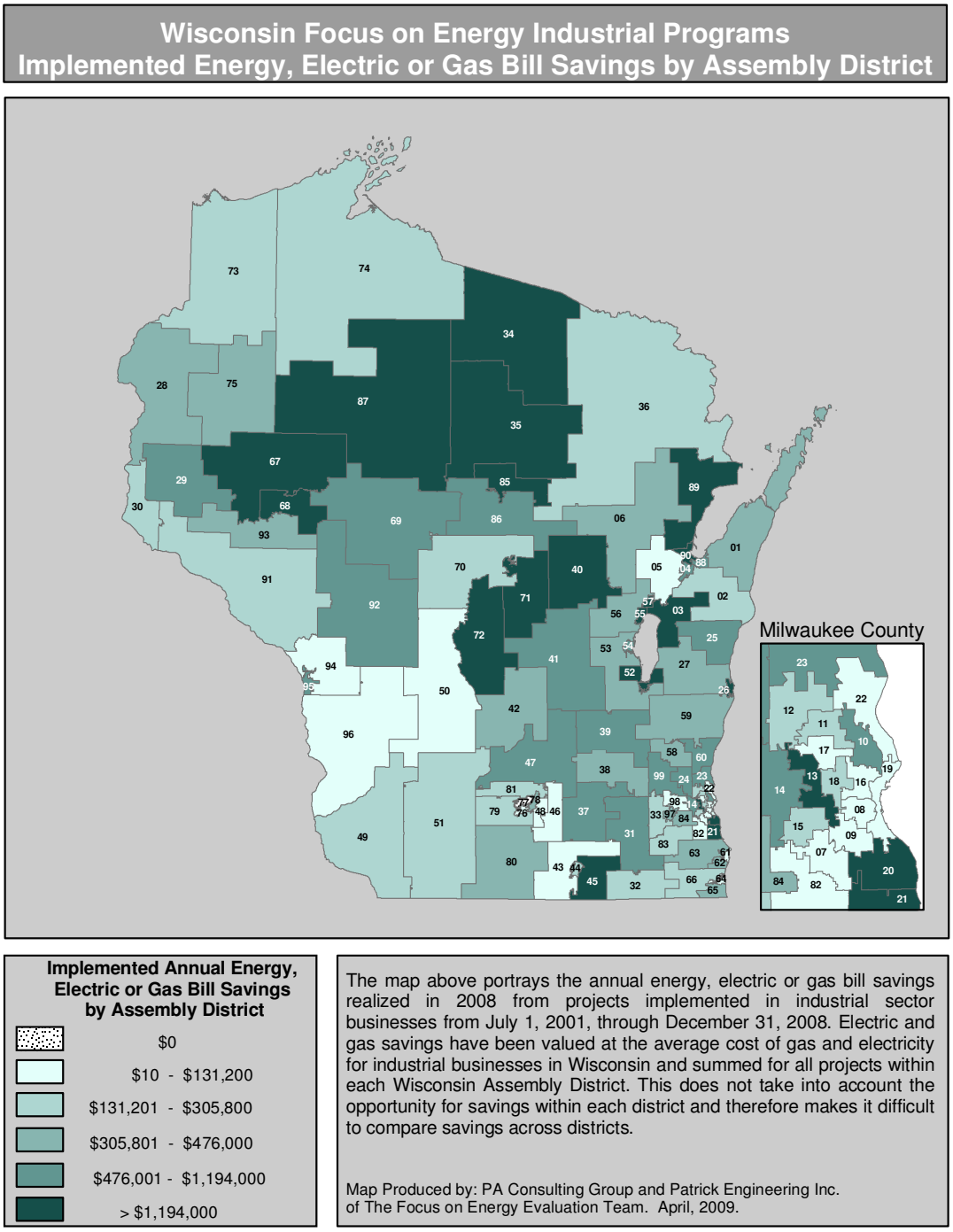


Table A-8. Industrial Program Energy Impacts
(By Assembly District)
(July 1, 2001–December 31, 2008)

Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
1	$329,005	2,332,245	357	185,698	1,187,242	170	110,379
2	$212,177	2,858,023	469	43,377	1,573,346	245	23,870
3	$1,896,167	16,992,085	2,116	869,942	7,996,610	975	511,162
4	$1,035,361	13,173,499	2,201	255,267	6,818,516	1,043	135,382
5	$121,026	1,598,746	332	26,518	883,060	174	12,242
6	$337,251	1,641,863	248	232,596	926,948	132	140,862
7	$1,881	32,159	6	-	16,396	3	-
8	$78,150	1,222,180	225	6,415	680,844	119	4,052
9	$56,415	578,993	111	21,740	335,411	61	8,378
10	$997,872	4,456,987	789	710,838	2,495,291	426	328,099
11	$228,302	1,859,975	255	115,230	1,020,848	135	48,304
12	$158,249	2,158,019	384	30,863	1,206,504	201	19,492
13	$1,313,288	4,166,239	296	1,031,401	1,860,306	147	447,149
14	$595,273	6,847,331	852	187,757	2,692,590	347	130,737
15	$134,650	2,101,068	296	11,319	801,314	111	6,371
16	$14,403	226,344	32	1,120	100,496	15	569
17	$11	188	0	-	107	0	-
18	$196,920	1,754,337	190	90,927	955,936	99	42,849
19	$119,514	1,276,560	150	43,235	685,534	76	21,478
20	$1,196,863	2,965,253	610	986,881	1,647,625	320	359,456
21	$1,325,822	3,260,332	436	1,094,592	2,066,120	250	491,049
22	$101,492	1,709,637	393	1,426	812,534	151	491
23	$919,676	7,330,968	1,148	473,302	3,885,868	577	296,283
24	$533,386	8,361,270	1,526	42,673	4,465,832	794	21,381
25	$654,344	4,614,525	789	370,679	2,588,805	419	232,009
26	$5,222,279	22,313,950	3,071	3,777,158	12,160,558	1,606	2,662,237
27	$333,806	1,734,948	326	224,023	950,581	177	100,021
28	$438,203	6,722,203	1,688	43,351	3,431,530	844	25,742
29	$1,193,975	11,772,512	1,794	487,255	6,388,471	902	319,298
30	$281,270	3,306,118	534	84,727	1,748,478	258	37,738
31	$794,317	1,447,561	284	684,315	829,553	159	411,606
32	$302,315	5,133,905	918	1,911	2,883,935	497	842
33	$200,389	1,471,759	249	110,214	784,433	126	69,550
34	$1,303,793	3,450,893	566	1,062,599	1,929,899	314	667,787
35	$2,674,346	2,710,344	361	2,426,027	1,526,727	193	1,898,223
36	$147,096	1,383,094	145	63,824	800,679	74	44,667
37	$663,437	4,665,847	640	376,552	2,143,320	306	233,169
38	$414,596	1,742,470	432	301,506	954,245	234	221,020
39	$766,992	7,151,292	1,120	336,202	3,829,115	568	230,295
40	$1,427,280	3,483,953	575	1,179,816	1,985,451	306	806,093
41	$549,201	4,544,963	1,041	273,212	2,450,066	487	157,484

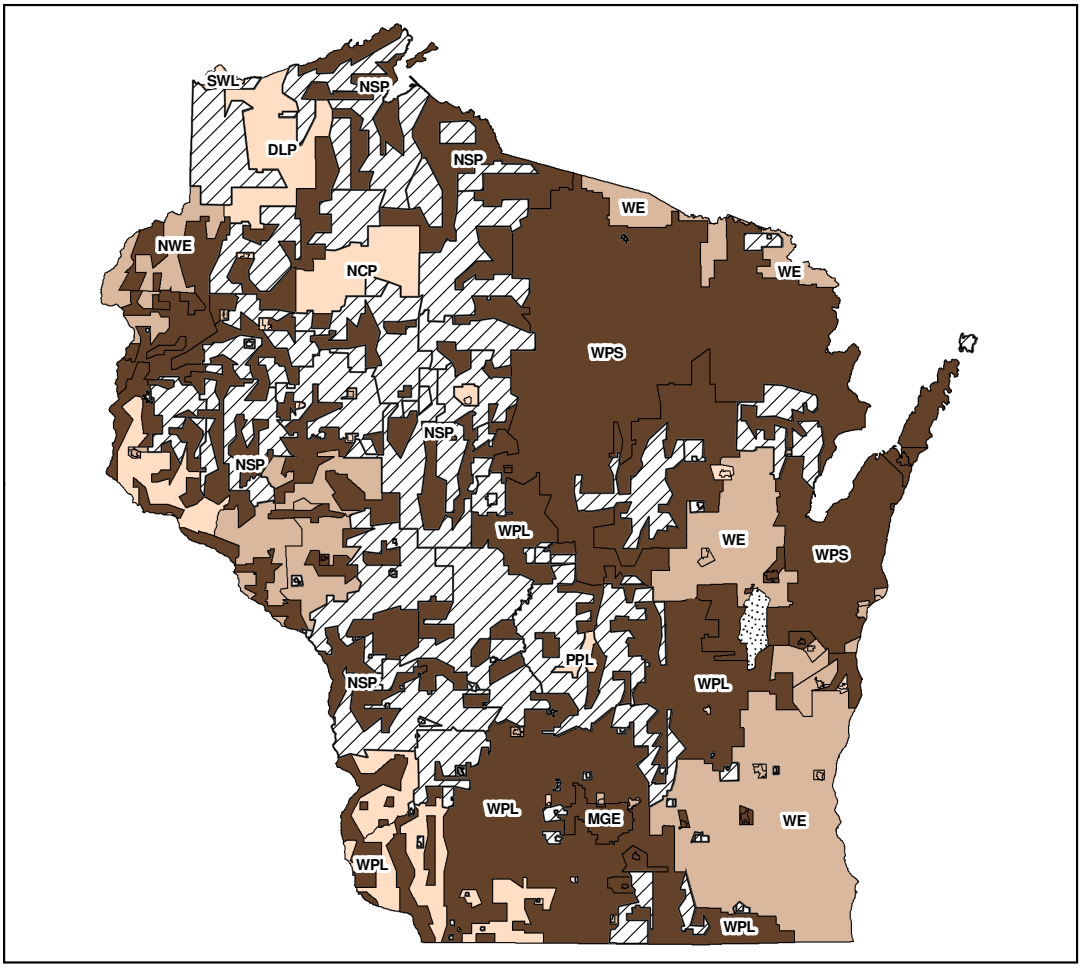
Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
42	$319,911	5,456,631	1,190	673	3,344,870	677	237
43	$85,718	1,206,588	377	14,593	544,470	142	6,683
44	$196,748	1,853,812	352	85,150	1,004,830	180	31,079
45	$1,495,055	8,950,490	1,242	936,790	4,577,569	597	610,178
46	$92,174	977,051	198	33,767	603,367	117	20,543
47	$573,071	5,720,021	839	229,942	3,111,143	440	145,127
48	$131,193	1,010,705	200	69,496	505,289	93	26,747
49	$201,146	662,520	27	156,595	328,360	(0)	77,681
50	$31,083	497,566	94	1,905	246,080	44	1,203
51	$156,830	2,643,354	300	2,116	922,871	111	1,336
52	$2,072,930	27,740,188	4,010	434,068	12,084,700	1,707	210,025
53	$321,055	4,034,255	825	82,016	2,330,251	453	51,417
54	$601,029	9,380,063	1,244	50,430	4,739,803	611	22,035
55	$2,355,843	10,950,768	1,475	1,654,024	5,893,357	767	998,048
56	$453,697	6,780,704	1,169	54,991	3,513,317	587	27,051
57	$1,278,115	17,259,545	2,601	258,854	10,072,820	530	161,706
58	$457,376	4,215,906	644	203,226	2,223,774	325	83,008
59	$395,454	2,296,147	308	251,813	1,039,165	135	86,407
60	$950,319	7,401,465	832	498,875	3,440,588	363	277,208
61	$95,013	706,449	167	51,770	309,784	73	23,833
62	$334,963	3,149,981	438	145,312	1,667,675	225	103,142
63	$372,672	2,619,374	550	211,609	1,208,166	251	124,949
64	$91,278	1,252,821	302	17,346	585,371	136	10,364
65	$450,706	3,349,817	566	245,652	1,967,734	318	137,564
66	$223,039	2,498,928	385	74,110	1,398,516	201	32,365
67	$1,363,724	12,326,297	1,753	619,707	6,824,208	928	337,654
68	$1,931,619	10,332,473	1,306	1,279,816	5,076,402	601	740,477
69	$735,174	6,528,757	930	340,638	3,664,733	491	171,146
70	$305,738	2,366,592	310	161,323	1,140,207	145	75,189
71	$4,815,689	18,430,248	2,103	3,604,165	9,822,561	1,047	1,883,128
72	$2,376,030	10,508,673	1,312	1,698,431	5,550,076	599	1,195,039
73	$218,527	1,536,221	487	124,068	794,774	248	76,820
74	$209,769	2,994,641	444	33,348	1,419,280	202	15,241
75	$349,398	3,196,168	541	156,627	1,798,700	293	67,463
76	$51,342	877,644	99	-	405,193	43	-
78	$475,949	4,560,738	655	201,683	2,316,010	393	114,053
79	$299,263	2,328,514	604	157,228	1,265,070	329	93,537
80	$446,436	6,597,778	1,062	58,309	3,954,055	601	39,580
81	$254,534	3,511,859	645	47,339	2,115,165	374	29,522
82	$108,349	1,815,542	301	2,063	1,004,663	153	1,287
83	$143,752	2,315,573	342	7,995	1,390,364	199	5,049
84	$451,794	2,389,533	448	300,874	1,238,930	230	145,152
85	$2,767,061	20,084,724	3,106	1,535,298	11,090,406	1,615	971,039
86	$720,987	7,489,871	1,463	272,738	4,190,604	786	134,629
87	$6,214,373	15,150,497	1,923	5,137,965	7,617,612	916	3,322,266

Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
88	$752,929	7,793,911	1,035	286,389	3,962,961	477	177,956
89	$1,754,147	1,362,950	577	1,614,671	773,238	333	996,784
90	$1,564,593	13,948,356	2,345	721,903	7,807,730	1,264	377,191
91	$230,486	1,830,812	279	118,982	1,009,465	144	61,505
92	$1,029,450	7,133,657	701	590,290	4,044,253	379	313,456
93	$338,305	5,255,336	628	29,766	2,930,742	330	18,800
94	$129,804	974,903	213	70,176	594,348	130	45,124
95	$1,122,774	11,925,395	1,984	409,969	5,430,204	945	271,848
96	$100,977	1,614,520	223	6,295	1,019,059	135	2,798
97	$449,374	6,853,980	902	46,689	3,143,422	417	26,534
98	$98,825	1,630,281	325	3,331	930,561	174	2,023
99	$591,214	2,934,424	282	404,580	1,536,908	142	267,133
Not mapped*	$313,079	1,982,670	192	190,061	1,121,875	104	119,793

* *Unknown District*: The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-9.
Industrial Programs
Per Capita Energy, Electric Bill Savings by Electric Utility Territory
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Industrial Programs
Per Capita* Energy, Electric Bill Savings by Electric Utility Territory



Per Capita Annual Energy, Electric Bill Savings by Utility Territory

- $0
- $2.60 - $820.00
- $820.01 - $3,430.00
- > $3,430.00
- Non Participating Utility Territories

The map above portrays the annual energy, electric bill savings realized in 2008 from projects implemented in industrial sector businesses from July 1, 2001, through December 31, 2008. Electric savings has been valued at the average cost of electricity for industrial businesses in Wisconsin and summed for all projects within each utility territory and divided by the number of industrial business customers in that utility territory.

* The unit of population is industrial customers as reported by the utilities in 2007.

Map Produced by: PA Consulting Group and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. April, 2009.

Table A-9. Industrial Program Electric Impacts
(By Participating Electric Utility)
(July 1, 2001–December 31, 2008)

Utility Name	Map Code	Annual Dollars Saved	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Algoma Utility Commission		$8,409	$8,409	143,746	11	81,153	11	1
Alliant Energy	WPL	$6,265,901	$6,260	107,109,417	8,172	55,284,787	8,172	1,001
Black River Falls Municipal Electric & Water		$18,654		318,866	33	181,720	33	
Bloomer City Of Electric Utility		$44,755	$814	765,050	65	418,551	65	55
Brodhead Water And Light Commission		$3,095	$1,548	52,912	4	30,154	4	2
Cedarburg Light And Water Commission		$9,386	$3,129	160,444	17	90,702	17	3
City of Kiel		$ 39,956	$2,350	683,003	72	389,796	72	17
City of Muscoda		$ -	$0	-	(31)	-	(31)	1
City of New Richmond		$ -	$0	-	-	-	-	1
Columbus Water And Light Dept		$ -	$0	-	-	-	-	1
Consolidated Water Power Company	CWP	$365,821	$365,821	6,253,358	232	3,563,741	232	1
Cornell Municipal Water And Electric Utility		$32,023	$3,202	547,401	47	344,011	47	10
Cuba City Electric & Water Utility		$ -		-	-	-	-	
Cumberland Municipal Utility		$64,626	$3,231	1,104,718	67	625,032	67	20
Dahlberg Light And Power Company	DLP	$3,281	$82	56,094	24	30,816	24	40
Eau Claire Electric Cooperative	C-8	$25,664	$1,974	438,698	68	224,382	68	13
Evansville City of Water & Light		$6,641	$6,641	113,520	5	59,658	5	1
Florence Utility Commission		$3,226		55,140	6	31,424	6	
Hartford City Of Utilities		$11,203	$1,600	191,500	20	109,134	20	7
Hustisford Utilities		$2,507		42,859	4	24,425	4	
Jefferson Utilities		$ -	$0	-	-	-	-	4
Kaukauna Utilities		$735,944	$91,993	12,580,241	642	5,731,305	642	8
Lake Mills Light And Water Dept		$8,071	$8,071	137,969	12	78,628	12	1
Madison Gas And Electric Company	MGE	$627,272	$12,801	10,722,590	1,015	5,788,095	1,015	49
Manitowoc Public Utilities		$219,564	$2,553	3,753,236	336	2,138,886	336	86
Mazomanie Electric Utility		$2,492	$156	42,605	11	24,280	11	16
Medford Electric Utility		$48,953	$699	836,809	72	476,891	72	70
Menasha Electric & Water Utilities		$88,063	$7,339	1,505,344	105	857,514	105	12

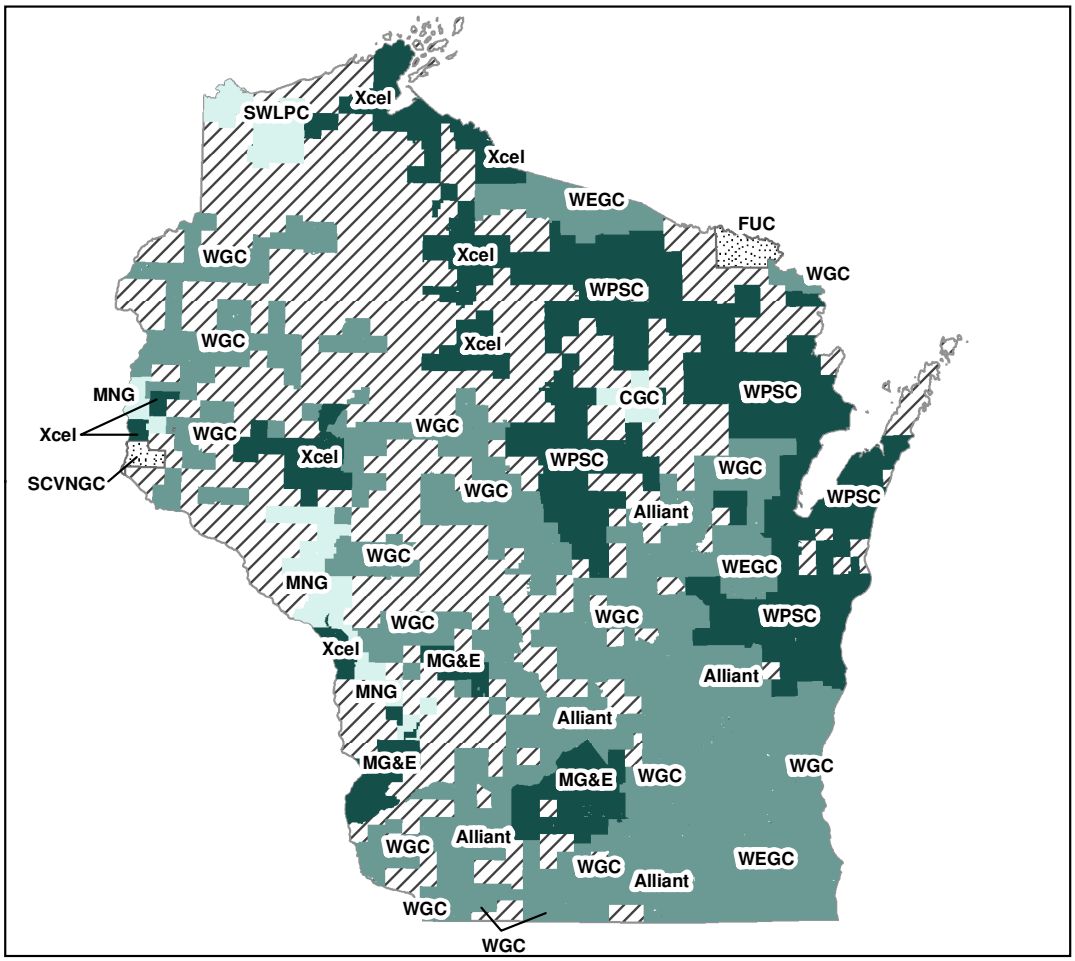
Utility Name	Map Code	Annual Dollars Saved	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
New Glarus Light And Water Works		$1,020		17,434	2	9,935	2	
New Holstein Public Utility		$11,178	$11,178	191,084	17	110,366	17	1
New London Electric & Water Utility		$16,367	$2,728	279,784	23	159,381	23	6
North Central Power Company Inc	NCP	$256	$85	4,379	0	2,496	0	3
Northwestern Wisconsin Electric Co	NWE	$95,930	$3,426	1,639,822	76	729,705	76	28
Oconomowoc City Of Utilities		$38,669	$4,834	661,011	83	387,999	83	8
Oconto Falls Water And Light Commission		$8,150		139,317	14	79,396	14	
Pierce-Pepin Electric Cooperative	C-14	$3,589	$598	61,349	5	28,749	5	6
Pioneer Power & Light Company	PPL	$430	$22	7,352	2	4,190	2	20
Plymouth Utilities		$23,930	$3,419	409,056	41	233,112	41	7
Polk-Burnett Electric Cooperative	C-15	$41,584	$20,792	710,841	25	424,777	25	2
Price Electric Cooperative Inc	C-16	$16,086		274,966	17	110,246	17	
Reedsburg Utility Commission		$8,504	$1,417	145,373	15	82,847	15	6
Rice Lake Municipal Water & Electric Utility		$21,298	$128	364,064	79	207,478	79	166
Richland Electric Cooperative	C-17	$4,109		70,245	8	40,032	8	
River Falls Municipal Utility		$5,601	$2,800	95,742	10	54,563	10	2
Riverland Energy Cooperative	C-18	$6,867		117,388	5	42,827	5	
Scenic River Electric Cooperative	C-20	$499	$28	8,538	1	4,670	1	18
Shawano Municipal Utilities		$48,492	$297	828,929	69	472,400	69	163
Sheboygan Falls Utilities		$155	$3	2,650	0	1,923	0	59
Slinger Utilities		$ -	$0	-	-	-	-	1
Spooner Municipal Utilities		$ 5,474	$342	93,576	9	51,641	9	16
Stoughton Electric Utility		$34,837	$11,612	595,509	62	339,376	62	3
Stratford Municipal Water & Electric Utility		$22,886	$5,722	391,218	40	215,220	40	4
Sturgeon Bay Utilities		$17,964	$8,982	307,073	35	174,999	35	2
Sun Prairie Water & Light Commission		$3,741	$1,870	63,945	6	36,442	6	2
Superior Water Light And Power Company	SWL	$86,587	$704	1,480,127	224	763,957	224	123
Two Rivers Water & Light Utility		$9,311	$3,104	159,158	16	89,568	16	3
Village of Benton		$2,579		44,083	3	31,277	3	
Village of Cadott		$586	$4	10,025	1	5,713	1	138

Utility Name	Map Code	Annual Dollars Saved	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Village of Waunakee		$3,489	$1,163	59,636	6	33,986	6	3
Waterloo Water And Light Commission		$1,278		21,845	6	12,449	6	
Waupun Public Utilities		$94	$47	1,598	0	911	0	2
We Energies	WEP	$8,379,692	$2,810	143,242,598	9,820	74,706,552	9,820	2,982
Whitehall Municipal Electric Utility		$22,104	$22,104	377,845	25	215,331	25	1
Wisconsin Public Service Corporation	WPS	$6,365,154	$29,198	108,806,055	9,079	58,312,538	9,079	218
Xcel Energy	NSP	$4,934,761	$53,639	84,354,889	6,397	43,779,672	6,397	92
Not mapped*		$941,809		16,099,301	1,063	8,606,964	1,063	

* *Unknown Utility:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-10.
Industrial Programs
Per Capita Energy, Gas Bill Savings by Gas Utility
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Industrial Programs
Per Capita* Energy, Gas Bill Savings by Gas Utility Territory



Per Capita Annual Energy, Gas Bill Savings by Utility Territory

- $0
- $320 - $3,360
- $3,361 - $7,160
- > $7,160
- Non Participating Utility Territories

The map above portrays the annual energy, gas bill savings realized in 2008 from projects implemented in industrial sector businesses from July 1, 2001, through December 31, 2008. Gas savings has been valued at the average cost of gas for industrial businesses in Wisconsin and summed for all projects within each utility territory and divided by the number of industrial business customers in that utility territory.

* The unit of population is industrial customers as reported by the utilities in 2007.

Map Produced by: PA Consulting Group and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. April, 2009.

Table A-10. Industrial Program Gas Impacts
(By Participating Gas Utility)
(July 1, 2001–December 31, 2008)

Utility Name	Map Code	Annual Dollars per Capita	Annual Dollars Saved	Lifecycle Verified Gross Therms	Persistent Net Therms	Number of Customers
Alliant/Wisconsin Power & Light	Alliant	$7,156	$1,617,356	1,559,649	993,178	226
City Gas Company	CGC	$3,356	$60,404	58,249	28,075	18
Madison Gas and Electric	MG&E	$7,690	$499,876	482,040	266,657	65
Midwest Natural Gas Inc.	MNG	$329	$26,020	25,092	9,271	79
St Croix Valley Natural Gas Company	SCVNGC	$0	$0	0	0	24
Superior Water Light And Power Company	SWLPC	$1,838	$128,658	124,068	76,820	70
Wisconsin Electric Gas Operations	WEGC	$4,964	$7,297,716	7,037,334	3,843,787	1,470
Wisconsin Gas Company	WGC	$4,946	$7,790,385	7,512,425	4,065,344	1,575
Wisconsin Public Service Corporation	WPSC	$13,268	$17,301,122	16,683,820	10,534,951	1,304
Xcel (Northern States Power Company)	Xcel	$313,957	$7,848,928	7,568,879	4,800,355	25
Not mapped*			$3,331,643	3,212,770	2,028,530	

* *Unknown Utility:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

A.3 RESIDENTIAL PROGRAMS

In this section, we summarize the verified energy impacts across the Residential Programs through December 31, 2008. The tables and maps below provide energy savings that are based on the evaluators' review of participants, measures installed, and per-unit (measure) savings used by WECC program administrators.

Note: A change in the type of energy impacts data used for the Residential Programs maps. As explained in the Introduction to this Appendix (above), the data reported in all of the maps in this report are *lifecycle verified gross* energy impacts— a recently introduced (for Focus) type of reported energy impacts. As in the past, these are impact estimates based on evaluation work done to establish verified gross for specific programs and/or program areas. However, as discussed in Section 1.1, *lifecycle verified gross* is defined as:

> Energy savings, expressed as *verified gross*, that explicitly incorporate measure life.

The reader should be aware of this shift since it has the effect of diminishing the levels of reported savings (compared to verified gross savings). This is because verified gross savings do ***not*** consider the lifecycle effects (i.e., the median operating life of energy efficiency measures, such as CFLs) that may cause energy savings to end.

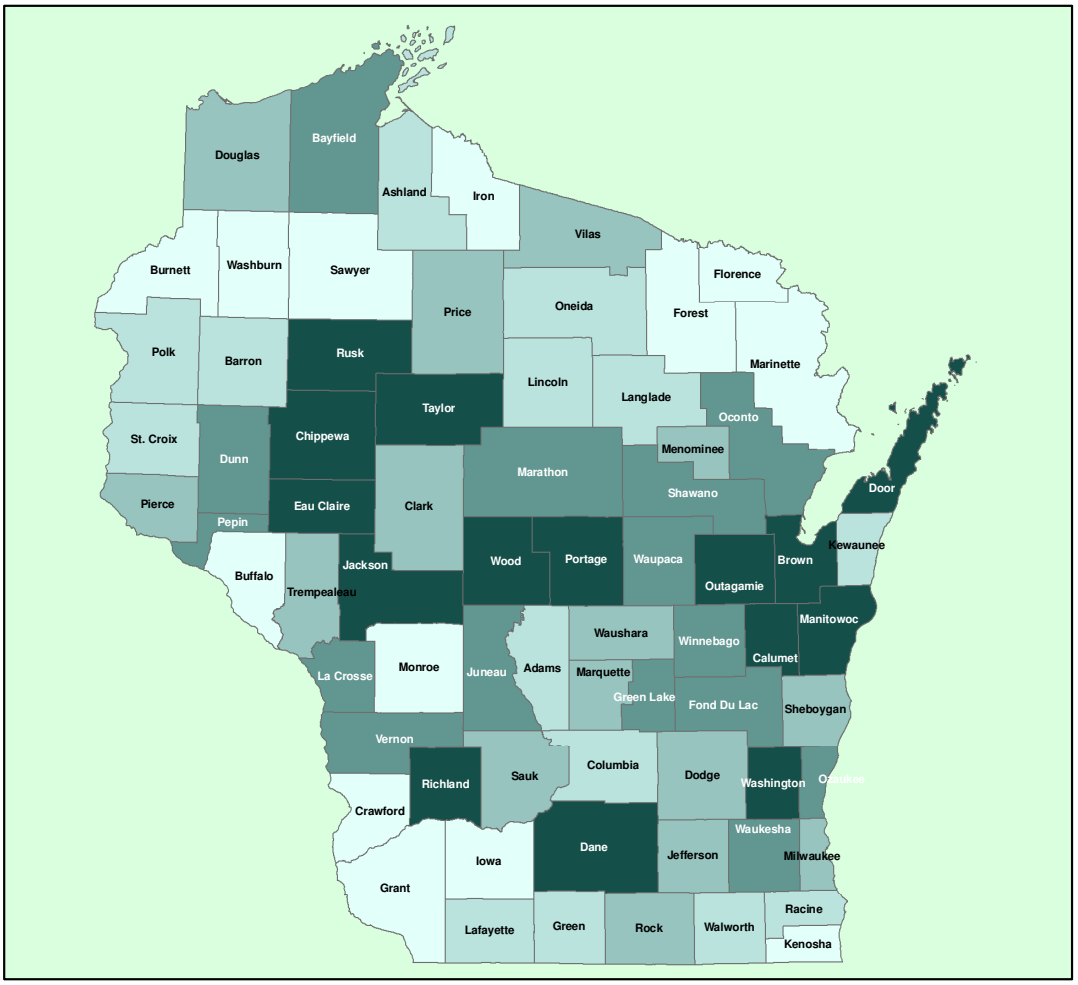
In order to provide some continuity in this transition in the basis for the mapped energy impacts, the tables that accompany the maps include a column for verified gross impacts—as in past reports impacts—though these are *lifecycle* verified gross impacts, and will therefore show some differences from past reports. Additional discussion of lifecycle and persistent savings is provided above in Section 2.1 and Section 2.8.

The *"Number of Customers (Households)"* for each county was estimated by determining the proportion of the area of each census block group that was within the boundaries of a utility participating in the Focus on Energy. This proportion was then applied to the population of that census block group to estimate the number of participating households within the block group. These block group estimates were then aggregated to the county level.

The *"Number of Customers"* presented for each of the participating utilities in Table A-14 are based on the number of customers reported by the utilities in 2005. The *"Number of Customers"* presented for each of the participating utilities in Table A-15 are based on the number of customers reported by the utilities in 2006.

Figure A-11.
Residential Programs
Per Capita Energy, Electric or Gas Bill Savings by County
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Residential Programs
Per Capita* Energy, Electric or Gas Bill Savings by County



Per Capita Annual Energy, Electric or Gas Bill Savings by County

	$0
	$5.60 - $25.80
	$25.81 - $30.70
	$30.71 - $38.50
	$38.51 - $46.90
	> $46.90

The map above portrays the annual energy, electric or gas bill savings realized in 2008 from projects implemented in households from July 1, 2001, through December 31, 2008. Electric and gas savings have been valued at the average cost of gas and electricity in Wisconsin and summed for all projects within each county and divided by the number of eligible households in that county.

* The unit of population is residential customers in participating utility territories.

Map Produced by: PA Consulting Group and Patrick Engineering Inc.
of The Focus on Energy Evaluation Team. April, 2009.

Table A-11. Residential Programs Energy Impacts
(by Participating County)
(July 1, 2001–December 31, 2008)

County	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms	Eligible Participants
Adams	$27	571,596	49	6,701	432,758	39	5,626	2,519
Ashland	$31	1,120,351	111	27,407	819,463	85	22,745	4,950
Barron	$28	2,179,859	200	22,391	1,637,772	158	19,883	9,114
Bayfield	$46	1,281,465	95	32,671	923,079	72	29,532	3,836
Brown	$48	30,288,731	3,837	806,106	23,297,991	3,027	646,374	87,295
Buffalo	$24	365,284	60	15,796	272,087	51	14,481	2,373
Burnett	$14	428,292	36	4,038	315,917	28	3,383	3,486
Calumet	$54	5,462,473	801	108,559	4,238,082	651	93,757	13,028
Chippewa	$62	6,809,884	560	101,360	4,965,659	439	88,730	13,563
Clark	$32	2,063,249	176	24,096	1,522,488	135	19,144	7,798
Columbia	$30	3,812,945	401	64,723	2,929,938	331	54,807	15,889
Crawford	$26	937,217	82	7,970	727,811	67	6,501	4,209
Dane	$63	59,505,006	7,591	2,765,100	45,759,913	6,171	2,213,345	154,704
Dodge	$34	7,677,175	1,174	120,930	5,874,470	956	101,454	27,767
Door	$50	2,618,306	296	24,849	1,989,334	242	22,670	6,178
Douglas	$37	4,119,591	298	96,834	2,867,644	221	81,635	14,885
Dunn	$40	3,053,507	283	30,410	2,302,392	215	25,037	8,903
Eau Claire	$58	14,605,981	1,379	202,033	11,586,388	1,132	164,549	30,944
Florence	$6	88,614	9	485	69,904	8	417	1,756
Fond Du Lac	$47	12,709,348	1,765	303,216	9,982,791	1,477	255,479	36,540
Forest	$23	821,942	73	6,001	640,802	58	5,139	4,043
Grant	$25	2,132,180	233	33,555	1,610,923	192	29,010	10,565
Green	$28	2,592,176	382	40,066	1,965,988	320	34,296	11,716
Green Lake	$41	2,325,068	267	31,192	1,732,933	215	26,219	6,843
Iowa	$23	1,599,818	148	26,167	1,213,302	117	22,453	8,753
Iron	$15	289,112	24	5,004	218,458	18	4,286	2,384
Jackson	$94	813,315	61	5,633	606,817	46	5,065	981
Jefferson	$31	5,750,889	759	85,333	4,377,937	618	76,110	22,669
Juneau	$41	884,036	94	17,343	678,479	77	13,984	2,814
Kenosha	$25	11,003,310	1,796	206,166	8,359,256	1,464	155,677	56,057
Kewaunee	$30	1,801,154	203	22,379	1,400,260	168	18,267	7,163
La Crosse	$39	10,809,667	1,705	236,374	8,335,120	1,430	183,138	37,142
Lafayette	$27	796,974	120	10,877	608,724	99	9,211	3,563
Langlade	$27	1,917,154	203	21,232	1,452,411	158	17,296	8,452
Lincoln	$28	2,376,054	316	56,242	1,838,628	262	41,866	11,553
Manitowoc	$59	6,009,349	890	115,791	4,663,542	725	103,081	13,227
Marathon	$42	13,966,142	1,883	301,865	10,858,693	1,565	242,218	44,418
Marinette	$25	3,541,147	441	37,878	2,722,006	360	31,618	16,834
Marquette	$36	778,931	69	7,573	588,512	55	6,171	2,534
Menominee	$36	286,265	38	12,837	218,074	33	11,318	1,289
Milwaukee	$34	87,151,342	12,524	2,910,903	65,382,332	9,993	2,198,692	377,729

County	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms	Eligible Participants
Adams	$27	571,596	49	6,701	432,758	39	5,626	2,519
Monroe	$18	1,636,154	205	23,452	1,248,631	168	20,286	11,207
Oconto	$42	2,818,853	285	33,660	2,148,038	228	29,667	8,063
Oneida	$29	3,542,329	439	54,673	2,656,778	338	47,423	15,211
Outagamie	$58	22,078,275	3,017	322,607	17,012,644	2,493	276,973	46,720
Ozaukee	$46	9,135,855	1,711	159,691	7,020,221	1,460	134,922	25,245
Pepin	$40	640,124	52	7,430	482,646	41	6,047	1,916
Pierce	$38	1,113,279	180	26,523	877,100	149	18,119	3,977
Polk	$26	1,619,216	148	34,003	1,225,565	110	27,237	8,142
Portage	$73	12,381,323	1,522	311,299	10,018,482	1,253	227,764	23,159
Price	$38	934,767	75	6,719	699,727	57	5,921	2,801
Racine	$28	16,817,209	2,678	197,867	12,885,412	2,249	156,256	70,819
Richland	$59	1,052,957	115	10,556	760,856	93	8,957	2,099
Rock	$38	15,810,844	1,563	337,158	11,395,381	1,187	240,370	54,206
Rusk	$54	1,558,286	107	14,002	1,099,229	78	11,452	3,369
Sauk	$34	4,248,352	545	86,350	3,250,381	431	68,553	16,064
Sawyer	$21	827,387	90	8,403	610,040	69	7,141	4,683
Shawano	$39	3,021,308	319	40,723	2,276,132	253	33,300	9,375
Sheboygan	$32	8,331,208	1,412	194,826	6,536,926	1,162	165,743	34,842
St. Croix	$28	2,940,843	434	60,148	2,298,472	368	49,693	13,910
Taylor	$222	1,280,398	89	22,665	962,067	67	15,094	733
Trempealeau	$38	840,183	76	14,482	617,750	59	10,280	2,785
Vernon	$45	1,570,457	141	23,950	1,196,321	113	20,151	4,360
Vilas	$33	2,424,759	269	28,235	1,847,777	217	23,849	8,793
Walworth	$26	6,789,016	930	96,777	5,239,642	793	75,411	31,728
Washburn	$25	811,766	60	4,912	570,594	44	3,909	3,684
Washington	$52	14,841,929	1,942	359,327	11,496,912	1,603	298,042	38,827
Waukesha	$41	42,683,427	6,896	625,302	32,854,074	5,800	527,410	128,672
Waupaca	$42	5,033,464	748	63,466	3,887,747	622	54,623	14,439
Waushara	$34	1,736,322	249	20,542	1,336,238	205	17,356	6,153
Winnebago	$46	18,932,467	2,640	458,029	14,703,014	2,156	370,462	55,533
Wood	$62	4,513,857	542	82,636	3,502,185	453	71,804	9,378
Not mapped*		52,767,702	3,024	88,287	42,013,808	2,303	62,029	

* *Unknown County:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-12.
Residential Programs
Implemented Energy, Electric or Gas Bill Savings by Senate District
(July 1, 2001–December 31, 2008)

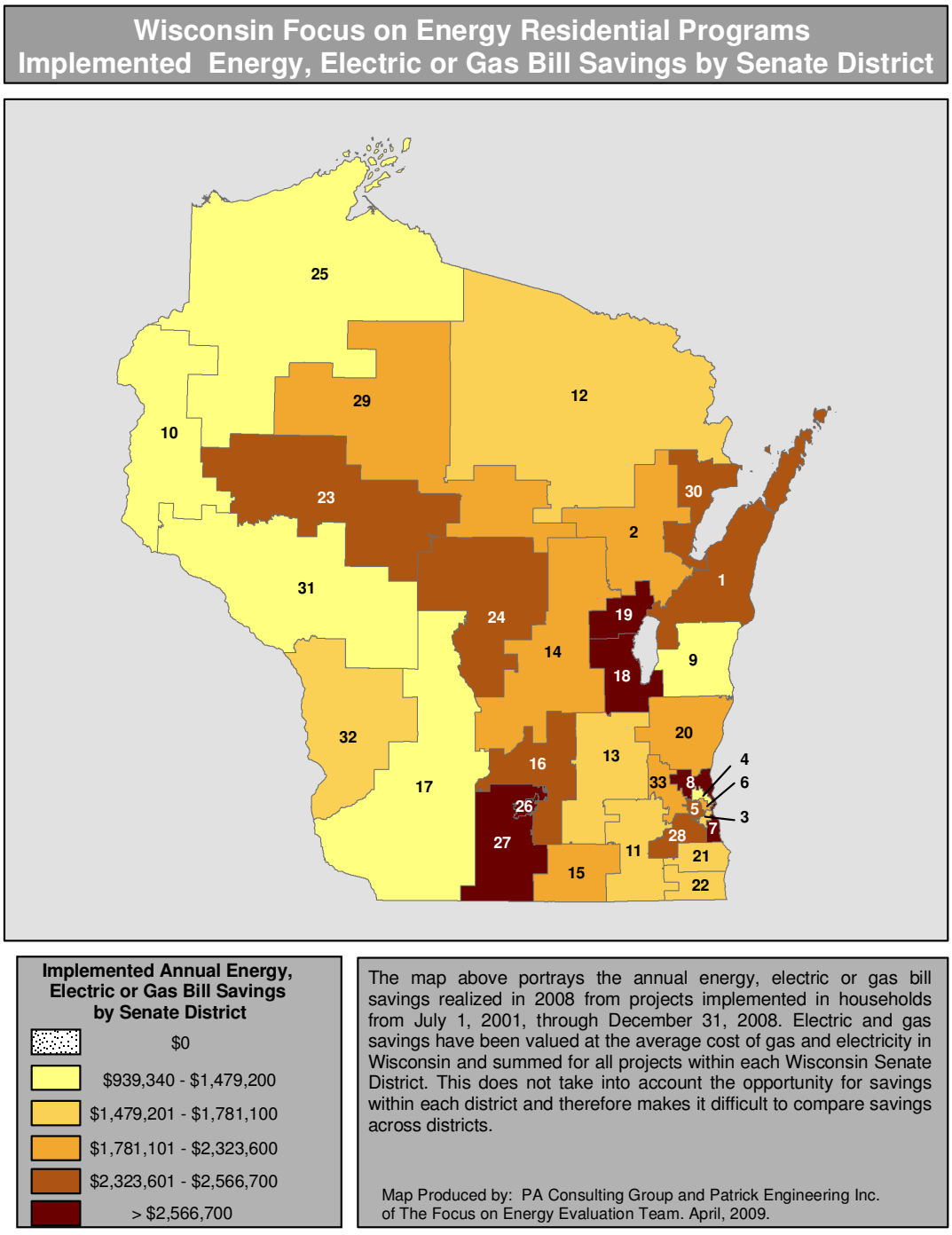


Table A-12. Residential Programs Energy Impacts
(By Senate District)
(July 1, 2001–December 31, 2008)

Senate District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
1	$2,389,147	18,797,853	2,464	331,856	14,480,322	2,002	284,186
2	$2,300,986	17,834,882	2,205	342,328	13,682,184	1,767	285,956
3	$1,600,476	11,645,629	1,469	302,183	8,767,677	1,171	223,257
4	$1,409,417	8,930,802	1,246	377,841	6,699,094	947	289,933
5	$2,387,602	18,867,727	3,181	324,722	14,333,023	2,614	268,678
6	$1,823,267	9,607,787	1,137	652,880	7,245,855	896	503,513
7	$3,380,081	21,972,629	3,106	859,356	16,100,808	2,387	617,269
8	$2,954,319	21,817,996	3,580	530,696	16,554,128	2,980	413,435
9	$1,479,155	10,981,444	1,856	260,839	8,659,110	1,535	224,851
10	$939,343	7,235,110	909	143,606	5,589,081	737	113,595
11	$1,723,876	13,893,439	2,157	211,617	10,757,826	1,843	176,703
12	$1,781,032	14,634,680	1,670	194,966	11,157,426	1,335	159,486
13	$1,737,156	13,789,319	1,940	231,058	10,548,961	1,584	198,610
14	$1,788,669	14,358,213	1,903	224,415	11,002,223	1,547	184,170
15	$2,205,448	17,080,416	1,680	329,291	12,382,350	1,286	232,796
16	$2,547,532	16,458,019	2,048	656,336	12,609,390	1,676	562,082
17	$1,079,595	8,781,108	980	125,763	6,673,778	802	107,568
18	$2,716,574	19,483,664	2,661	536,791	15,199,045	2,200	435,621
19	$3,156,708	25,240,268	3,564	404,459	19,507,311	2,941	345,233
20	$2,323,520	17,589,039	2,418	381,149	13,569,254	2,009	327,097
21	$1,706,393	14,346,273	2,249	159,390	10,973,992	1,877	125,476
22	$1,572,584	12,207,510	2,012	232,403	9,301,009	1,652	175,624
23	$2,515,919	20,871,824	1,781	258,660	16,142,869	1,436	217,709
24	$2,363,972	17,721,094	2,140	402,476	14,146,359	1,767	306,689
25	$1,368,003	10,673,134	882	197,638	7,681,469	671	169,064
26	$4,503,089	26,190,497	3,572	1,404,870	20,177,023	2,878	1,069,449
27	$3,198,972	21,316,838	2,534	769,320	16,354,447	2,084	637,353
28	$2,566,688	21,064,560	3,189	283,149	16,149,429	2,666	228,367
29	$2,147,278	16,512,964	2,035	330,470	12,692,511	1,673	262,014
30	$2,484,395	17,734,619	2,276	497,983	13,636,508	1,783	390,523
31	$1,198,454	9,564,523	1,018	155,074	7,151,903	812	127,620
32	$1,774,213	13,646,714	1,970	272,828	10,507,479	1,645	213,833
33	$2,297,664	18,325,355	3,068	298,290	14,182,253	2,585	249,574
Not mapped*	$5,672,379	52,903,287	3,036	90,083	42,103,769	2,313	63,574

* *Unknown district:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of state boundaries according to the GIS mapping application.

Figure A-13.
Residential Programs
Implemented Energy, Electric or Gas Bill Savings by Assembly District
(July 1, 2001–December 31, 2008)

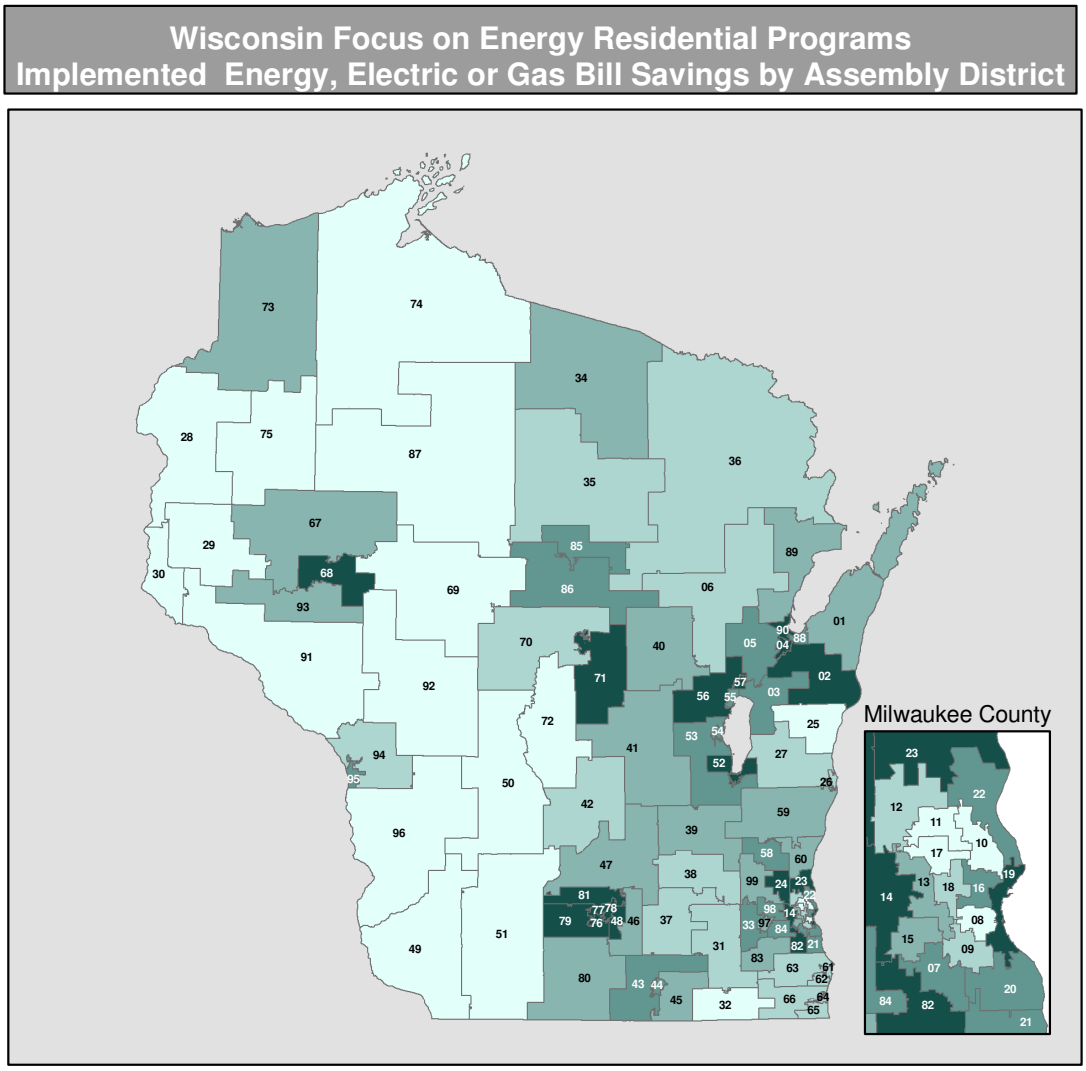


Table A-13. Residential Programs Energy Impacts
(By Assembly District)
(July 1, 2001–December 31, 2008)

Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
1	$619,574	5,179,912	591	60,325	3,978,526	487	52,545
2	$931,211	7,049,295	866	152,753	5,426,723	692	128,417
3	$838,387	6,568,883	1,007	118,778	5,075,236	823	103,223
4	$1,009,307	8,054,154	1,050	130,670	6,116,012	832	107,719
5	$812,423	5,781,277	694	164,375	4,539,307	564	139,163
6	$479,132	3,998,266	461	47,283	3,025,865	371	39,073
7	$847,769	6,106,828	884	165,282	4,644,168	713	113,234
8	$272,365	2,007,339	144	49,272	1,485,719	108	37,656
9	$480,334	3,531,383	441	87,629	2,637,741	350	72,366
10	$408,627	2,813,028	347	90,672	2,103,825	264	74,960
11	$397,452	2,185,228	304	134,658	1,656,140	235	110,134
12	$603,282	3,932,241	595	152,490	2,938,799	449	104,823
13	$670,164	5,236,887	876	96,121	3,984,255	715	81,908
14	$1,018,910	8,203,160	1,343	125,809	6,259,905	1,119	103,460
15	$698,488	5,427,290	963	102,793	4,088,613	781	83,310
16	$830,720	3,337,070	391	385,228	2,505,652	297	289,892
17	$428,136	3,044,860	360	86,774	2,266,188	287	72,282
18	$564,427	3,226,010	387	180,878	2,474,130	312	141,339
19	$1,707,621	9,047,304	1,230	607,343	6,480,761	901	429,348
20	$890,418	6,732,671	1,013	146,721	4,928,248	766	105,684
21	$782,042	6,192,654	863	105,292	4,691,799	719	82,237
22	$920,921	6,429,452	1,191	196,778	4,842,418	1,001	159,690
23	$1,080,012	8,017,532	1,445	190,505	6,125,002	1,221	141,458
24	$953,467	7,371,554	944	143,433	5,587,172	758	112,302
25	$428,166	3,171,716	513	76,099	2,503,571	420	68,075
26	$566,177	3,953,551	800	120,914	3,141,181	662	101,382
27	$484,834	3,856,391	543	63,826	3,014,576	453	55,395
28	$244,690	1,885,296	176	37,356	1,424,453	132	30,098
29	$411,979	3,163,130	376	63,832	2,414,126	294	49,363
30	$282,674	2,186,684	357	42,419	1,750,501	311	34,133
31	$543,944	4,420,692	671	63,667	3,395,609	570	57,033
32	$439,304	3,488,473	533	58,319	2,703,170	455	44,822
33	$740,615	5,984,155	953	89,631	4,658,980	819	74,848
34	$685,408	5,583,471	655	79,121	4,211,329	511	68,025
35	$593,599	4,672,324	567	82,294	3,590,253	462	63,128
36	$502,100	4,379,593	449	33,551	3,356,532	362	28,333
37	$518,419	4,203,783	501	61,478	3,180,889	411	55,415
38	$526,022	3,891,616	573	93,911	3,020,579	465	78,585
39	$692,799	5,694,719	866	75,669	4,347,997	708	64,611
40	$641,335	5,325,843	796	65,481	4,117,337	662	56,276
41	$642,020	5,319,418	657	66,572	4,045,677	534	56,267
42	$505,346	3,713,252	450	92,362	2,839,506	351	71,628

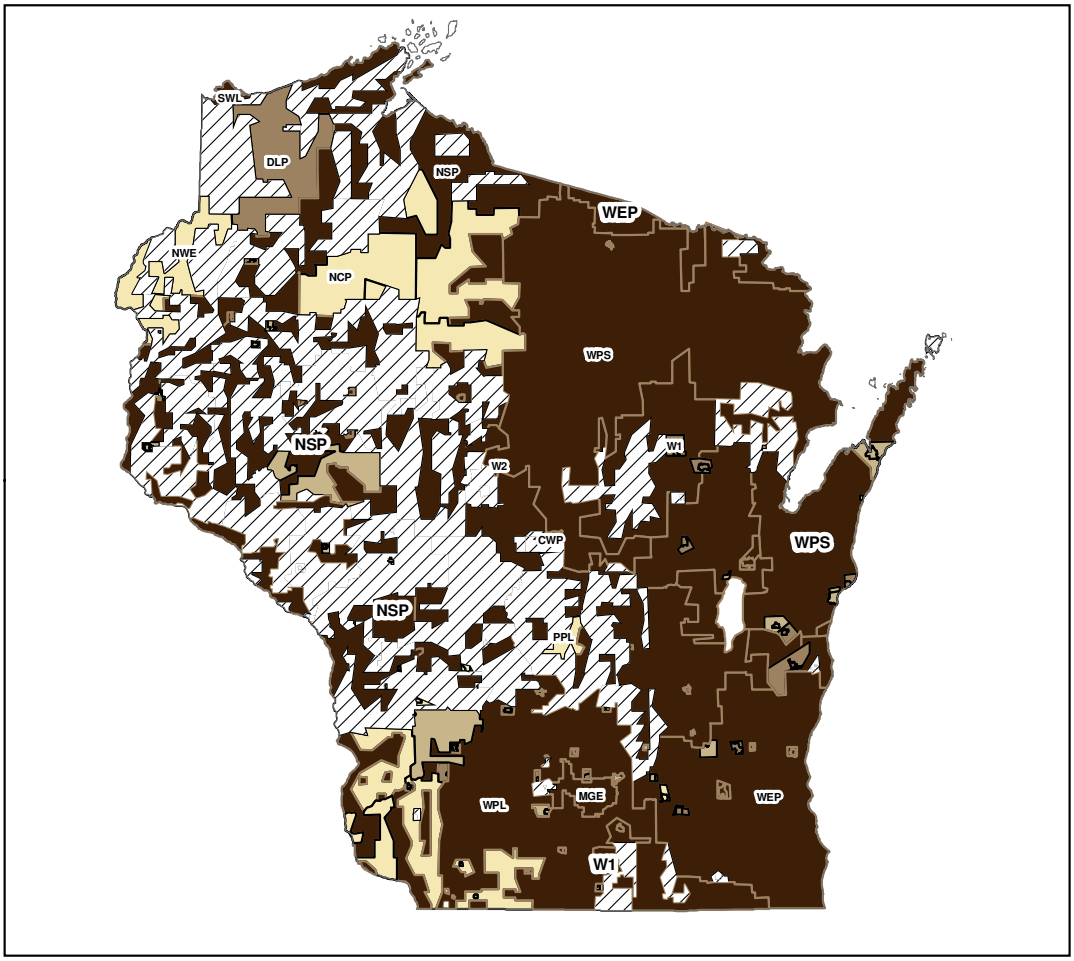
Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
43	$760,530	6,415,305	569	69,246	4,660,202	444	51,711
44	$784,868	5,628,494	642	155,147	4,113,256	490	109,125
45	$660,051	5,036,617	468	104,898	3,608,892	352	71,959
46	$633,397	4,134,204	418	159,624	3,155,848	348	141,646
47	$678,425	5,269,843	603	99,971	3,967,669	492	87,842
48	$1,235,591	7,052,830	1,026	396,740	5,485,283	836	332,594
49	$287,658	2,317,393	251	35,393	1,741,289	206	30,455
50	$319,582	2,624,646	308	35,098	2,028,767	258	29,566
51	$472,328	3,838,809	420	55,272	2,903,462	339	47,548
52	$1,045,110	7,510,006	1,120	205,304	5,955,613	945	170,675
53	$806,976	6,107,193	823	132,512	4,717,914	672	109,970
54	$864,488	5,866,466	719	198,975	4,525,518	583	154,977
55	$769,237	6,088,632	876	103,790	4,755,085	713	87,287
56	$1,359,404	10,730,366	1,412	185,909	8,166,839	1,166	158,353
57	$1,028,087	8,421,468	1,275	114,760	6,585,498	1,062	99,593
58	$916,732	6,662,236	887	173,781	5,194,535	737	146,457
59	$732,613	5,478,076	740	125,897	4,228,812	605	109,475
60	$674,137	5,448,368	791	81,471	4,145,560	667	71,164
61	$540,736	4,957,181	622	15,840	3,774,187	510	14,904
62	$558,759	4,290,940	810	86,502	3,286,802	671	63,285
63	$606,898	5,098,151	817	57,048	3,913,004	696	47,287
64	$552,946	3,895,983	661	115,151	2,921,707	511	79,180
65	$511,169	4,166,828	757	58,777	3,212,191	642	49,175
66	$508,469	4,144,699	595	58,476	3,167,111	498	47,269
67	$679,438	5,800,790	452	56,000	4,262,694	350	49,611
68	$1,368,739	11,459,044	1,008	131,937	9,201,450	838	109,320
69	$467,722	3,611,799	321	70,724	2,678,581	249	58,778
70	$540,456	4,332,508	499	68,306	3,324,717	406	58,732
71	$1,480,380	10,778,294	1,288	278,957	8,778,856	1,062	199,495
72	$343,136	2,610,292	352	55,212	2,042,785	299	48,462
73	$610,549	4,635,644	338	98,991	3,233,075	251	83,267
74	$451,422	3,433,128	313	72,713	2,509,984	239	63,083
75	$306,032	2,604,363	232	25,934	1,938,410	182	22,714
76	$1,376,375	8,181,998	1,220	414,484	6,210,392	999	335,452
77	$1,530,121	9,045,587	1,293	465,032	7,037,797	1,037	324,730
78	$1,596,608	8,963,055	1,060	525,354	6,928,740	843	409,267
79	$1,477,556	9,726,959	1,153	365,371	7,471,498	937	310,596
80	$624,918	4,960,787	623	83,098	3,758,207	521	71,108
81	$1,096,519	6,629,293	758	320,851	5,124,924	626	255,649
82	$938,722	7,494,923	1,084	121,192	5,737,971	904	90,783
83	$734,696	6,085,412	891	76,339	4,646,523	745	64,520
84	$893,279	7,484,304	1,214	85,617	5,764,985	1,017	73,064
85	$890,865	6,128,847	810	198,012	4,816,533	678	154,651
86	$780,870	6,386,709	936	87,983	4,951,122	780	74,020
87	$475,542	3,997,408	289	44,474	2,924,855	216	33,342
88	$854,849	5,884,672	756	189,703	4,542,006	592	144,916

Assembly District	Annual Dollars Saved	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms	Persistent Net kWh	Persistent Net kW	Persistent Net Therms
89	$649,693	5,124,664	610	89,158	3,913,562	492	78,150
90	$979,853	6,725,283	910	219,122	5,180,941	699	167,457
91	$271,735	2,107,519	214	40,317	1,572,642	172	33,230
92	$293,584	2,570,031	253	18,839	1,940,461	202	17,230
93	$633,155	4,887,163	551	95,918	3,638,943	437	77,160
94	$531,468	4,359,261	674	58,836	3,379,375	575	49,612
95	$904,319	6,495,028	1,035	177,923	4,989,081	858	133,864
96	$338,426	2,792,425	260	36,069	2,139,023	211	30,356
97	$651,126	4,801,052	984	117,605	3,679,439	816	93,069
98	$909,146	7,491,960	1,277	97,705	5,856,660	1,094	84,730
99	$737,420	6,032,606	807	82,980	4,646,351	675	71,775
Not mapped*	$5,672,379	52,903,287	3,036	90,083	42,103,769	2,313	63,574

* *Unknown District*: The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of state boundaries according to the GIS mapping application.

Figure A-14.
Residential Programs
Per Capita Energy, Electric Bill Savings by Electric Utility Territory
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Residential Programs
Per Capita* Energy, Electric Bill Savings by Electric Utility Territory



Per Capita Annual Energy, Electric Bill Savings by Utility Territory

- $0
- $1.50 - $7.00
- $7.01 - $9.55
- $9.56 - $15.80
- > $15.80
- Non Participating Utility Territories

The map above portrays the annual energy, electric bill savings realized in 2008 from projects implemented in households from July 1, 2001, through December 31, 2008. Electric savings has been valued at the average cost of electricity in Wisconsin and summed for all projects within each utility territory and divided by the number of residential customers in that utility territory.

* The unit of population is residential customers as reported by the utilities in 2007.

Map Produced by: PA Consulting Group and Patrick Engineering Inc.
of The Focus on Energy Evaluation Team. April, 2009

Table A-14. Residential Programs Electric Impacts
(By Participating Electric Utility)
(July 1, 2001–December 31, 2008)

Utility Name	Map Code	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Algoma Utility Commission		$2	24,975	1	19,293	1	1,644
Alliant Energy	WPL	$21	77,148,190	8,224	58,681,984	8,224	393,691
Arcadia Electric & Water Utility		$3	28,670	1	20,720	1	1,143
Barron Light And Water Utility		$9	125,530	9	94,074	9	1,456
Black River Falls Municipal Electric & Water		$8	174,465	10	132,345	10	2,170
Bloomer City Of Electric Utility		$16	246,672	15	178,200	15	1,575
Boscobel Municipal Utilities		$6	80,874	4	65,083	4	1,423
Brodhead Water And Light Commission		$9	130,017	9	96,625	9	1,498
Cashton Municipal Electric And Water Utility		$14	65,221	11	49,592	11	484
Cedarburg Light And Water Commission		$19	915,851	104	697,698	104	5,153
Centuria Municipal Electric Utility		$11	30,050	2	19,468	2	289
City of Argyle		$21	79,846	11	65,144	11	394
City of Kiel		$12	238,408	24	191,214	24	2,129
City of Lodi		$16	214,046	14	164,404	14	1,382
City of Muscoda		$15	131,986	8	93,225	8	933
City of New Richmond		$5	152,053	13	125,028	13	3,525
City of Westby		$5	44,534	2	31,722	2	971
Columbus Water And Light Dept		$7	154,483	12	119,426	12	2,252
Consolidated Water Power Company	CWP	$20	190,261	23	148,878	23	984
Cornell Municipal Water And Electric Utility		$42	289,459	8	228,156	8	716
Cuba City Electric & Water Utility		$3	28,684	1	20,722	1	934
Cumberland Municipal Utility		$20	212,633	19	164,754	19	1,117
Dahlberg Light And Power Company	DLP	$10	937,515	45	655,301	45	9,945
Eagle River Light And Water Commission		$29	229,922	13	176,582	13	847
Eau Claire Electric Cooperative	C-8	$8	758,748	43	539,339	43	9,773
Elroy Municipal Electric And Water Utility		$6	45,299	4	36,023	4	755

Utility Name	Map Code	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Evansville City of Water & Light		$21	599,671	40	446,706	40	3,058
Florence Utility Commission		$3	44,102	4	35,126	4	1,341
Hartford City Of Utilities		$14	782,053	54	606,367	54	5,670
Hustisford Utilities		$8	99,844	10	78,975	10	1,318
Jefferson Utilities		$10	313,959	28	243,649	28	3,448
Juneau Utility Commission		$6	56,804	5	44,257	5	940
Kaukauna Utilities		$23	2,781,174	298	2,229,273	298	12,531
La Farge Municipal Electric Utility		$4	15,609	1	11,854	1	448
Lake Mills Light And Water Dept		$6	208,153	26	163,948	26	3,368
Madison Gas And Electric Company	MGE	$37	42,024,544	4,476	32,470,886	4,476	118,959
Manitowoc Public Utilities		$8	1,241,507	119	1,002,188	119	15,621
Mazomanie Electric Utility		$13	96,801	8	75,343	8	802
Medford Electric Utility		$20	481,543	25	369,319	25	2,574
Menasha Electric & Water Utilities		$9	674,657	73	549,271	73	8,008
Mount Horeb Electric Utility		$9	256,741	22	195,086	22	3,068
New Glarus Light And Water Works		$17	160,536	16	123,436	16	1,002
New Holstein Public Utility		$9	190,917	18	152,731	18	2,234
New London Electric & Water Utility		$14	448,267	55	352,834	55	3,271
North Central Power Company Inc	NCP	$7	272,834	17	198,374	17	4,369
Northwestern Wisconsin Electric Co	NWE	$5	509,749	33	389,139	33	11,557
Oconomowoc City Of Utilities		$20	1,418,809	145	1,119,506	145	7,482
Oconto Falls Water And Light Commission		$11	137,722	9	105,287	9	1,334
Pierce-Pepin Electric Cooperative	C-14	$10	632,657	57	477,191	57	6,964
Pioneer Power & Light Company	PPL	$6	109,690	7	81,879	7	1,983
Plymouth Utilities		$10	664,551	49	511,671	49	6,842
Polk-Burnett Electric Cooperative	C-15	$4	750,783	42	555,594	42	18,637
Price Electric Cooperative Inc	C-16	$7	561,680	34	421,401	34	8,663
Princeton Municipal Water & Electric Utility		$14	96,465	7	73,842	7	706
Reedsburg Utility Commission		$13	516,712	37	419,150	37	4,149

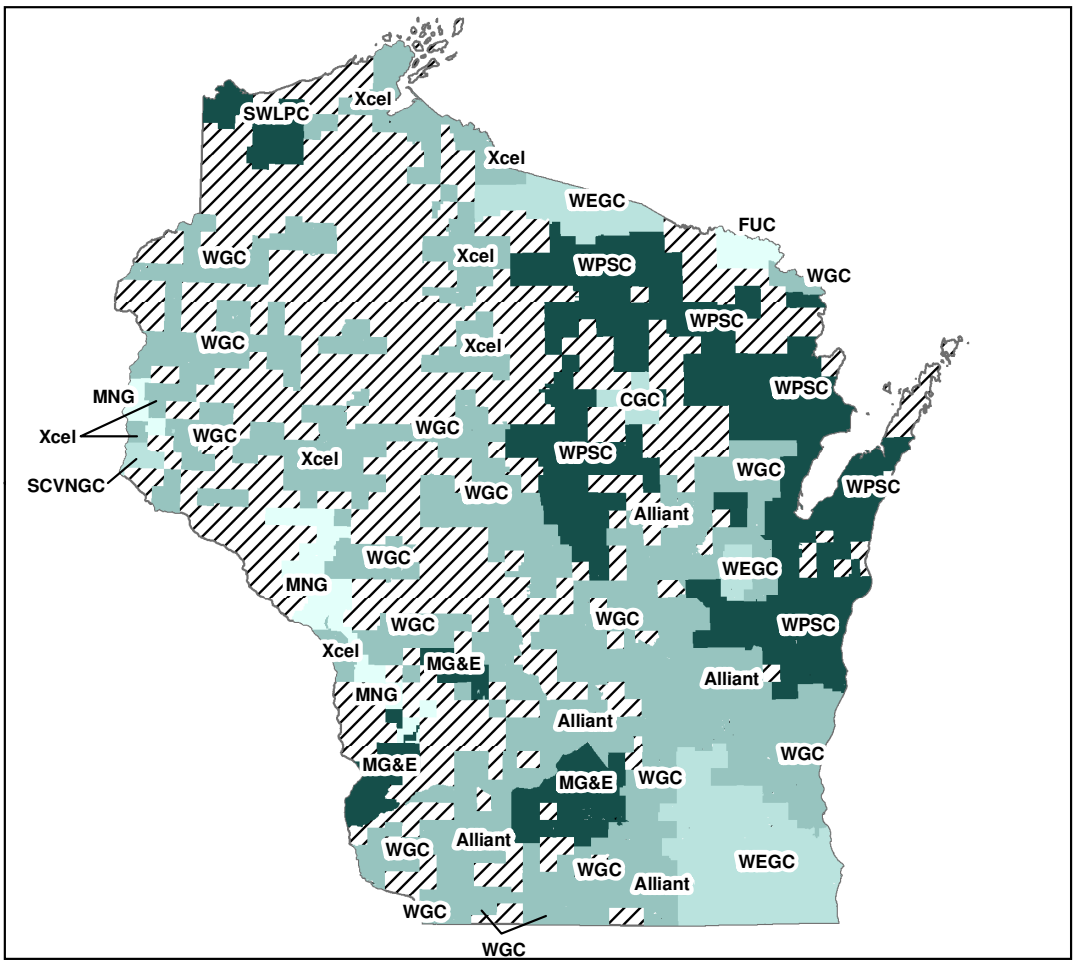
Utility Name	Map Code	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Rice Lake Municipal Water & Electric Utility		$7	300,223	17	232,184	17	4,422
Richland Center Electric Utility		$13	303,038	19	220,186	19	2,438
Richland Electric Cooperative	C-17	$10	316,593	26	230,863	26	3,489
River Falls Municipal Utility		$8	412,152	27	334,949	27	5,162
Riverland Energy Cooperative	C-18	$2	341,796	26	249,073	26	15,151
Rock County Electric Cooperative	C-19	$7	414,613	34	298,742	34	6,304
Scenic River Electric Cooperative	C-20	$5	573,339	43	429,079	43	12,429
Shawano Municipal Utilities		$14	570,402	52	439,058	52	4,151
Sheboygan Falls Utilities		$10	360,816	45	279,887	45	3,825
Shullsburg Electric Utility		$8	49,513	8	37,105	8	639
Slinger Utilities		$16	268,507	25	209,833	25	1,718
Spooner Municipal Utilities		$12	137,838	7	94,727	7	1,254
Stoughton Electric Utility		$18	1,274,840	93	924,541	93	7,563
Stratford Municipal Water & Electric Utility		$32	208,142	11	159,031	11	679
Sturgeon Bay Utilities		$8	571,133	61	441,932	61	7,361
Sun Prairie Water & Light Commission		$8	869,633	58	689,692	58	11,253
Superior Water Light And Power Company	SWL	$26	3,120,240	171	2,165,575	171	12,526
Two Rivers Water & Light Utility		$12	650,494	58	485,818	58	5,561
Village of Belmont		$7	35,773	2	26,791	2	535
Village of Benton		$3	14,252	2	10,502	2	486
Village of Cadott		$36	218,331	13	157,274	13	641
Village of Gresham		$13	115,084	6	84,752	6	948
Village of Pardeeville		$16	181,047	14	141,004	14	1,210
Village of Prairie Du Sac		$15	231,283	17	173,185	17	1,669
Village of Viola		$3	8,471	0	6,728	0	337
Village of Waunakee		$12	496,181	40	388,334	40	4,369
Waterloo Water And Light Commission		$7	103,535	9	78,694	9	1,505
Waupun Public Utilities		$13	452,105	24	346,008	24	3,707
We Energies	WEP	$24	225,685,445	27,634	172,041,754	27,634	968,454
Whitehall Municipal Electric Utility		$7	53,175	3	38,236	3	746
Wisconsin Dells Municipal Electric Utility		$8	102,922	6	80,461	6	1,279
Wisconsin Public Service Corporation	WPS	$25	86,536,581	9,281	67,722,121	9,281	370,222

Utility Name	Map Code	Annual Dollars per Capita	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Persistent Net kWh	Persistent Net kW	Number of Customers
Wonewoc Electric & Water Utility		$8	34,193	2	25,569	2	438
Xcel Energy	NSP	$23	45,235,689	4,251	34,773,736	4,251	206,386
Not mapped*			73,004,908	3,662	56,383,164	3,662	

* *Unknown Utility:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

Figure A-15.
Residential Programs
Per Capita Energy, Gas Bill Savings by Gas Utility
(July 1, 2001–December 31, 2008)

Wisconsin Focus on Energy Residential Programs
Per Capita* Energy, Gas Bill Savings by Gas Utility Territory



Per Capita Annual Energy, Gas Bill Savings by Utility Territory

- $0
- $0.30 - $3.40
- $3.41 - $5.50
- $5.51 - $8.80
- > $8.80
- Non Participating Utility Territories

The map above portrays the annual energy, gas bill savings realized in 2008 from projects implemented in households from July 1, 2001, through December 31, 2008. Gas savings has been valued at the average cost of gas in Wisconsin and summed for all projects within each utility territory and divided by the number of residential customers in that utility territory.

* The unit of population is residential customers as reported by the utilities in 2007.

Map Produced by: PA Consulting Group and Patrick Engineering Inc.
of The Focus on Energy Evaluation Team. April 2009

Table A-15. Residential Programs Gas Impacts
(By Participating Gas Utility)
(July 1, 2001–December 31, 2008)

Utility Name	Map Code	Annual Dollars per Capita	Annual Dollars Saved	Lifecycle Verified Gross Therms	Persistent Net Therms	Number of Customers
Alliant/Wisconsin Power & Light	Alliant	$8	$1,315,806	1,056,024	847,751	155,827
City Gas Company	CGC	$5	$19,102	15,330	13,592	4,096
Florence Utility Commission	FUC	$0	$348	279	232	1,118
Madison Gas and Electric	MG&E	$23	$2,822,250	2,265,048	1,861,314	125,241
Midwest Natural Gas Inc.	MNG	$3	$41,724	33,486	27,348	12,402
St Croix Valley Natural Gas Company	SCVNGC	$4	$24,961	20,033	17,799	6,648
Superior Water Light And Power Company	SWLPC	$11	$123,029	98,740	80,224	10,899
Wisconsin Electric Gas Operations	WEGC	$5	$2,267,180	1,819,567	1,461,370	416,733
Wisconsin Gas Company	WGC	$9	$4,673,783	3,751,030	3,004,996	535,433
Wisconsin Public Service Corporation	WPSC	$10	$2,673,126	2,145,366	1,728,532	278,936
Xcel (Northern States Power Company)	Xcel	$8	$715,891	574,552	464,665	84,867
Not mapped*			$1,240,181	995,330	683,083	

* *Unknown Utility:* The impacts for these participants are not mapped either because their address information is not complete or because their address falls out of the boundaries of participating utility territory according to the GIS mapping application.

A.4 RENEWABLE ENERGY PROGRAM

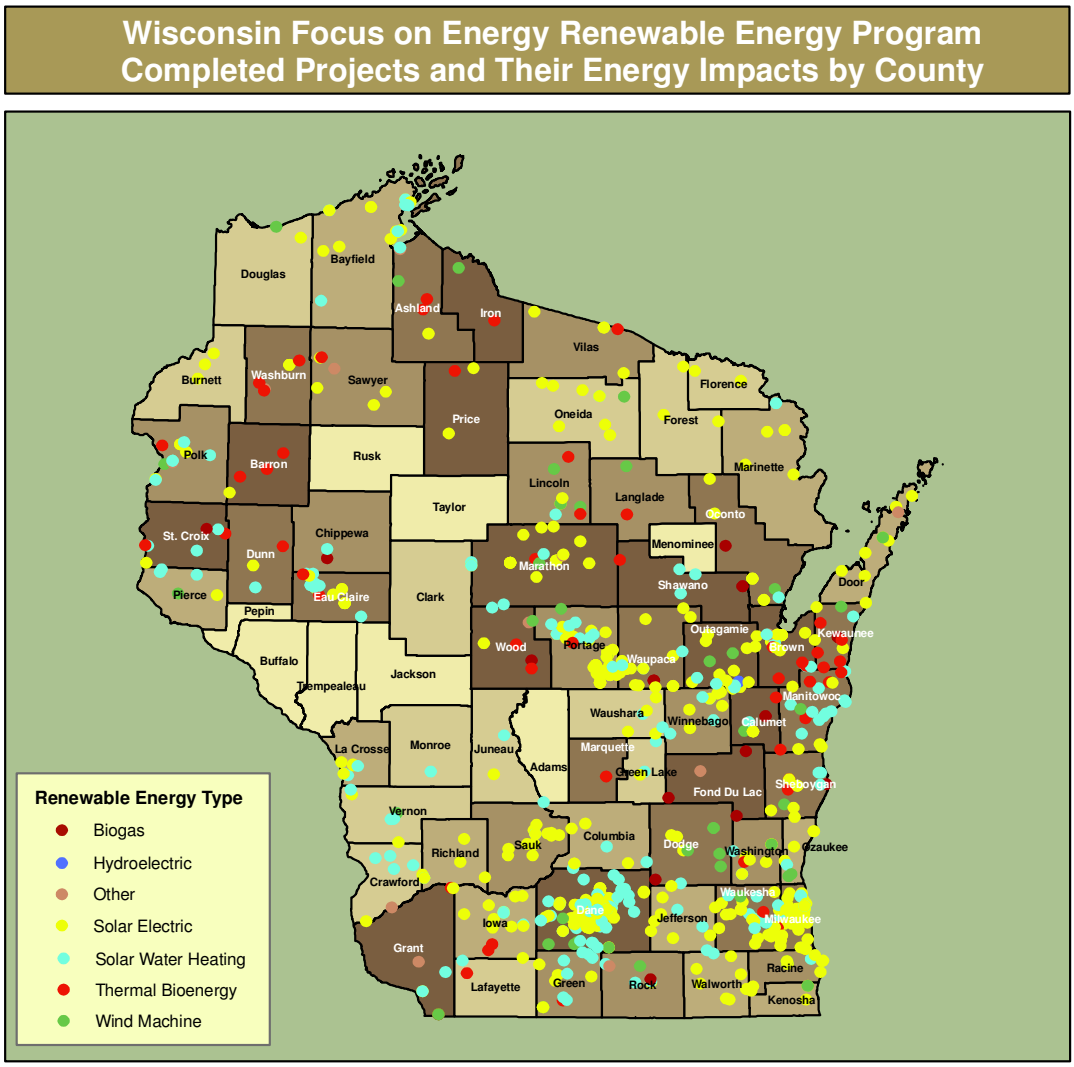
In this section, we summarize the verified energy impacts across the Renewable Energy Programs through December 31, 2008.

Note: A change in the type of energy impacts data used for the Renewable Energy Programs maps. As explained in the Introduction to this Appendix (above), the data reported in all of the maps in this report are *lifecycle verified gross* energy impacts—a recently introduced (for Focus) type of reported energy impacts. As in the past, these are impact estimates based on evaluation work done to establish verified gross for specific programs and/or program areas. However, as discussed in Section 1.1, *lifecycle verified gross* is defined as:

> Energy savings, expressed as *verified gross*, that explicitly incorporate measure life.

In order to provide some continuity in this transition in the basis for the mapped energy impacts, the tables that accompany the maps include a column for verified gross impacts—as in past reports impacts—though these are *lifecycle* verified gross impacts, and will therefore show some differences from past reports. Additional discussion of lifecycle and persistent savings is provided above in Section 2.1 and Section 2.8.

Figure A-16.
Renewable Energy Program
Completed Projects and Their Energy Impacts by County
(July 1, 2001–December 31, 2008)



Annual Value of Energy Impacts

$0
$100 - $1600
$1601 - $7,901
$7,901 - $26,000
$26,001 - $272,900
> $272,900

The map above portrays the annual retail value of the energy impacts realized in 2008 from renewable energy projects installed from July 1, 2001, through December 31, 2008. Electric and gas savings have been valued at the average cost of gas and electricity in Wisconsin and summed for all projects within each county. Location of Individual projects is also shown on the map.

Map Produced by: PA Consulting Group and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. April, 2009.

Table A-16. Renewable Programs Energy Impacts
(By County)
(July 1, 2001–December 31, 2008)

County	Annual Dollars	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms
Ashland	$272,894.62	17,637	14	247,193
Barron	$276,661.81	450	0	251,935
Bayfield	$5,048.22	33,922	16	2,012
Brown	$467,036.06	94,516	64	418,147
Burnett	$864.83	10,333	4	-
Calumet	$704,033.86	8,159,339	1,272	19,214
Chippewa	$17,493.37	206,396	33	199
Clark	$1,094.32	11,768	5	100
Columbia	$2,740.75	31,247	22	114
Crawford	$1,060.33	12,668	3	-
Dane	$1,329,823.43	15,569,172	2,057	24,302
Dodge	$100,655.95	1,202,580	359	-
Door	$4,068.03	36,212	32	945
Douglas	$388.64	4,643	6	-
Dunn	$54,852.50	2,277	2	49,783
Eau Claire	$34,102.70	26,932	11	29,006
Florence	$121.79	1,455	1	-
Fond Du Lac	$621,585.83	7,331,248	991	7,250
Forest	$335.92	4,013	3	-
Grant	$716,898.86	247,402	202	634,054
Green	$10,313.96	28,694	17	7,206
Green Lake	$908.30	6,434	6	337
Iowa	$6,818.39	52,146	26	2,235
Iron	$671,762.68	(437,210)	(41)	645,134
Jefferson	$4,274.93	48,583	28	190
Juneau	$720.93	445	0	623
Kenosha	$5,770.52	68,943	24	-
Kewaunee	$271,718.56	3,158,400	363	6,704
La Crosse	$6,026.63	34,706	19	2,843
Lafayette	$472.19	589	0	385
Langlade	$16,350.85	72,747	64	9,346
Lincoln	$18,674.74	56,552	44	12,697
Manitowoc	$138,373.75	67,194	27	120,901
Marathon	$305,688.14	52,595	35	274,395
Marinette	$1,661.66	8,793	7	843
Marquette	$60,322.80	-	-	54,939
Milwaukee	$28,261.86	296,553	179	3,133
Monroe	$103.35	1,235	0	-
Oconto	$174,491.80	2,083,084	257	125
Oneida	$1,560.11	18,639	13	-
Outagamie	$589,644.81	7,000,298	1,315	3,388
Ozaukee	$7,879.81	94,143	26	-
Pierce	$2,913.67	21,587	6	1,008
Polk	$15,159.31	88,184	35	7,084

County	Annual Dollars	Lifecycle Verified Gross kWh	Lifecycle Verified Gross kW	Lifecycle Verified Gross Therms
Portage	$21,825.61	216,163	121	3,400
Price	$945,932.43	5,125	2	861,114
Racine	$12,581.73	149,560	93	58
Richland	$4,513.40	53,924	19	-
Rock	$25,969.59	308,554	39	131
Sauk	$22,604.49	107,435	45	12,397
Sawyer	$19,793.95	11,337	6	17,163
Shawano	$629,658.00	6,018,359	710	114,682
Sheboygan	$83,511.93	46,630	32	72,504
St. Croix	$324,857.14	(174,197)	(43)	309,142
Vernon	$1,057.22	12,016	7	47
Vilas	$16,987.35	11,264	4	14,613
Walworth	$5,310.56	63,448	29	-
Washburn	$71,295.49	6,986	5	64,400
Washington	$9,938.62	24,763	19	7,164
Waukesha	$52,664.28	119,332	76	38,867
Waupaca	$159,413.48	1,750,571	250	11,740
Waushara	$1,556.66	18,598	12	-
Winnebago	$8,931.70	55,113	26	3,933
Wood	$1,257,788.75	45,627	20	1,142,049

Table A-17. Participant Avoided Costs

Rate Class	kWh Cost	Therm Cost	kWh Year used	Therm Year Used	kWh Source Used	Therm Source Used	Date Updated
Commercial	0.0837	1.098	2006	2008	http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm	http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm	03/20/09
Industrial	0.0585	1.037	2006	2008	http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm	http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm	03/20/09
Residential	0.1051	1.246	2006	2008	http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm	http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm	03/20/09

APPENDIX B: RESIDENTIAL DEFAULT SAVINGS VALUES USED FOR THE 18-MONTH CONTRACT PERIOD

The following table lists default/deemed energy savings by measure (used for the 18-month contract period) for the Residential Programs.

Table B-1. Residential Programs: Default/Deemed Energy Savings By Measure (as of December 31, 2008)

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
ACES	Direct Install	CFL	DI-Post 5-1-08	43.5	37.2795	0.0042	0.003599	0	0
ACES	Direct Install	CFL	DI-Pre 5-1-08	43.5	37.2795	0.0031	0.002657	0	0
ACES	Direct Install	Faucet Aerator - Bath - Electric	DI-Post 5-1-08	127.1	108.9247	0	0	0	0
ACES	Direct Install	Faucet Aerator - Bath - Gas	DI-Post 5-1-08	0	0	0	0	6.3	5.544
ACES	Direct Install	Faucet Aerator - Kitchen - Electric	DI-Post 5-1-08	223.1	191.1967	0	0	0	0
ACES	Direct Install	Faucet Aerator - Kitchen - Gas	DI-Post 5-1-08	0	0	0	0	11.1	9.768
ACES	Direct Install	Pre-Rinse Sprayer - Electric	DI	957	820.149	0.218	0.186826	0	0
ACES	Direct Install	Pre-Rinse Sprayer - Gas	DI	0	0	0	0	42	36.96
ACES	Direct Install	Showerhead - Gas	DI-Pre 5-1-08	0	0	0	0	25	22
ACES	Direct Install	Showerhead 1.5 gpm - Electric	DI-Post 5-1-08	726.2	622.3534	0	0	0	0
ACES	Direct Install	Showerhead 1.5 gpm - Gas	DI-Post 5-1-08	0	0	0	0	36.2	31.856
ACES	Direct Install	Showerhead 1.75 gpm - Electric	DI-Post 5-1-08	544.8	466.8936	0	0	0	0
ACES	Direct Install	Showerhead 1.75 gpm - Electric	DI-Pre 5-1-08	493	422.501	0	0	0	0
ACES	Direct Install	Showerhead 1.75 gpm - Gas	DI-Post 5-1-08	0	0	0	0	27.2	23.936
ACES	Direct Install	Showerhead 1.75 gpm - Gas	DI-Pre 5-1-08	0	0	0	0	25	22

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
ACES	New Construction	Furnace 90%+ AFUE w/ECM	N/A	0	0	0	0	1773	762.39
ACES	Whole Building	4ft 4 L System 30w	N/A	185	98.605	0.0212	0.0113	0	0
ACES	Whole Building	Boiler 90%+ Modulating	Pre 5-1-08	0	0	0	0	98	48.804
ACES	Whole Building	Central Split AC - 15 SEER	N/A	154	82.082	0.37	0.19721	0	0
ACES	Whole Building	Central Split AC - 16 SEER+	N/A	216	115.128	0.52	0.27716	0	0
ACES	Whole Building	CFL	Post 5-1-08	407	216.931	0.0415	0.02212	0	0
ACES	Whole Building	CFL	Pre 5-1-08	43.5	23.1855	0.0031	0.001652	0	0
ACES	Whole Building	CFL Fixtures	N/A	394	210.002	0.045	0.023985	0	0
ACES	Whole Building	CFL Reflector Lamps	Post 5-1-08	407	216.931	0.0415	0.02212	0	0
ACES	Whole Building	CFL Reflector Lamps	Pre 5-1-08	43.5	23.1855	0.0031	0.001652	0	0
ACES	Whole Building	ES Clothes Washer - Common Area	N/A	384	204.672	0	0	22	10.956
ACES	Whole Building	ES Clothes Washer - In Unit	N/A	163	86.879	0	0	5.5	2.739
ACES	Whole Building	ES Dehumidifier	N/A	50	26.65	0.05	0.02665	0	0
ACES	Whole Building	ES Dishwasher	N/A	90	47.97	0	0	5	2.49
ACES	Whole Building	ES Refrigerator	N/A	66	35.178	0.011	0.005863	0	0
ACES	Whole Building	ES Room Thru Wall AC	N/A	33	17.589	0.11	0.05863	0	0
ACES	Whole Building	ES Room Window AC	N/A	33	17.589	0.11	0.05863	0	0

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
ACES	Whole Building	Furnace 90%+ AFUE w/ECM	Retrofit Post 5-1-08	759	404.547	0.17	0.09061	20	9.96
ACES	Whole Building	Furnace 90%+ AFUE w/ECM	Retrofit Pre 5-1-08	773	412.009	0.1	0.0533	20	9.96
ACES	Whole Building	HPT8 1 lamp 4ft	N/A	56	29.848	0.0064	0.003411	0	0
ACES	Whole Building	HPT8 2 lamp 4ft	N/A	80	42.64	0.0091	0.00485	0	0
ACES	Whole Building	HPT8 3 lamp 4ft	N/A	145	77.285	0.0166	0.008848	0	0
ACES	Whole Building	HPT8 4 lamp 4ft	N/A	171	91.143	0.0195	0.010394	0	0
ACES	Whole Building	LED Exit Fixture	Post 5-1-08	272	144.976	0.031	0.016523	0	0
ACES	Whole Building	LED Exit Fixture	Pre 5-1-08	298	158.834	0.017	0.009061	0	0
ACES	Whole Building	Low Watt T8 1 Lamp 28w	N/A	26	13.858	0.003	0.001599	0	0
ACES	Whole Building	Occupancy Sensor Ceiling	N/A	525	279.825	0	0	0	0
ACES	Whole Building	Occupancy Sensor Socket	N/A	189	100.737	0	0	0	0
ACES	Whole Building	Occupancy Sensor Wall	N/A	189	100.737	0	0	0	0
ACES	Whole Building	Steam Trap-All Other Traps-Replace or Repair	N/A	0	0	0	0	299	148.902
ACES	Whole Building	Water Heater-Electric Tank Type 93%+	N/A	268	142.844	0	0	0	0
EHCI	EHCI	>=90% modulating hot water	N/A	0	0	0	0	98	98
EHCI	EHCI	>=90% non-modulating hot water	N/A	0	0	0	0	98	98
EHCI	EHCI	90+ AFUE with ECM	New Construction Post 5-1-08	1116	1116	0.17	0.17	20	20

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
EHCI	EHCI	90+ AFUE with ECM	New Construction Pre 5-1-08	773	773	0.1	0.1	20	20
EHCI	EHCI	90+ AFUE with ECM	Retrofit Post 5-1-08	759	759	0.17	0.17	20	20
EHCI	EHCI	90+ AFUE with ECM	Retrofit Pre 5-1-08	773	773	0.1	0.1	20	20
EHCI	EHCI	HVAC - Flue Closure	N/A	0	0	0	0	60	60
EHCI	EHCI	SEER 14	Post 5-1-08	54	54	0.1	0.1	0	0
EHCI	EHCI	SEER 14	Pre 5-1-08	185	185	0.42	0.42	0	0
EHCI	EHCI	SEER 14 w/o RCA	Pre 5-1-08	82	82	0.2	0.2	0	0
EHCI	EHCI	SEER 15	Post 5-1-08	101	101	0.17	0.17	0	0
EHCI	EHCI	SEER 15	Pre 5-1-08	257	257	0.59	0.59	0	0
EHCI	EHCI	SEER 15 w/ECM	N/A	54	54	0.1	0.1	0	0
EHCI	EHCI	SEER 15 w/o RCA	Pre 5-1-08	154	154	0.37	0.37	0	0
EHCI	EHCI	SEER 16	Post 5-1-08	142	142	0.28	0.28	0	0
EHCI	EHCI	SEER 16	Pre 5-1-08	319	319	0.74	0.74	0	0
EHCI	EHCI	SEER 16 w/ECM	N/A	101	101	0.17	0.17	0	0
EHCI	EHCI	SEER 16 w/o RCA	Pre 5-1-08	216	216	0.52	0.52	0	0
EHCI	EHCI	SEER 17	Post 5-1-08	178	178	0.29	0.29	0	0
EHCI	EHCI	SEER 17	Pre 5-1-08	374	374	0.87	0.87	0	0
EHCI	EHCI	SEER 17 w/ECM	N/A	142	142	0.28	0.28	0	0
EHCI	EHCI	SEER 17 w/o RCA	Pre 5-1-08	271	271	0.65	0.65	0	0
EHCI	EHCI	SEER 18	Post 5-1-08	211	211	0.37	0.37	0	0
EHCI	EHCI	SEER 18	Pre 5-1-08	424	424	0.99	0.99	0	0
EHCI	EHCI	SEER 18 w/ECM	N/A	178	178	0.29	0.29	0	0
EHCI	EHCI	SEER 18 w/o RCA	Pre 5-1-08	321	321	0.77	0.77	0	0
EHCI	EHCI	SEER 19	Post 5-1-08	239	239	0.39	0.39	0	0
EHCI	EHCI	SEER 19	Pre 5-1-08	467	467	1.09	1.09	0	0
EHCI	EHCI	SEER 19 w/ECM	N/A	211	211	0.37	0.37	0	0
EHCI	EHCI	SEER 19 w/o RCA	Pre 5-1-08	364	364	0.87	0.87	0	0
EHCI	EHCI	SEER 20	Post 5-1-08	265	265	0.41	0.41	0	0
EHCI	EHCI	SEER 20	Pre 5-1-08	507	507	1.19	1.19	0	0

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
EHCI	EHCI	SEER 20 w/o RCA	Pre 5-1-08	404	404	0.97	0.97	0	0
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 2	EE	341	341	0	0	0	0
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 2	EG	170	170	0	0	5.8	5.8
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 2	GE	188	188	0	0	6.5	6.5
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 2	GG	17	17	0	0	12.3	12.3
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 2	N/A	186	186	0	0	6.2	6.2
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 3	EE	393	393	0	0	0	0
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 3	EG	197	197	0	0	6.7	6.7
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 3	GE	216	216	0	0	7.6	7.6
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 3	GG	20	20	0	0	14.3	14.3
ENERGY STAR - Appliances	Customer Rewards	Clothes Washers Tier 3	N/A	214	214	0	0	7.2	7.2
ENERGY STAR - Appliances	Customer Rewards	Dehumidifier	N/A	50	50	0.05	0.05	0	0
ENERGY STAR - Appliances	Customer Rewards	Electric .93 EF +	N/A	260	260	0	0	0	0

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
ENERGY STAR - Appliances	Customer Rewards	Flue Closure	N/A	0	0	0	0	60	60
ENERGY STAR - Appliances	Customer Rewards	Fuel Conversion Electric to LP	N/A	3280	3280	0.25	0.25	0	0
ENERGY STAR - Appliances	Customer Rewards	Fuel Conversion Electric to Natural Gas	N/A	3280	3280	0.25	0.25	-78	-78
ENERGY STAR - Appliances	Customer Rewards	Power Vent with EF of .64 to .79	N/A	-50	-50	-0.005	-0.005	15	15
ENERGY STAR - Appliances	Customer Rewards	Power Vent with EF of .80 or Greater	N/A	-50	-50	-0.005	-0.005	45	45
ENERGY STAR - Appliances	Customer Rewards	Refrigerator	N/A	66	66	0.01	0.01	0	0
ENERGY STAR - Appliances	Customer Rewards	Thermal (At least 80% AFUE)	N/A	0	0	0	0	85	85
ENERGY STAR - Lighting	Customer Rewards	Ceiling Fan	N/A	175	175	0	0	0	0
ENERGY STAR - Lighting	Customer Rewards	CFL	Instant Post 5-1-08	42.5	31.9	0.0027	0.002	0	0
ENERGY STAR - Lighting	Customer Rewards	CFL	Instant Pre 5-1-08	38.4	28.8	0.0027	0.002	0	0
ENERGY STAR - Lighting	Customer Rewards	CFL	KEEP	38.4	38.4	0.0027	0.0027	0	0
ENERGY STAR - Lighting	Customer Rewards	CFL	Mail In Post 5-1-08	47.7	35.8	0.0031	0.0023	0	0
ENERGY STAR - Lighting	Customer Rewards	CFL	Mail In Pre 5-1-08	43.5	32.6	0.0031	0.0023	0	0
ENERGY STAR - Lighting	Customer Rewards	CFL	MF	173	173	0.005	0.005	0	0

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
ENERGY STAR - Lighting	Customer Rewards	CFL	WR	51.1	51.1	0.004	0.004	0	0
ENERGY STAR - Lighting	Customer Rewards	Indoor Fixture/Lamp	N/A	104	104	0.004	0.004	0	0
ENERGY STAR - Lighting	Customer Rewards	Lighting Fixture	N/A	104	104	0.004	0.004	0	0
ENERGY STAR - Lighting	Customer Rewards	Lighting Fixture-LED	N/A	15.2	15.2	0	0	0	0
ENERGY STAR - Lighting	Customer Rewards	Torchiere	N/A	349	349	0.01	0.01	0	0
HPES	Whole House	Attic Insulation	N/A	160	136	0.118	0.1	100	85
HPES	Whole House	Chimney Liner	N/A	0	0	0	0	81	81
HPES	Whole House	Duct Sealing	N/A	1080	1080	0.1	0.1	84	84
HPES	Whole House	Floor Insulation	N/A	126	107	0.093	0.079	79	67
HPES	Whole House	Foundation Insulation	Exterior	59	51	0	0	49	41
HPES	Whole House	Foundation Insulation	Interior	172	172	0	0	140	140
HPES	Whole House	Sidewall Insulation	1 inch Foam Continuous	60	60	0.049	0.049	41	41
HPES	Whole House	Sidewall Insulation	1/2 inch Foam Continuous	36	36	0.029	0.029	25	25
HPES	Whole House	Sidewall Insulation	Cavity	326	326	0.264	0.264	225	225
HPES	Whole House	Sill Box Insulation	N/A	53	45	0	0	39	33
HPES	Whole House	Water Heater - Fuel Switch	N/A	3280	3280	0.25	0.25	-78	-78
HPES	Whole House	Water Heater - Poor Draft	N/A	0.5	0.5	-0.005	-0.005	75	75
THPES	Whole House	Home Weatherization	N/A	1636	1636	0.269	0.269	269	269
WESH	Reward Items	Compact Fluorescent Bulbs	N/A	47.7	47.7	0.0031	0.0031	0	0
WESH	Reward Items	Drain Water	N/A	0	0	0	0	49	49
WESH	Reward Items	Low Solar Heat Gain Windows	N/A	104.87	104.87	0	0	-10.27	-10.27

Program	Program Initiative	Measure	Qualifier	Deemed Verified kWh	Deemed Net kWh	Deemed Verified kW	Deemed Net kW	Deemed Verified Therms	Deemed Net Therms
WESH	Reward Items	Structural Plumbing - Gas Water Heater	N/A	0	0	0	0	91.9	91.9
WESH	Whole House	Certified Home	N/A	0	0	0	0	100	100

APPENDIX C: MEASURE LIFETIME AND NET INCREMENTAL COSTS BY PROGRAM BY BENEFIT-COST MEASURE CATEGORY

Table C-1. Measure Lifetime and Net Incremental Costs by Program by Benefit-cost Measure Category

BCI_ID	Program	Measure Category BC	Measure Life	NIC Value	NIC Unit
1101	Agriculture	CFL	6	2.2	avoided cost
1102	Agriculture	HVAC	15	2.5	avoided cost
1103	Agriculture	Manufacturing Process	12	1.29	avoided cost
1104	Agriculture	Motor	16	1.29	avoided cost
1105	Agriculture	Other Lighting	15	2.2	avoided cost
1107	Agriculture	Other	17	2.9	avoided cost
1201	Commercial	CFL	6	2.2	avoided cost
1202	Commercial	HVAC	15	2.5	avoided cost
1203	Commercial	Manufacturing Process	12	1.29	avoided cost
1204	Commercial	Motor	16	1.29	avoided cost
1205	Commercial	Other Lighting	15	2.2	avoided cost
1206	Commercial	Building Shell	10	6.18	avoided cost
1207	Commercial	Other	19	2.9	avoided cost
1301	Industrial	CFL	6	2.2	avoided cost
1302	Industrial	HVAC	15	2.5	avoided cost
1303	Industrial	Manufacturing Process	12	1.29	avoided cost
1304	Industrial	Motor	16	1.29	avoided cost
1305	Industrial	Other Lighting	15	2.2	avoided cost
1306	Industrial	Building Shell	10	6.18	avoided cost
1307	Industrial	Other	28	2.9	avoided cost
1401	Schools & Government	CFL	6	2.2	avoided cost
1402	Schools & Government	HVAC	15	2.5	avoided cost
1403	Schools & Government	Manufacturing Process	12	1.29	avoided cost
1404	Schools & Government	Motor	16	1.29	avoided cost
1405	Schools & Government	Other Lighting	15	2.2	avoided cost
1406	Schools & Government	Building Shell	10	6.18	avoided cost
1407	Schools & Government	Other	10	2.9	avoided cost
1501	Channel EHCI	CFL	6	2.2	avoided cost
1502	Channel EHCI	HVAC	15	2.5	avoided cost
1503	Channel EHCI	Manufacturing Process	12	1.29	avoided cost
1504	Channel EHCI	Motor	16	1.29	avoided cost
1505	Channel EHCI	Other Lighting	15	2.2	avoided cost
1506	Channel EHCI	Building Shell	10	6.18	avoided cost
1507	Channel EHCI	Other	19	2.9	avoided cost
1601	Channel Lighting	CFL	6	2.2	avoided cost
1602	Channel Lighting	HVAC	15	2.5	avoided cost
1603	Channel Lighting	Manufacturing Process	12	1.29	avoided cost
1604	Channel Lighting	Motor	16	1.29	avoided cost
1605	Channel Lighting	Other Lighting	15	2.2	avoided cost
1606	Channel Lighting	Building Shell	10	6.18	avoided cost
1607	Channel Lighting	Other	19	2.9	avoided cost
2107	ACES	Other	8	0.05207	kWh

BCI_ID	Program	Measure Category BC	Measure Life	NIC Value	NIC Unit
2207	EHCI	Other	20	1.16155	kWh
2208	EHCI	ECM Furnace	23	850	unit
2212	EHCI	SEER 12	20	350	unit
2213	EHCI	SEER 13	20	700	unit
2214	EHCI	SEER 14+	20	350	unit
2301	ENERGY STAR	CFL	6	4	unit
2305	ENERGY STAR	Other Lighting	25	0.06734	kWh
2307	ENERGY STAR	Other	12	0.75188	kWh
2309	ENERGY STAR	Clothes Washers	12	200	unit
2407	HPES	Other	25	6.41556	therm
2408	HPES	ECM Furnace	23	850	unit
2412	HPES	SEER 12	20	350	unit
2413	HPES	SEER 13	20	700	unit
2414	HPES	SEER 14+	20	1050	unit
2420	HPES	Air Sealing	25	375	home
2421	HPES	Attic Insulation	25	900	home
2422	HPES	Sidewall Insulation	25	1800	home
2507	THPES	Other	25	6100	home
2607	WESH	Other	12	0	unit
2608	WESH	ECM Furnace	23	0	unit
2612	WESH	SEER 12	20	0	unit
2613	WESH	SEER 13	20	0	unit
2614	WESH	SEER 14+	20	0	unit
2630	WESH	Home Certification	50	2445	home
2705	Head Start	Other Lighting	25	0.06734	kWh
4101	Renewables	Solar Electric	25	6.8	kWh
4102	Renewables	Wind	20	1.37	kWh
4103	Renewables	Solar Water Heating	20	16.1	therm
4104	Renewables	Biogas	20	3.06	kWh
4105	Renewables	Biomass-Combustion	20	1.92	therm
4107	Renewables	Other	25	0.2	kWh

APPENDIX D: TABLES AND FIGURES LINKED TO THE TYPE OF IMPACTS

Reference Number	Title	Gross	Verified	Net
Table 2-1a	All Programs: Tracked Energy Impacts - Lifecycle Verified Gross (July 1, 2007–December 31, 2008)		Lifecycle	
Table 2-1b	All Programs: Tracked Energy Impacts - Annual First Year Verified Gross (July 1, 2001–December 31, 2008)		First - Year	
Table 2-1c	All Programs: Tracked Energy Impacts - Lifecycle Verified Gross and Lifecycle Verified Net (July 1, 2007–December 31, 2008)		Lifecycle	Lifecycle
Table 2-1d	All Programs: Tracked Energy Impacts - Annual First Year Program to Date (July 1, 2001–December 31, 2008)	First - Year	First - Year	First - Year
Figure 2-1	Lifecycle Verified Gross Electricity Savings (GWh)		Lifecycle	
Figure 2-2	Lifecycle Verified Gross Electricity Demand Reductions (MW)		Lifecycle	
Figure 2-3	Lifecycle Verified Gross Gas Savings (Million Therms)		Lifecycle	
Figure 2-4	Persistent Verified Net Electricity Savings (GWh)			Persistent
Figure 2-5	Persistent Verified Net Electricity Demand Reductions (MW)			Persistent
Figure 2-6	Persistent Verified Net Gas Savings (Million Therms)			Persistent
Figure 2-7	Electric Energy Impacts by Measure Category - Business Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 2-8	Electric Energy Impacts by Measure Category - Business Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Figure 2-9	Gas Energy Impacts by Measure Category - Business Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 2-10	Gas Energy Impacts by Measure Category - Business Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Figure 2-11	Electric Energy Impacts by Measure Category - Residential Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 2-12	Electric Energy Impacts by Measure Category - Residential Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Figure 2-13	Gas Energy Impacts by Measure Category - Residential Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 2-14	Gas Energy Impacts by Measure Category - Residential Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Table 2-2	Electric Energy Impacts by Measure Category - Business Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 2-3	Electric Energy Impacts by Measure Category - Business Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	

Reference Number	Title	Gross	Verified	Net
Table 2-4	Gas Energy Impacts by Measure Category - Business Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 2-5	Gas Energy Impacts by Measure Category - Business Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Table 2-6	Electric Energy Impacts by Measure Category - Residential Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 2-7	Electric Energy Impacts by Measure Category - Residential Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Table 2-8	Gas Energy Impacts by Measure Category - Residential Programs 18 Month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 2-9	Gas Energy Impacts by Measure Category - Residential Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Table 2-16	Verified Gross Emissions Displaced (lbs) Annually (July 1, 2007–December 31, 2008)			First - Year
Table 2-17	Verified Gross Emissions Displaced (lbs) Annually Cumulative in Current Year (July 1, 2001–December 31, 2008)			Persistent
Table 2-18	Verified Gross Emissions Displaced (lbs) Annual With Adjustments for Energy Impacts From Renewables Biomass/Biogas 18-month Contract Period (July 1, 2007–December 31, 2008)			First - Year
Table 2-19	Value of Non-Energy Benefits by Program Area Program to Date (July 1, 2001–December 31, 2008)			Persistent
Table 2-21	Simple Benefit-cost and Cost of Conserved Energy (July 1, 2007–December 31, 2008)			Persistent
Table 2-22	Simple Benefit-cost and Cost of Conserved Energy Program to Date (July 1, 2001–December 31, 2008)			Persistent
Table 2-25	Comparisons of Focus Electric Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential—Commercial & Industrial Markets			First - Year
Table 2-26	Comparisons of Focus Gas Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential—Commercial & Industrial Markets			First - Year
Table 2-27	Comparisons of Focus Electric Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential—Residential Markets			First - Year
Table 2-28	Comparisons of Focus Gas Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential—Residential Markets			First - Year
Table 2-29	Comparisons of Focus Electric Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential—Renewables Markets			First - Year

Reference Number	Title	Gross	Verified	Net
Table 2-30	Comparisons of Focus Gas Energy Impacts (Net, the 12-month period from January 1, 2008–December 31, 2008) and Achievable Potential—Renewables Markets			First - Year
Figure 3-1	Electric Energy Impacts by Program - Business Programs 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 3-2	Electric Energy Impacts by Program - Business Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Figure 3-3	Gas Energy Impacts by Program - Business Programs 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 3-4	Gas Energy Impacts by Program - Business Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Table 3-7a	All Business Programs: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)	First - Year	First - Year	First - Year
Table 3-7b	All Business Programs: Tracked Energy Impacts FY07 (July 1, 2006–June 30, 2007)	First - Year	First - Year	First - Year
Table 3-7c	All Business Programs: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)	First - Year	First - Year	First - Year
Table 3-7d	All Business Programs: Tracked Energy Impacts FY05 (July 1, 2004–June 30, 2005)	First - Year	First - Year	First - Year
Table 3-7e	All Business Programs: Tracked Energy Impacts FY04 (July 1, 2003–June 30, 2004)	First - Year	First - Year	First - Year
Table 3-7f	All Business Programs: Tracked Energy Impacts FY03 (July 1, 2002–June 30, 2003)	First - Year	First - Year	First - Year
Table 3-7g	All Business Programs: Tracked Energy Impacts FY02 (July 1, 2001–June 30, 2002)	First - Year	First - Year	First - Year
Table 3-8	Agriculture July 1, 2007–December 31, 2008		First - Year	
Table 3-9	Commercial July 1, 2007–December 31, 2008		First - Year	
Table 3-10	Industrial July 1, 2007–December 31, 2008		First - Year	
Table 3-11	Schools & Government July 1, 2007–December 31, 2008		First - Year	
Table 3-12	Net Business Program Savings versus Business Program Portfolio Targets 18-month Contract Period (July 1, 2007–December 31, 2008)			First - Year
Figure 4-1	Electric Energy Impacts by Program - Residential Programs 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 4-2	Electric Energy Impacts by Program - Residential Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Figure 4-3	Gas Energy Impacts by Program - Residential Programs 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Figure 4-4	Gas Energy Impacts by Program - Residential Programs Program to Date (July 1, 2001–December 31, 2008)		First - Year	
Table 4-1a	All Residential Programs: Tracked Energy Impacts July 1, 2007–December 31, 2008	First - Year	First - Year	First - Year
Table 4-1b	All Residential Programs: Tracked Energy Impacts FY07 (July 1, 2006–June 30, 2007)	First - Year	First - Year	First - Year

Reference Number	Title	Gross	Verified	Net
Table 4-1c	All Residential Programs: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)	First - Year	First - Year	First - Year
Table 4-1d	All Residential Programs: Tracked Energy Impacts FY05 (July 1, 2004–June 30, 2005)	First - Year	First - Year	First - Year
Table 4-1e	All Residential Programs: Tracked Energy Impacts FY04 (July 1, 2003–June 30, 2004)	First - Year	First - Year	First - Year
Table 4-1f	All Residential Programs: Tracked Energy Impacts FY03 (July 1, 2002–June 30, 2003)	First - Year	First - Year	First - Year
Table 4-1g	All Residential Programs: Tracked Energy Impacts FY02 (July 1, 2001–June 30, 2002)	First - Year	First - Year	First - Year
Table 4-2	Net Residential Program Savings versus Residential Program Portfolio Targets 18-month Contract Period (July 1, 2007–December 31, 2008)			First - Year
Table 4-3	ENERGY STAR - Lighting Products Program: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-5	ENERGY STAR - Appliances Products Program: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-6	Wisconsin ENERGY STAR Homes: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-7	Home Performance with ENERGY STAR: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-9	Apartment and Condominium Efficiency Services: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-11	Targeted Home Performance with ENERGY STAR: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-13	Efficient Heating and Cooling: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table 4-14	Head Start CFL: Tracked Energy Impacts 18-month Contract Period (July 1, 2007–December 31, 2008)		First - Year	
Table A-1	Commercial Program Energy Impacts (By County) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-2	Commercial Program Energy Impacts (By Senate District) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-3	Commercial Program Energy Impacts (By Assembly District) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-4	Commercial Program Electric Impacts (By Participating Electric Utility) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-5	Commercial Program Gas Impacts (By Participating Gas Utility) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-6	Industrial Program Energy Impacts (By County) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-7	Industrial Program Energy Impacts (By Senate District) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-8	Industrial Program Energy Impacts (By Assembly District) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent

Reference Number	Title	Gross	Verified	Net
Table A-9	Industrial Program Electric Impacts (By Participating Electric Utility) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-10	Industrial Program Gas Impacts (By Participating Gas Utility) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-11	Residential Program Energy Impacts (By County) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-12	Residential Program Energy Impacts (By Senate District) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-13	Residential Program Energy Impacts (By Assembly District) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-14	Residential Program Electric Impacts (By Participating Electric Utility) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-15	Residential Program Gas Impacts (By Participating Gas Utility) (July 1, 2007–December 31, 2008)		Lifecycle	Persistent
Table A-16	Renewable Energy Program Completed Projects and Their Energy Impacts (by County) (July 1, 2007–December 31, 2008)		Lifecycle	

APPENDIX E: EVALUATION REPORTS AND OTHER DELIVERABLES

Table E-1. Evaluation Reports and Other Deliverables
The 18-month Contract Period (July 1, 2007–December 31, 2008)

Program Area	Program	Document Title	Draft Report Date	Final Report Date
Administration	Administration	Current Research Efforts-July 2007	11-Jun-07	18-Jun-07
Administration	Administration	Current Research Efforts-August 2007	13-Jul-07	20-Jul-07
Administration	Administration	Current Research Efforts-September 2007	10-Aug-07	17-Aug-07
Administration	Administration	Evaluation Monthly Progress Report July 2007	20-Aug-07	20-Aug-07
Administration	Administration	Evaluation Monthly Progress Report August 2007	17-Sep-07	17-Sep-07
Administration	Administration	Current Research Efforts-October 2007	16-Sep-07	23-Sep-07
Administration	Administration	Evaluation Monthly Progress Report September 2007	16-Oct-07	16-Oct-07
Administration	Administration	Evaluation's Quarterly Performance Report July - September 2007	22-Oct-07	22-Oct-07
Administration	Administration	Current Research Efforts-November 2007	16-Oct-07	23-Oct-07
Administration	Administration	Schedule of Evaluation Deliverables	31-Oct-07	31-Oct-07
Administration	Administration	Evaluation Monthly Progress Report October 2007	19-Nov-07	19-Nov-07
Administration	Administration	Schedule Of Survey Tasks December 2007	19-Nov-07	19-Nov-07
Administration	Administration	Schedule Of Survey Tasks January 2008	07-Dec-07	14-Dec-07
Administration	Administration	Evaluation Monthly Progress Report November 2007	17-Dec-07	17-Dec-07
Administration	Administration	Current Research Efforts-February 2008	12-Jan-08	17-Jan-08
Administration	Administration	Monthly Performance Report December 2007	21-Jan-08	21-Jan-08
Administration	Administration	Current Research Efforts-March 2008	15-Feb-08	15-Feb-08
Administration	Administration	Monthly Performance Report January 2008	18-Feb-08	18-Feb-08
Administration	Administration	Monthly Performance Report February 2008	18-Mar-08	18-Mar-08
Administration	Administration	Current Research Efforts April 2008	21-Mar-08	21-Mar-08
Administration	Administration	Current Research Efforts May 2008	12-Apr-08	19-Apr-08
Administration	Administration	Monthly Performance Report March 2008	21-Apr-08	21-Apr-08
Administration	Administration	Current Research Efforts June 2008	06-May-08	13-May-08
Administration	Administration	Monthly Performance Report April 2008	16-May-08	16-May-08
Administration	Administration	Monthly Performance Report May 2008	15-Jun-08	15-Jun-08
Administration	Administration	Current Research Efforts July 2008	13-Jun-08	20-Jun-08
Administration	Administration	Current Research Efforts July 2008 – Revised	01-Jul-08	01-Jul-08
Administration	Administration	Current Research Efforts August 2008	12-Jul-08	19-Jul-08
Administration	Administration	Monthly Performance Report June 2008	21-Jul-08	21-Jul-08
Administration	Administration	Monthly Performance Report July 2008	19-Aug-08	19-Aug-08
Administration	Administration	Current Research Efforts-Sep2008	21-Aug-08	21-Aug-08

Program Area	Program	Document Title	Draft Report Date	Final Report Date
Administration	Administration	Monthly Performance Report - August 2008	15-Sep-08	15-Sep-08
Administration	Administration	Current Research Efforts-October 2008	19-Sep-08	19-Sep-08
Administration	Administration	Current Research Efforts-November 2008	17-Oct-08	17-Oct-08
Administration	Administration	Monthly Performance Report October 2008	20-Oct-08	20-Oct-08
Administration	Administration	Monthly Performance Report - October 2008	14-Nov-08	14-Nov-08
Administration	Administration	Current Research Efforts-December 2008	22-Nov-08	22-Nov-08
Administration	Administration	Monthly Performance Report - November 2008	15-Dec-08	15-Dec-08
Administration	Administration	Current Research Efforts-February 2009	15-Dec-08	19-Dec-08
Administration	Administration	Current Research Efforts-January 2009	15-Dec-08	19-Dec-08
Business Programs	Business Program - General	Abbreviated FY07 Business Programs Impact Evaluation	15-Jan-08	19-Feb-08
Business Programs	Business Program - General	Joint Incremental Cost Study Proposal	21-Aug-08	02-Sep-08
Business Programs	Business Program - General	Business Programs: Channel Studies—Fiscal Year 2008	30-Aug-08	17-Jan-09
Business Programs	Business Program - General	Business Programs Impact Evaluation Report: First Three Quarters of the 18-month Contract Period	24-Oct-08	17-Jan-09
Business Programs	Business Programs - E&T	Process Evaluation of the Education and Training Program	15-Oct-08	20-Nov-08
Business Programs	Business Programs - E&T	Impact Evaluation of the Education and Training Program	15-Oct-08	20-Nov-08
Business Programs	Business Programs - General	Business Programs Life Cycle Attribution Analysis Results	02-Dec-08	02-Dec-08
Crosscutting	Crosscutting - General	Evaluation Monthly Progress Report June 2007	16-Jul-07	16-Jul-07
Crosscutting	Crosscutting - General	Focus on Energy Evaluation Contract Period One Detailed Evaluation Plans	06-Aug-07	06-Aug-07
Crosscutting	Crosscutting - General	Evaluation Semiannual Summary Report FY07 Year-end	09-Aug-07	11-Sep-07
Crosscutting	Crosscutting - General	Evaluation Semiannual Report FY07 Year-end	09-Aug-07	11-Sep-07
Crosscutting	Crosscutting - General	Evaluation's Annual Report for Fiscal Year 07	11-Sep-07	11-Sep-07
Crosscutting	Crosscutting - General	Response to Review Comments Semiannual Reports FY07 Year-end	11-Sep-07	11-Sep-07
Crosscutting	Crosscutting - General	Summary Semiannual Report Second Half of 2007 Revised 12 July 08	02-Feb-08	12-Jul-08
Crosscutting	Crosscutting - General	Semiannual Report Second Half of 2007 Revised 12 July 08	02-Feb-08	12-Jul-08
Crosscutting	Crosscutting - General	Framework for Net-to-Gross Attribution Questions	08-Feb-08	18-Mar-08
Crosscutting	Crosscutting - General	Responses to Review Comments 2007 Second Half 17 Mar 08	17-Mar-08	17-Mar-08
Crosscutting	Crosscutting - General	Integrating Supply-Side Research and End-User Self-Report Results	21-Mar-08	18-Apr-08
Crosscutting	Crosscutting - General	Treatment of Accelerated Savings	25-Mar-08	22-Apr-08

Program Area	Program	Document Title	Draft Report Date	Final Report Date
Crosscutting	Crosscutting - General	Emission Rate Estimates 2002 through 2006	27-Jun-08	28-Oct-08
Crosscutting	Crosscutting - General	Semiannual Report (First Half of 2008) - Final	01-Aug-08	23-Oct-08
Crosscutting	Crosscutting - General	Semiannual Summary Report (First Half of 2008)	01-Aug-08	01-Aug-08
Crosscutting	Crosscutting - General	Responses to Review Comments Semiannual Report (First Half of 2008)	23-Oct-08	23-Oct-08
Crosscutting	Scopes of Work	Detailed Evaluation Plans for FY08	15-Jun-07	23-Jul-07
Renewables	Renewables	Renewable Energy-Standard Calculation Recommendations	20-Jun-08	10-Sep-08
Residential	Apartment and Condo Efficiency Services	ACES Default Deemed Savings Review - final	26-May-08	24-Jun-08
Residential	Apartment and Condo Efficiency Services	ACES Participant Survey, Flowchart, and Algorithm	11-Jun-08	03-Sep-08
Residential	Efficient Heating and Cooling Initiative	FY08 Net-to-Gross Adjustments for ECM Furnaces	30-Sep-08	19-Jan-09
Residential	Efficient Heating and Cooling Initiative	ECM Furnace Impact Assessment Report	15-Oct-08	12-Jan-09
Residential	ENERGY STAR Products	Comprehensive CFL Market Effects Study	12-Jun-07	30-Jul-07
Residential	ENERGY STAR Products	FY06 Net-to-Gross Savings Adjustments for ENERGY STAR Qualified Clothes Washers	18-Jun-07	25-Jul-07
Residential	Home Performance with ENERGY STAR	Home Performance with ENERGY STAR Program Net Analysis	21-Jun-07	08-Oct-07
Residential	Residential - General	FY07 Contract Metrics Measurement	21-Dec-07	21-Jan-08
Residential	Residential - General	FY08 Metrics Performance—Residential Programs	26-Aug-08	22-Feb-09
Residential	Residential - General	Residential Deemed Savings Review - Final - 2 Feb 09	24-Dec-08	02-Feb-09
Residential	Residential Lighting	Compact Fluorescent Lighting Installation Rate Study	28-Nov-07	08-Jan-08
Residential	Residential Lighting	Analysis of Delta Watts Values for CFLs Rewarded through the Residential Lighting Program in FY07	12-Dec-07	06-Mar-08
Residential	Residential Lighting	FY08 CFL Customer Research	22-Aug-08	30-Sep-08
Residential	Residential Lighting	Second Annual Comprehensive CFL Market Effects Study	22-Aug-08	30-Sep-08
Residential	Residential Lighting	CFL Database Analysis Report	13-Oct-08	20-Jan-09
Residential	Targeted Home Performance with ENERGY STAR	Targeted Home Performance with ENERGY STAR Service Provider Interview Results	19-Jul-08	16-Feb-09

APPENDIX F: ENDNOTES

Endnotes include sources and references supporting this report.

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[i] *Economic Development Benefits: FY07 Economic Impacts Report*. Lisa Petraglia, Glen Weisbrod, Brian Baird. Final: February 23, 2007.

[ii] *Estimating Seasonal and Peak Environmental Emissions Factors.* With Carmen Best, David Sumi, Bryan Ward, Bryan Zent, and Karl Hausker. Report for the Wisconsin Department of Administration, Division of Energy Focus on Energy statewide evaluation. May 2004.

[iii] The Renewable Energy Program savings are evaluation-verified gross, not net.

[iv] *Interim Benefit-cost Analysis: FY07 Evaluation Report*. Miriam L. Goldberg, Chris Clark, Sander Cohan. Final: February 26, 2007.

[v] State of Wisconsin, Public Service Commission of Wisconsin, Focus on Energy Evaluation: FY07 Metrics Performance—Residential Programs, January 21, 2008.