PA Consulting Group

State of Wisconsin Department of Administration Division of Energy

Focus on Energy Public Benefits Evaluation*

Semiannual Report (FY06, Year-end)

Final: September 27, 2006

Evaluation Contractor: PA Government Services Inc.

Prepared by: Focus evaluation team

* Includes **Low-income Public Benefits Evaluation**.



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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 two quarters 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 (the most prevalent of which are displaced generation emissions); 2) other non-energy benefits driven by 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 element 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.

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. The table below provides definitions for each of the various tracked savings impacts incorporated in the Focus impact evaluation system. Currently, *the verified gross energy savings* is being used for publicly reported impacts, while the *verified net energy savings* are used for the economic and benefit-cost analyses.

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, such as a quarter, is the sum of the annual energy savings for all of the energy conservation measures installed in that quarter. The energy conservation measures installed typically last for a number of years, so their lifetime energy impact would be calculated by multiplying the annual energy savings by the number of years that energy conservation measure is expected to be in operation.

The term "tracked" is used to signify that these savings result from Focus efforts directly counted (or tracked) by program administrators. The table below provides definitions for each of the various tracked savings impacts referred to throughout this report. Currently, the verified gross energy savings are being used for publicly reported impacts, while the net energy savings are used for the economic and benefit-cost analyses.

Table 1-1. Tracked Energy Impacts

Gross Reported Savings	Energy savings as reported by the program administrator, unverified by an independent evaluation.
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.

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 sponsors. 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 rewards but fail to do so). Nontracked energy savings should be 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 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 elements of this report. Supporting information can be found in the various reports listed in Table 1-2. An effort has been made to reference the appropriate evaluation reports in the relevant places throughout this report. The table below provides a list of all of the evaluation reports (and other deliverables) submitted during the last two quarters of FY06.

Table 1-2. Focus Statewide Evaluation Deliverables
FY06 Year-end (January 1–June 30, 2006)

Program Area	Program	Description	Draft Report Date	Final Report Date
Business Programs	Business Program - General	Review of Rebated Measures in Relation to Free-ridership	January 3, 2006	February 3, 2006
Residential	ENERGY STAR Products	FY04-05 Net-to-Gross Savings Adjustments for CFLs Rewarded Through the ENERGY STAR Products Program	January 11, 2006	February 22, 2006
Crosscutting functions	Crosscutting - General	Monthly Performance Report—December 2005	January 16, 2006	January 16, 2006
Crosscutting functions	Crosscutting - General	Quarterly Performance Report (through December 2005)	January 23, 2006	January 30, 2006
Crosscutting functions	Crosscutting - General (Energy Savings)	Semiannual Report: FY06 Midyear	January 30, 2006	March 3, 2006
Crosscutting functions	Crosscutting - General (Energy Savings)	Semiannual Summary Report: FY06 Midyear	January 31, 2006	March 3, 2006
Renewables	Renewables - General	Dairy Biogas Energy System Panel Baseline Analysis	February 3, 2006	May 8, 2006
Crosscutting functions	Crosscutting - General	Monthly Performance Report—January 2006	February 20, 2006	February 20, 2006
Residential	ENERGY STAR Products	CFL Database Analysis	February 23, 2006	April 14, 2006
Low-income	WAP	Best Practices Study of WAP Operators and Staff Training	February 27, 2006	May 4, 2006
Business Programs	Business Program - General	Business Programs Recent Customer Experience FY05	February 28, 2006	April 7, 2006
Residential	ENERGY STAR Products	Delta Watts Review for CFLs	February 28, 2006	April 14, 2006
Business Programs	Business Program - General	Delivery review and effects on program attribution	March 2, 2006	April 7, 2006
Crosscutting functions	Crosscutting - General (Energy Savings)	Response to Review Comments (of Draft Semiannual Reports FY06 Midyear)	March 3, 2006	March 3, 2006
Crosscutting functions	Crosscutting - General	Net-to-Gross White Paper	March 16, 2006	March 16, 2006
Crosscutting functions	Crosscutting - General	Monthly Performance Report—February 2006	March 17, 2006	March 17, 2006
Residential	ENERGY STAR Products	Clothes Washer Gross Savings Adjustments	March 23, 2006	April 14, 2006
Business Programs	Business Program - General	Agricultural Program HVLS Fans Suppliers Survey—Targeted Market Study	April 4, 2006	June 13, 2006
Business Programs	Business Program - General	Delivery Review and Effects on Program Attribution—Response to Comments	April 7, 2006	April 7, 2006
WPS 10 MW	Scopes of Work	Strategic Evaluation Plan FY07—WPS 10 MW	April 11, 2006	May 11, 2006

Program Area	Program	Description	Draft Report Date	Final Report Date
Crosscutting functions	Crosscutting - General	Monthly Performance Report—March 2006	April 20, 2006	April 20, 2006
Residential	Efficient Heating and Cooling Initiative	FY05 Net-to-Gross Savings Adjustments for 12/13+ SEER Central Air Conditioners and ECM Furnaces	April 20, 2006	June 27, 2006
Crosscutting functions	Crosscutting - General	Quarterly Performance Report (through March 2006)	April 25, 2006	April 25, 2006
Residential	Targeted Home Performance	Targeted Home Performance & We Energies Pilot Mini Process Evaluation	May 3, 2006	May 23, 2006
Business Programs	Business Program - General	A Behind-the-Scenes Look at Attribution	May 9, 2006	June 26, 2006
Crosscutting functions	Crosscutting - General	Monthly Performance Report—April 2006	May 15, 2006	May 15, 2006
Crosscutting functions	Scopes of Work	Detailed Evaluation Plan FY07	May 22, 2006	June 20, 2006
WPS 10 MW	Scopes of Work	Detailed Evaluation Plan FY07—WPS 10 MW	May 26, 2006	June 19, 2006
Business Programs	Business Program - General	Preliminary Approach To Stronger Supply And Technology Focus In Impact Evaluation	May 31, 2006	-
Low-income	Scopes of Work	Detailed Evaluation Plans for FY07—Low-income	June 1, 2006	June 19, 2006
Business Programs	Business Program - General	Impact Evaluation Report (FY06)	June 1, 2006	June 29, 2006
Renewables	Non-energy Benefits	WREN Non-energy Benefits	June 2, 2006	-
Crosscutting functions	Crosscutting - General	Monthly Performance Report—May 2006	June 13, 2006	June 13, 2006
Residential	ENERGY STAR Products	Process Evaluation Interviews with Members of the CFL Distribution System	June 19, 2006	July 18, 2006
Low-income	WAP	WAP Multifamily Measure Review	June 26, 2006	June 26, 2006
Residential	ENERGY STAR Products	FY05 Net-to-Gross Savings Adjustments for ENERGY STAR Qualified Clothes Washers	June 26, 2006	July 18, 2006
Residential	Home Performance with ENERGY STAR	FY05 Savings Adjustments for Home Performance with ENERGY STAR Insulation Measures	June 27, 2006	July 18, 2006
Environmental Research	Environmental Research	Report Dissemination and Impact on Policy	June 29, 2006	-
Administration	Administration - General	Focus Schedule of Deliverables	Monthly updates	Ongoing task
Administration	Administration - General	Focus Schedule of Survey Activities	Monthly updates	Ongoing task

Source: Focus evaluation team's Schedule of Deliverables, as of July 27, 2006.

2. FOCUS IMPACTS

This chapter describes Focus impact areas:

- Evaluated tracked energy impacts.
- Evaluated 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 on July 17, 2006.

2.1 VERIFIED TRACKED ENERGY IMPACTS

Table 2-1a presents a summary of the annual kWh and therms saved with dollar values along with number of participants. Table 2-1b shows the gross, verified gross, and net energy impacts of the Business, Residential, and Renewable Energy Program areas for energy efficiency measures implemented from July 1, 2001, through June 30, 2006, (program to date) as documented in their respective tracking systems (Tracked Energy Impacts).

NOTE: A significant change has occurred in the way gross impacts for the residential programs are shown. The gross impacts now reflect the energy impact values from the program administrator's tracking database. Previously gross impacts were calculated using an agreed upon "deemed" value applied to the quantities of measures in the tracking database. The change has been made because it is now possible due to updates to WECC's tracking database that have occurred over the last couple of years, and this makes reconciliation of the evaluation reporting database with WECC's tracking database much more straightforward.

Table 2-1a. All Programs: Tracked Energy Impacts Summary (July 1, 2001–June 30, 2006)

	Annual kWh Saved	Annual Dollar Value of kWh Saved	Annual Therms Saved	Annual Dollar Value of Therms Saved	Number of Participants
FY06 (July 1, 2005–June 30, 2006)					
Total Saved	**198,228,057**	**$17,198,064**	**12,847,200**	**$13,301,758**	
Business	111,617,300	$8,095,274	9,674,031	$9,624,055	13,117
Residential	73,991,451	$7,776,501	1,602,851	$1,857,704	229,043
Renewable Energy	12,619,307	$1,326,289	1,570,318	$1,819,999	93
Program to Date (July 1, 2001–June 30, 2006)					
Total Saved	**931,660,730**	**$79,883,666**	**47,882,278**	**$49,297,610**	
Business	534,671,984	$38,160,149	37,645,242	$37,432,886	38,400

	Annual kWh Saved	Annual Dollar Value of kWh Saved	Annual Therms Saved	Annual Dollar Value of Therms Saved	Number of Participants
Residential	358,256,596	$37,652,768	8,107,549	$9,396,649	547,224
Renewable Energy	38,732,150	$4,070,749	2,129,487	$2,468,075	246
FY05 (July 1, 2004–June 30, 2005)					
Total Saved	**228,658,724**	**$19,725,787**	**9,357,431**	**$9,641,929**	
Business	124,511,649	$8,779,929	7,294,858	$7,251,406	11,284
Residential	82,237,365	$8,643,147	1,718,951	$1,992,265	208,894
Renewable Energy	21,909,710	$2,302,711	343,622	$398,258	69
FY04 (July 1, 2003–June 30, 2004)					
Total Saved	**229,804,131**	**$19,326,839**	**14,750,286**	**$14,941,434**	
Business	139,345,186	$9,819,604	12,679,554	$12,541,455	12,145
Residential	89,974,794	$9,456,351	1,856,899	$2,152,146	213,847
Renewable Energy	484,151	$50,884	213,834	$247,834	57
FY03 (July 1, 2002–June 30, 2003)					
Total Saved	**220,011,486**	**$18,934,736**	**8,200,071**	**$8,529,241**	
Business	128,661,286	$9,333,830	6,204,370	$6,216,224	7,448
Residential	87,631,763	$9,210,098	1,993,987	$2,311,031	156,526
Renewable Energy	3,718,437	$390,808	1,713	$1,985	26
FY02 (July 1, 2001–June 30, 2002)					
Total Saved	**54,958,331**	**$4,698,240**	**2,727,289**	**$2,883,249**	
Business	30,536,563	$2,131,512	1,792,429	$1,799,746	1,183
Residential	24,421,223	$2,566,671	934,860	$1,083,503	56,109
Renewable Energy	545	$57	0	$0	1

Note: Based on verified gross savings data. As discussed in subsection 2.2, this table does not include energy savings attributable to the Focus effort that are not directly "tracked" by program administrators.

Table 2-1b. All Programs: Tracked Energy Impacts
Program to Date (July 1, 2001–June 30, 2006)

	Annual kWh Saved			kW Reduction			Annual Therms Saved		
	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net
FY06 (July 1, 2005–June 30, 2006)									
Total	**234,946,967**	**198,228,057**	**130,806,084**	**43,799**	**36,982**	**23,327**	**13,693,014**	**12,847,200**	**6,470,117**
Business Programs	132,002,393	111,617,300	57,590,144	28,405	23,970	11,436	9,719,657	9,674,031	4,685,184
Residential Programs	90,178,932	73,991,451	71,874,948	13,478	11,132	11,561	1,899,632	1,602,851	1,502,532
Renewable Energy Program	12,765,642	12,619,307	1,340,992	1,916	1,880	330	2,073,725	1,570,318	282,401
Program to Date (July 1, 2001–June 30, 2006)									
Total	**1,093,200,581**	**931,660,730**	**629,317,100**	**180,908**	**160,188**	**106,268**	**50,843,976**	**47,882,278**	**31,637,090**
Business Programs	604,754,401	534,671,984	282,420,398	116,893	99,295	51,776	39,689,003	37,645,242	23,299,987
Residential Programs	449,312,844	358,256,596	337,844,900	57,831	54,928	52,504	8,525,427	8,107,549	7,765,287
Renewable Energy Program	39,133,336	38,732,150	9,051,802	6,184	5,965	1,988	2,629,546	2,129,487	571,816
FY05 (July 1, 2004–June 30, 2005)									
Total	**279,943,482**	**228,658,724**	**147,185,767**	**41,541**	**38,130**	**23,551**	**9,866,502**	**9,357,431**	**5,272,857**
Business Programs	144,805,231	124,511,649	62,703,801	27,438	23,231	11,048	7,284,426	7,294,858	3,554,156
Residential Programs	112,946,708	82,237,365	80,225,627	10,760	11,638	11,520	2,134,884	1,718,951	1,630,424

	Annual kWh Saved			kW Reduction			Annual Therms Saved		
	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net	Gross	Verified Gross	Verified Net
Renewable Energy Program	22,191,543	21,909,710	4,256,338	3,343	3,261	984	447,192	343,622	88,276
FY04 (July 1, 2003–June 30, 2004)									
Total	**283,945,262**	**229,804,131**	**169,208,879**	**44,573**	**37,714**	**27,044**	**14,972,144**	**14,750,286**	**12,604,533**
Business Programs	158,138,780	139,345,186	80,744,565	28,756	23,452	13,165	13,039,719	12,679,554	10,593,787
Residential Programs	125,289,987	89,974,794	88,015,335	15,600	14,042	13,684	1,825,482	1,856,899	1,810,992
Renewable Energy Program	516,495	484,151	448,980	217	220	195	106,943	213,834	199,754
FY03 (July 1, 2002–June 30, 2003)									
Total	**237,206,941**	**220,011,486**	**143,713,328**	**38,701**	**35,744**	**24,154**	**8,264,319**	**8,200,071**	**5,620,397**
Business Programs	136,656,549	128,661,286	62,614,695	23,990	21,483	11,639	6,533,984	6,204,370	3,648,373
Residential Programs	96,891,272	87,631,763	78,093,581	14,003	13,657	12,037	1,728,649	1,993,987	1,970,638
Renewable Energy Program	3,659,120	3,718,437	3,005,052	707	604	478	1,686	1,713	1,385
FY02 (July 1, 2001–June 30, 2002)									
Total	**57,157,929**	**54,958,331**	**38,403,042**	**12,295**	**11,619**	**8,191**	**4,047,997**	**2,727,289**	**1,669,187**
Business Programs	33,151,448	30,536,563	18,767,193	8,304	7,159	4,488	3,111,217	1,792,429	818,486
Residential Programs	24,005,945	24,421,223	19,635,409	3,991	4,460	3,703	936,780	934,860	850,701
Renewable Energy Program	536	545	440	0	0	0	0	0	0

Note: As discussed in subsection 2.2 this table does not include energy savings attributable to the Focus effort that are not directly "tracked" by program administrators.

Figure 2-1. Electric Energy Impacts by Measure Category
Business Programs
Program to Date (July 1, 2001–June 30, 2006)

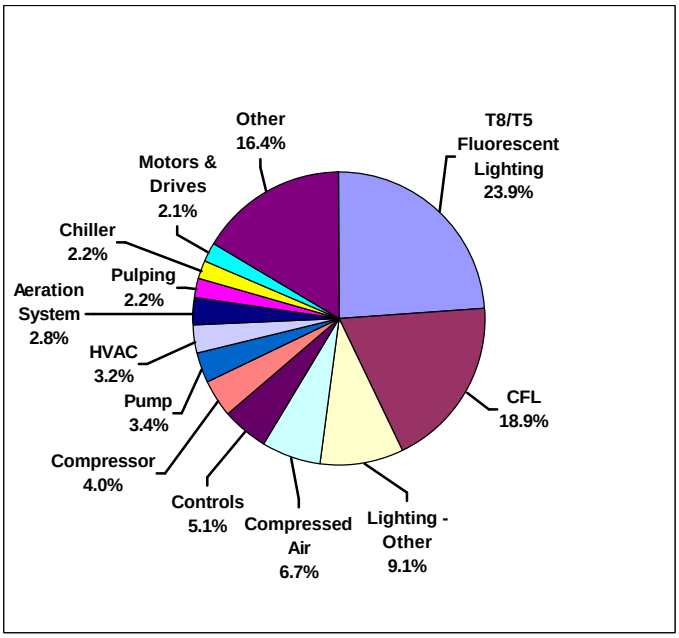


Figure 2-2. Gas Energy Impacts by Measure Category
Business Programs
Program to Date (July 1, 2001–June 30, 2006)

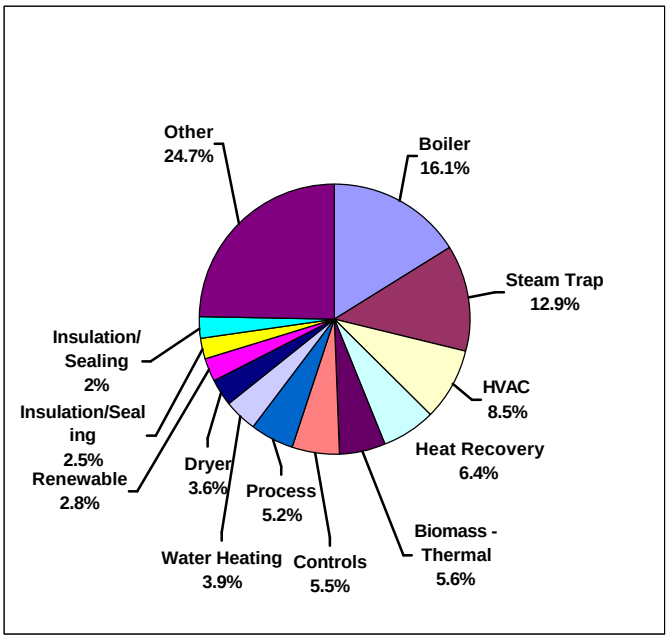


Table 2-2. Electric Energy Impacts by Measure Category
Business Programs
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross kWh	Percent of Total
T8/T5 Fluorescent Lighting	127,902,887	23.9%
CFL	100,873,235	18.9%
Other	87,713,071	16.4%
Lighting - Other	48,709,323	9.1%
Compressed Air	35,749,863	6.7%
Controls	27,521,653	5.1%
Compressor	21,178,548	4.0%
Pump	18,132,007	3.4%
HVAC	17,171,405	3.2%
Aeration System	14,968,444	2.8%
Pulping	11,825,153	2.2%
Chiller	11,726,317	2.2%
Motors & Drives	11,200,079	2.1%

Table 2-3. Gas Energy Impacts by Measure Category
Business Programs
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross Therms	Percent of Total
Other	9,279,860	24.7%
Boiler	6,046,921	16.1%
Steam Trap	4,863,893	12.9%
HVAC	3,183,563	8.5%
Heat Recovery	2,405,147	6.4%
Biomass - Thermal	2,114,582	5.6%
Controls	2,083,510	5.5%
Process	1,955,412	5.2%
Water Heating	1,459,440	3.9%
Dryer	1,343,693	3.6%
Renewable	1,041,640	2.8%
Insulation/Sealing	937,556	2.5%
Stationary Siphons	930,024	2.5%

Figure 2-3. Electric Energy Impacts by Measure Category
Residential Programs
Program to Date (July 1, 2001–June 30, 2006)

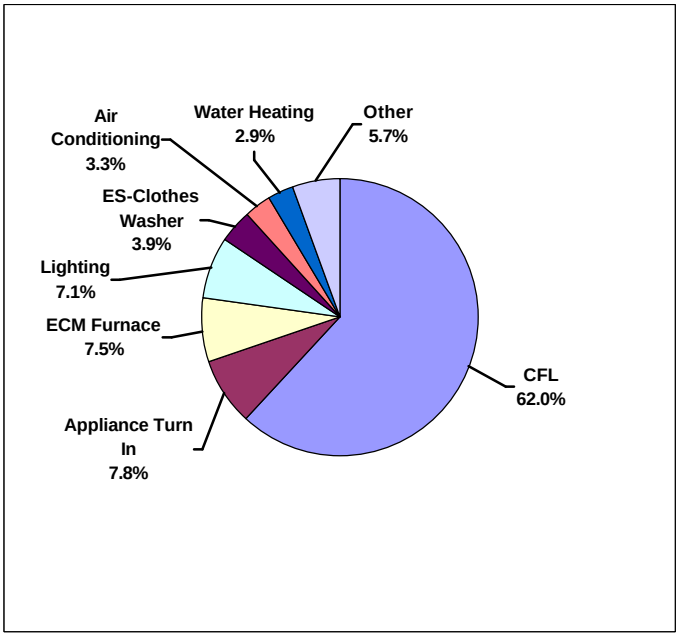


Figure 2-4. Gas Energy Impacts by Measure Category
Residential Programs
Program to Date (July 1, 2001–June 30, 2006)

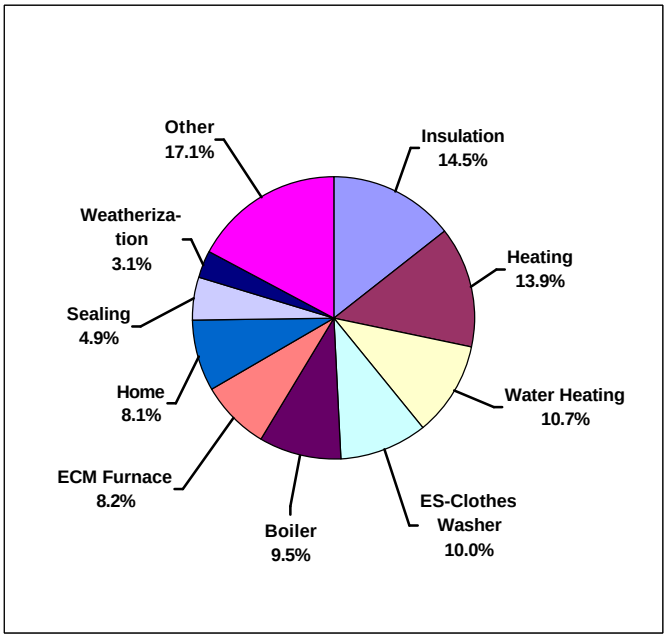


Table 2-4. Electric Energy Impacts by Measure Category - Residential Programs
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross kWh	Percent of Total
CFL	222,111,564	62.0%
Appliance Turn In	27,854,048	7.8%
ECM Furnace	26,768,995	7.5%
Lighting	25,419,016	7.1%
Other	20,336,830	5.7%
ES-Clothes Washer	13,836,228	3.9%
Air Conditioning	11,675,750	3.3%
Water Heating	10,254,165	2.9%

Table 2-5. Gas Energy Impacts by Measure Category - Residential Programs
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross Therms	Percent of Total
Other	1,388,263	17.1%
Insulation	1,177,431	14.5%
Heating	1,129,372	13.9%
Water Heating	865,241	10.7%
ES-Clothes Washer	806,739	10.0%
Boiler	769,041	9.5%
ECM Furnace	663,100	8.2%
Home	657,089	8.1%
Sealing	398,754	4.9%
Weatherization	252,520	3.1%

The figures above 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 will seek to also 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 – To Date" are presented as a range. The report providing these estimates characterized the lower estimate as a "robust" estimate at about 1.1 million kWh and 298 kW and the higher estimate as a "basic" estimate of about 16.2 million kWh over 4,600 kW. More information on the nontracked energy impacts for the business programs is presented in section 3.3.3.

Table 2-6. 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 – To Date	Robust	1,108,813	298	0
		Basic	16,196,526	4,609	0
Business	Non-CFL Participants – To Date		629,248	452	845
	Total	Robust	**19,005,005**	**1,273**	**845**
		Basic	**34,092628**	**5,584**	**845**

Notes: FY03 is only through December 31, 2002, because nontracked sales information is not available for all of fiscal year 2003. Savings are not adjusted for installation rates of CFLs.

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% 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.

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. As these impacts are quantified, they will be reported in Table 2-6 above. 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. 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 and policy makers and administrators using that 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, 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 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 (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 at least a year of program activity. Market effects that are sizable enough to be translated into energy impacts should not 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—will establish a comprehensive system for collecting retail-based CFL sales information that directly addresses the limitations of the former POS approach. We have proposed (in the FY07 Detailed Evaluation Plan) to design a system that allows for 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 will be designed to provide a representative picture of Wisconsin retail-based CFL sales by including both participating and nonparticipating retailers. The system will seek 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 following five market channels for CFLs will be included: 1) grocery; 2) drug; 3) hardware; 4) mass merchandisers; and 5) home centers. In addition, the system can be implemented annually or bi-annually (if so desired) once it is established. This is important for at least three reasons. First, CFLs have historically made up a significant portion of overall program savings

in not only the residential but also the commercial, agricultural, and multifamily sectors. Second, this emphasis is likely to continue as Focus on Energy moves toward full funding. Third, any hope of capturing the long-term market effects of this CFL promotion—for any of the four program areas identified—hinges on the success of such a research effort.

The upcoming *Comprehensive CFL Market Effects Study* will have three 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.

Assuming the study detects market effects in the Wisconsin CFL market, the evaluation team will estimate the net effects, and the resulting nontracked energy impacts will be added to the currently reported nontracked energy impacts. The methodology for this research is specified in section 4.4.3 (Market Effects—ENERGY STAR Products Program) of the Focus on Energy Public Benefits Evaluation: FY07 Detailed Evaluation Plans (June 19, 2006).

2.4 ECONOMIC IMPACTS[i]

The Focus program spends money to promote energy efficiency improvements and renewable energy in the state of Wisconsin. This spending in turn results in a number of impacts on the economy:

- The creation of new jobs.
- Increases in Wisconsin business sales.
- Increases in Wisconsin's gross state product.
- An increase in household income.

Creation of New Jobs. Focus directly affects the energy costs of participating businesses. Lower energy costs can make business operations more profitable. Reductions in energy bills may also allow businesses to spend dollars on ways to increase production. By lowering the costs of doing business, Focus also makes Wisconsin a more competitive location for attracting new business or increasing the investment and expansion of existing businesses.

Increase in Sales. Focus creates other direct and indirect economic impacts throughout Wisconsin. Wisconsin businesses include major manufacturers of heating and air conditioning equipment, motors, and controls. Focus stimulates sales for these industries, as well as the development of solar, wind and biomass energy production within the state.

Increase in Wisconsin's Gross State Product. At the same time Focus is increasing the flow of dollars within Wisconsin, it is also reducing the outflow of money from the state. Every kWh and therm saved means that less money leaves Wisconsin to buy coal and natural gas. Keeping money in Wisconsin saves jobs, increases personal income, and makes Wisconsin's economy more efficient and competitive overall.

Increase in Personal Income. If less money is spent on energy, the buying power of Wisconsin households is increased. Families with more money in their pockets have more to spend on other Wisconsin goods and products.

Note: The economic benefits for Focus shown in Table 2-7 are based on analysis conducted in February and March of 2003, which at that time assumed stable funding levels over ten years of operation. However, the State biennial budget for 2003–2005 subsequently reduced the funding for Focus on Energy by approximately 40 percent. At this reduced level of funding, program impacts will not reach the levels projected and, thus, economic impacts will not reach the levels projected in the table unless future funding is greater than was expected at the time, or there are significant increases in the ratio of energy saved per program dollar spent.

Table 2-7 shows the economic benefits of Focus based on Focus performance through December 2002. The number of jobs created (full-time equivalent job years), sales generated, value added to the Gross State Product, and personal income generated were projected out for ten years, assuming the program continued at budget levels similar to those in effect in 2002. The benefits would have increased each year because energy efficiency improvements installed earlier would still be creating benefits in future years (i.e., every time a new piece of energy-efficient equipment is installed, additional economic benefits occur over the operating life of the equipment). The economic benefits in this would, therefore, have accumulated over time, as long as the energy-efficient equipment was working.

Table 2-7. Economic Benefits of Focus on Energy

Economic Benefits	First Year	Fifth Year	Tenth Year	Sum of 10 years
Full-time equivalent job years	630	1,774	2,778	18,956
Sales generated *(in millions)*	$46	$135	$224	$1,483
Gross state product (value-added) *(in millions)*	$26	$85	$146	$934
Personal income generated *(in millions)*	$11	$66	$149	$779

Source: Economic Development Benefits: Interim Economic Impacts Report, Focus evaluation team (Final: March 31, 2003).

Note: Based on program operations data through December 31, 2002, including market effects and using verified net energy savings. All dollar amounts are in millions (MM) of Year 2001 constant dollars. Market effects were not estimated for three programs—Industries of the Future, the Business Programs renewables program, and the pilot program—because insufficient data were available.

2.5 ENVIRONMENTAL IMPACTS

Evaluators also estimated emission factors or rates for the electric generating plants serving Wisconsin (Table 2-8)[ii] and used these data to estimate displaced emissions associated with the Focus programs (Table 2-9). The evaluation team estimated the generation emissions rates shown in Table 2-8 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 2-8) 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 2-8. Emissions Rates

Emissions	Generation Lbs/MWh	On-site Therms Lbs/Therm
NO_x	5.7	.01
SO_2	12.2	.00006
Mercury (Lbs/GWh)	0.0489	
CO_2	2,216	11.708

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

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

Using the marginal cost emission rates and evaluation-verified net installed electricity savings estimates,[iii] the Focus programs together potentially displaced 5,789,291pounds of NO_x; 11,369,137 pounds of SO_2; over 2,625 million pounds of CO_2; and over 45.5 pounds of mercury from inception to June 30, 2006 (Table 2-9).

Table 2-9. Emissions Displaced
Program to Date (July 1, 2001–June 30, 2006)

Program	Verified Gross		Emissions Reductions (Pounds)			
	MWh	Therms	NO_x	SO_2	CO_2	Mercury
Agriculture	40,150	590,846	234,762	489,863	95,889,618	1.963
Commercial	151,164	5,696,756	918,605	1,844,548	401,677,958	7.392
Industrial	274,248	23,282,524	1,796,040	3,347,224	880,325,676	13.411
Schools & Government	69,110	8,075,116	474,678	843,625	247,690,979	3.379
Total Business Programs	**534,672**	**37,645,242**	**3,424,084**	**6,525,260**	**1,625,584,230**	**26.145**
Apt and Condos Efficiency Services	50,448	3,612,933	323,682	615,681	154,092,714	2.467
Efficient Heating & Cooling Initiative	10,840	271,650	64,502	132,259	27,200,872	0.530
ENERGY STAR Reward	260,494	900,179	1,493,819	3,178,085	587,794,712	12.738
Existing Homes	31,167	2,126,030	198,912	380,365	93,957,652	1.524
Targeted Home Performance	1,725	477,461	14,605	21,069	9,411,792	0.084
New Construction	3,583	719,297	27,618	43,759	16,362,056	0.175
Total Residential Programs	**358,257**	**8,107,549**	**2,123,138**	**4,371,217**	**888,819,797**	**17.519**
Total Renewable Energy Program	**38,732**	**2,129,487**	**242,068**	**472,660**	**110,762,478**	**1.894**
GRAND TOTALS	**931,661**	**47,882,278**	**5,789,291**	**11,369,137**	**2,625,166,506**	**45.558**

Notes: 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.

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 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 lightbulb 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 evaluated energy impacts of the program are cited and available on the state's DNR website.

2.6 NON-ENERGY BENEFITS

Table 2-10 shows the total value of non-energy benefits (NEBs) for each program area. NEBs for the Focus program include benefits for participants—for example, increased health, safety, and comfort—and benefits for the utility companies serving the participants—for example, reduced cost of service. The identification and valuation of non-energy benefits has been completed for both the Residential and Business Programs (see the respective chapters). Valuation of non-energy benefits provided by the Renewable Energy Program is in progress.

The value shown for Business Programs of $57,628,037 reflects annual benefits resulting from program efforts through June 30, 2006. The value shown for Residential Programs of $9,661,216 reflects annual benefits resulting from Residential Program efforts through June 30, 2006. A qualitative analysis of the Renewable Energy NEBs has been completed, but there is not enough information to allow for quantification of these NEBs.

Table 2-10. Value of Non-Energy Benefits by Program Area
Program to Date (July 1, 2001–June 30, 2006)

<table>
<tr><th rowspan="2">Program Area</th><th colspan="2">Value of Non-energy Benefits</th></tr>
<tr><th>FY06
July 1, 2005–June 30, 2006</th><th>Program to Date
July 1, 2001–June 30, 2006</th></tr>
<tr><td>Business Programs</td><td>$13,560,988*</td><td>$57,628,037*</td></tr>
<tr><td colspan="3">Example Benefits from Business Programs:
• Maintenance employee morale
• Equipment life
• Productivity
• Waste generation
• Defects and errors
• Sales
• Non-energy costs
• Personnel needs
• Injuries and illnesses.</td></tr>
<tr><td>Residential Programs</td><td>$1,783,556</td><td>$9,840,480</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 a horizontal-axis washing machine, which uses much less water than conventional washing machine</td></tr>
</table>

Program Area	Value of Non-energy Benefits	
	FY06 July 1, 2005–June 30, 2006	Program to Date July 1, 2001–June 30, 2006
Renewable Energy Programs	N/A**	N/A**
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.		

* Method of applying value is under review.

** A qualitative analysis of the Renewable Energy NEBs has been completed, but there is not enough information to allow quantification of these NEBs.

2.7 COST OF CONSERVED ENERGY (CCE)

Following from a memo report issued by the evaluation team (*Cost of Conserved Energy (CCE): Potential Calculations for Focus on Energy*, October 31, 2005), this section of the *Semiannual Report* describes the calculation of CCE for Focus and provides interim results. Because this is the first program-year the CCE has been calculated and reported, some background context is provided immediately below. This is followed by a discussion of the input assumptions and the results. Because CCEs are likely to be estimated on a regular basis, future semiannual reports will include the technical assumption information in appendices. Readers interested primarily in the results can skip to section 2.7.5.

2.7.1 Background of CCE

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)[1] .

Based on reporting by ACEEE, CCE results have been calculated and reported by six other public benefits states. They are: California, Connecticut, Massachusetts, New Jersey, New York, and Vermont.

2.7.2 The CCE Calculation

The CCE has some variations in its calculation, depending on the extent to which other monetizable effects of the implementation of EE options are included (e.g., reduced pollution

[1] 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.

due to decreased use of electricity, or other economic effects that are monetizable; see Sathaye and Murtishaw, 2004). The CCE may be estimated from different perspectives (residential consumer, utility company, and societal), again depending on the availability of required estimations of key monetizable input variables. The estimation and/or use of assumed values, where data are lacking, has been a source of controversy in the CCE calculation for many years (Golove and Eto, 1996)[2].

In the context of public benefits programs, including Focus on Energy, the use of CCE by the California Public Utilities Commission (CPUC), the CEC, and the major investor-owned utilities (IOUs) in California reflects a consistently reported version of CCE.[3] Since 2000, California has tracked program cost effectiveness by sector—residential, nonresidential, and new construction—using the following formula for Levelized Cost of Conserved Energy:

$$\text{Levelized Cost of Conserved Energy} = \frac{\text{Program Costs x CRF}}{\text{First year kWh saved}}$$

$$\text{Capital Recovery Factor (CRF)} = \frac{i\,(1+i)^n}{(1+i)^n - 1}$$

where i = real discount rate

n = useful life period

In this calculation, the Capital Recovery Factor is based on a standard formula for estimating the net present value of a stream of payments over time, which in turn is derived algebraically from a time series in which each year's payment is appropriately reduced based on the discount rate and the number of elapsed years.

A key aspect of the CCE calculation used in California is that the savings count only utility program costs and incentives and do not include the incremental costs of the measures borne by customers. This is important because in the context of cost-effectiveness tests this CCE thus assumes a *utility* perspective, not a societal or customer perspective.

2.7.3 Key Assumptions in a CCE Calculation for Focus on Energy

For Focus on Energy (or any specific program effort) some assumptions need to be assessed and specified. These are summarized below. Much of the discussion of key assumptions draws upon an earlier summary of cost-effectiveness tests issued by DOA (*Benefit/Cost Analysis – Wisconsin's Focus on Energy Public Benefits Programs*, January 17, 2003, Prepared by Oscar Bloch), as well as assumptions used in the *Initial Benefit-Cost Analysis* for Focus (Final Report: March 31, 2003).

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[2] Golove, W.H. and Eto, J., 1996. *Market Barriers to Energy Efficiency: A Critical Reappraisal of the Rationale for Public Policies to Promote Energy Efficiency.* Berkeley, CA: Lawrence Berkeley National Laboratory LBL-38059.

[3] See *Funding and Savings for Energy Efficiency Programs for Program Years 2000 through 2004*, Rogers, Cynthia; Messenger, Mike; and Sylvia Bender. Energy Efficiency, Demand Analysis and Renewable Energy Division, California Energy Commission, In support of the *2005 Integrated Energy Policy Report*, July 2005. CEC-400-2005-042.

Level of disaggregation. The primary options for Focus are to disaggregate by program area (Business Programs, Residential, and Renewable), and by kWh vs. therms. This provides calculations for five CCEs. In addition, the calculations reported below are both from a public perspective (counting the customer costs in the equation), and from the "program administrator" perspective (not counting customers' costs—sometimes also referred to as a program leverage perspective). This will enable consumers of the Focus CCE results to explicitly see the difference in the two cost-effectiveness perspectives. Providing a Focus CCE that includes customer costs will avoid distorting the CCE by completely leaving out these costs (a potentially serious risk given the quite modest rebates in Focus), and will realize an important element of consistency between a public perspective CCE and the evaluation's benefit-cost analysis. Also, the CCE calculations use both verified gross estimates of energy savings (not consistent with the benefit-cost analysis) and verified net (consistent with the benefit-cost analysis).

Real discount rate. The initial Focus benefit-cost analysis (2003) used a real discount rate of 3 percent. This was documented as "a societal discount rate, calculated as the mean 20-year Treasury Bond rate minus the rate of inflation, over the most recent 25 years." A societal discount rate can be seen as appropriate for a state-sponsored public benefits program since with Focus, for example, Wisconsin is buying efficiency as a public good, not a private decision. Using the current Treasury Bond rate, the societal perspective calculation reported below includes a real discount rate of 2.5%.

The program administrator perspective calculation uses a real discount rate of 7%. This is used for the benefit-cost analysis of federal public programs where the benefit is subject to uncertainty and is often applied by states for analysis of spending programs according to comments from economist Glen Weisbrod in response to questions on benefit costs analysis issues related to Focus on Energy on June 3, 2002.

Useful life period. The initial Focus benefit-cost analysis did a program area-specific weighting of average measure life based on assumptions for individual measure types (see pages V-9, V-12, and V-13 in the *Initial Benefit-Cost Analysis* for Focus, Final Report: March 31, 2003). This is supported in the DOA-issued summary of cost-effectiveness tests (Bloch, 2003), which suggests, "Measure Lifetimes = Weighted Average for Each Program." This analysis of useful life has been updated for the calculations reported below.

Program cost allocations for electricity and natural gas. To avoid laborious tracking and accounting of program resource expenditures, a starting assumption is suggested in the DOA-issued summary of cost-effectiveness tests (Bloch, 2003) as follows:

> "Percentage breakouts are based on the average proportion of program costs across all programs that were allocated to gas and electric services by utilities when they offered efficiency programs under PSC regulation. Focus on Energy programs do not track gas and electric expenses separately, but there is no reason to believe that the proportions have changed."

Customer costs. To include incremental customer costs, we directly add these costs to program costs, resulting in this small—but important—variation in the CCE calculation:

$$\text{Levelized Cost of Conserved Energy} = \frac{(\text{Program Costs} + \text{Customer Costs}) \times \text{CRF}}{\text{First year kWh saved}}$$

$$\text{Capital Recovery Factor (CRF)} = \frac{i\,(1+i)^n}{}$$

$$(1 + i)^n - 1$$

where i = real discount rate

n = useful life period

The customer costs added to the program costs need to be "incremental costs" in more than one sense.

1. This cost should reflect the additional implementation costs associated with the efficiency measure relative to baseline costs. This is the usual sense of "incremental costs."
2. If the incentive payment is counted in program costs, only the implementation cost in excess of the incentive should be counted in the customer costs. Alternatively, the numerator can be viewed as program cost excluding incentives, plus total customer incremental cost. From a total societal cost, we do not care whether this part of the project cost is viewed as coming from the program or the customer, but we must not count it twice. This alternative view is useful when we deal with net savings and corresponding CCE.
3. If the CCE is calculated for net savings, the denominator is net first-year savings, and only net (i.e., program-attributable) customer costs should be added to the numerator. Thus, for a "net" CCE, we would apply the net-to-gross ratio (NTGR) to the denominator, and apply the same ratio to the customer cost component in the numerator. We want to count incentive payments in the net cost only if the incentive is for a measure customers would not have paid for on their own. Thus, the numerator includes the program costs minus incentives, plus the net incremental customer cost. The net incremental customer cost is the NTGR times the incremental customer cost without subtracting the incentive amount.

Note that if we are calculating the program perspective excluding customer costs, we count the incentive payment as part of the program spending for both the net and the gross CCE. We only "net out" incentive costs when we combine program and customer costs.

2.7.4 Estimating customer costs for Business and Residential Programs.

The Benefit-Cost report cited above provides the following for Business Programs (Table IV-1) and Residential (Table IV-2) for the first full year of program activity:

- Total $ value of first-year net energy savings ("Direct Savings")
- Total incremental measure cost for measures attributable to Focus, without deducting any incentive amount received ("Implementation Costs").

We can therefore calculate a ratio of incremental customer cost per dollar of first-year savings from these two numbers.

k = (Implementation Cost $, year 1)/(Direct Savings $, year 1)

Since the numbers are "apples to apples," the same ratio would apply to net or gross savings for the corresponding CCE calculation.

Thus, we substitute the following for the cost term in the CCE equation:

Cost = (Program Cost) – (Incentive Cost)

+ k (First-year savings ($), current year).

This same formula applies whether the savings are gross or net.

The values of k are

Residential: k = 3.10

BP: k = 4.17

A special case: customer costs for Renewable Energy. For Renewables, we cannot do exactly the same thing, because the first-year net savings from the Benefit-Cost report is 0. But the customer costs are based on actual job costs as reported in the data tracking system.

2.7.5 Results for CCE Calculations

A. AGGREGATE CCE RESULTS

Table 2-11. Total Savings and Costs

Total kW	Total kWh	Total Therm	Total Elec Cost	Total Gas Cost
3,343	22,191,543	447,192	$ 3,834,002	$ 1,074,912

Table 2-12. Cost per First-year Savings ($)

Cost/kW	Cost/kWh	Cost/therm
$1,146.90	$ 0.17	$ 2.40

B. DISAGGREGATED CCE RESULTS

The results for all calculations of CCE are presented in Table 2-13 below. The data in the table are intended to prompt discussion within the Focus team on how to best calculate, analyze, and interpret CCE values reported over time.

Table 2-13. Cost of Conserved Energy (CCE) in Dollars per Energy Unit by Program Area and Perspectives Program to Date (July 1, 2001–June 30, 2006)

Program Area	Program Administrator Perspective				Societal Perspective			
	Gross kWh	Net kWh	Gross Therm	Net Therm	Gross kWh	Net kWh	Gross Therm	Net Therm
Business Programs	$ 0.026	$ 0.050	$ 0.198	$ 0.319	$ 0.038	$ 0.053	$ 0.482	$ 0.560
Residential	$ 0.029	$ 0.031	$ 0.345	$ 0.361	$ 0.053	$ 0.054	$ 0.436	$ 0.425
Renewables	$ 0.016	$ 0.067	$ 0.134	$ 0.500	$ 0.020	$ 0.060	$ 0.539	$ 0.825

Another commonly used test of program cost effectiveness is the Total Resource Cost (TRC) test. This test uses many of the same inputs that are used to calculate the CCE. A significant difference is that it compares program and participant costs against the avoided costs of supplying the conserved energy. The utility-avoided costs used for this test were obtained

from *Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006-2015.* The inputs used are shown in Table 2-15.

The residential sector has the highest ratio at 1.93 (see Table 2-14), indicating that efforts in that sector have been the most cost effective to date. However, the results of the TRC test indicate that the benefits significantly outweigh the costs of the Focus on Energy program across all program areas. It should be noted that there are also significant differences in the complexities of the markets served by each program area and the maturity of the energy efficient technologies that are available, which may account for some of the differences in TRC ratios.

Table 2-14. Total Resource Cost (TRC) Ratios Based on Net Energy Impacts Program to Date (July 1, 2001–June 30, 2006)

Program Area	TRC Ratio
Business	1.71
Residential	1.94
Renewables	1.31

Table 2-15. Inputs Used for CCE and TRC Test Program to Date (July 1, 2001–June 30, 2006)

Assumptions for CCE and TRC	Business Programs	Residential	Renewables
Real discount rate—program administrator	7.0%	7.0%	7.0%
Real discount rate—societal	2.5%	2.5%	2.5%
Useful life period kWh (average years)	13.8	9.3	15
Useful life period therms (average years)	14.2	15.2	15
Participant avoided cost—electricity (per kWh)	$0.071	$0.10510	$0.10510
Participant avoided cost—gas (per therm)	$0.997	$0.1591	$0.1591
Utility avoided cost—electricity (per kW)	$70.00	$70.00	$70.00
Utility avoided cost—electricity (per kWh)	$0.06	$0.06	$0.06
Utility avoided cost—gas (per therm)	$1.00	$1.00	$1.00
Customer cost—net	$139,677,550	$92,148,473	$4,384,396
Program Costs—kWh	$121,811,297	$70,953,393	$5,529,349
Program Costs—therms	$65,331,611	$24,259,283	$2,602,046

Note: Program costs were allocated to the energy type based on the proportion of incentive dollars allocated to projects. For any projects that generated both kWh and therm savings, the incentives were allocated based on the value of the energy saved. Program costs include all administrative costs (except for WDOA) and the costs of other contractors such as evaluation.

2.8 BENEFIT-COST ANALYSIS

Note: The benefit-cost analysis presented in this section was conducted in February and March of 2003. Projected program impacts for the first ten years of operation assumed stable funding levels over that time period. However, the State biennial budget for 2003–2005 reduced funding for the Focus on Energy program by approximately 40 percent for 2003–2005. At this reduced level of funding, program impacts will not reach the levels projected. Thus, assumptions about the elements in the benefit-cost ratios discussed in this section are also affected. The benefit-cost and economic impact analysis originally planned for FY04 to update these numbers was also cut as a result of budget reductions. There are tentative plans to reproduce the benefit-cost analysis in FY07.

Benefit-Cost Analysis and Results. The first step in conducting a benefit-cost analysis of a program is to list the costs and benefits involved. Table 2-16 shows each element of the benefit-cost analysis for Focus and indicates whether the element is added to or subtracted from the benefit or cost side. The **benefits** of Focus consist of both pluses and minuses. The four major impacts discussed earlier—energy, economic, environmental, and other non-energy benefits—are all pluses. Market effects—the positive effect that Focus has on the market for energy efficiency goods and services—is also a plus (and is also included in the economic, environmental and non-energy benefits). Incentives paid to participants are a plus, but the portion the participant must pay to receive energy efficiency improvements through Focus is a minus on the benefits side of the equation.[iv] The **costs** of Focus include total program spending and the cost of incentives paid to participants.

Table 2-16. Elements Included In a Benefit-Cost Analysis for Focus

Element	"Benefit"	"Cost"
Economic Impacts	+/-	
Energy Impacts	+	
Environmental Benefits	+	
Market Effects	+	
Other Non-energy Benefits	+	
Participant Spending	-	
Program Incentives	+	+
Program Spending		+

The second step in a benefit-cost analysis is to select a valuation method for the analysis. Table 2-17 shows three methods for estimating the benefit-cost ratios for Focus ranging from "conservative" to "most complete" depending on which elements are included or excluded. A ratio of greater than 1 in the table indicates that benefits exceed the costs of the program.

Table 2-17 shows that using the most conservative estimate, which excludes economic impacts and non-energy elements, overall Focus benefits still outweighed the costs. This means that at the time of this analysis, Focus was creating greater value for the state of Wisconsin than it cost to run it.

A less conservative method that would include non-energy benefits was available only for the Residential Program. These benefits had not yet been quantified for the Business and Renewable Energy Programs at the time the benefit-cost analysis was completed. The most

complete estimate currently available included economic impacts for all programs and non-energy benefits for the Residential Program area only.

Table 2-17. Benefit-Cost Ratios for Focus Overall and by Program Area*

Program Area	Conservative Estimate (Economic Impacts and Non-energy Benefits Excluded)	Less Conservative Estimate (All Elements Included)	Most Complete Current Estimate
Focus Overall	**3.0**	**NA**	**5.7**
Business	2.0	NA	3.0
Residential	4.3	9.0	9.0
Renewable Energy	(1.1)	NA	(0.8)

Notes: NA: Not applicable
Ratios are based on verified net savings data through March 2003.
"Most Complete Current Estimate" Includes economic impacts for all program areas plus non-energy benefits for the Residential Program area only.

The Residential Programs have a very good benefit-cost ratio even by the conservative estimate. The majority of the benefits from this program area come from the CFL component of the ENERGY STAR Products program.

The Business Programs show moderately good performance, with a benefit-cost ratio above 2. The "Most Complete Current Estimate" for the Business Programs did not include non-energy benefits, which prohibits meaningful comparison between Business and Residential Programs. The Business Programs are planning some changes to improve operational efficiency, reduce program spending for energy efficiency measures that would be implemented even without program support, and develop more focused market transformation efforts. These changes should improve future cost effectiveness.[4]

The results for the Renewable Energy Program area are more preliminary and more uncertain than those for the Residential and Business Program areas, due to the late start of the Renewable program. A key contributor to this negative result is the high project implementation costs (participant spending plus program incentives) associated with the photovoltaic (solar panel) projects. With the project implementation costs and associated savings from these solar panel projects excluded, the benefit-cost ratio for Renewable Energy Program is greater than 1.

2.9 COMPARISONS OF FOCUS ENERGY IMPACTS AND ACHIEVABLE POTENTIAL

As part of an effort to present additional information at the technology or end-use level, 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 measures promoted in Focus. The

[4] There are also significant differences in the market that could account for differences in the b-c ratio. BP programs have a much more diverse customer base with many more technologies to address. This, as well as performance, can make a difference in the resulting b-c ratio.

results for achievable potential are taken from the recently released 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.

2.9.1 Focus Energy Impacts Used in the Comparisons

Previously reported energy impacts disaggregated to the technology or end-use level have been verified gross impacts. Because the Potential Study was designed to "identify net program-induced savings…excluding any free riders" (Volume I, page 5), our comparisons use the evaluation's verified net impacts. Further, because the comparisons are made at the technology/end-use level—and the verified net impacts currently reported for Focus do not use technology/end-use level adjustment factors—there are some small differences between the Focus impacts included in these comparison tables and the formally reported verified net impacts included elsewhere in this *Semiannual Report* (e.g., adjustment factors for Business Programs are applied at the sector level).

The comparison results in this section apply only to electric energy (kWh) and natural gas (therms), and do not include electricity demand potential as did the ECW report. The next semi-annual report in February 2007 will include comparisons of kW impacts against potential.

2.9.2 "Mapping" Focus Measure Categories to Potential Study Markets

The ECW 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 2-18 through 2-20).

To make comparisons between potential savings and achieved savings, the first step was to "map" or assign the measure categories installed through Focus to the Potential Study markets. This was an imperfect exercise, and is a source of inaccuracies in the comparisons. The evaluation team made the initial assignments with some review by ECW's author of the Potential Study report. On September 6, 2006, a meeting was held with the program administrators and representatives from ECW and the evaluation team to review the assignments. This resulted in a number of changes being made to the assignments of Focus measure categories for both the residential and the commercial and industrial markets. The changes resulting from that meeting have been made and are reflected in the comparison table for the residential sector (Table 2-19). However, for the C&I markets (Table 2-18) only some of the more straightforward changes have been applied. This sector is more complex and more work will have to be done before we can be confident that the mapping of program activities to the markets as defined for the Potential Study are accurate and can be useful for evaluating which markets may present the best opportunities for Focus to pursue. This work is continuing and a memo will be submitted in early October 2006 providing an update on the comparison for the business sector.

2.9.3 Markets with No Identified Potential

The Potential Study estimates the ability of 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). Thus, for many markets, no achievable potential has been identified that is considered obtainable within the Study's "target avoided costs" (4 to 8 cents/kWh; 60 to 140 cents/therm). In Tables 2-18 through 2-20 where there is no value included for a market it is because there was no positive achievable potential impacts at the target avoided cost. The reader should refer to the Potential Study for market-specific details (*Volume II, Technical Appendices—Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006–2015*).

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.

2.9.4 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% probability boundaries for each market's estimates. The point estimate used in the comparison tables in this report represents the mid-point of the average annual incremental impact. Also, the Potential Study used both a 5-year and 10-year horizon for estimating the incremental impacts. Because we are comparing estimates of potential to *current actual* Focus energy impacts, the 5-year horizon values are used.

A. C&I MARKETS

Table 2-18 provides the comparison results for 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 pump system improvements dominate the C&I sector contribution to overall potential."

Considering electric energy, there is a close convergence 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 over 47 percent of achievable potential. At this end-use level, Focus measures assigned to the two lighting markets (specified in the Potential Study) contributed about 31 percent of Focus kWh savings, which makes the convergence appear smaller. However, what is not included in this comparison to Focus lighting impacts is a significant amount of lighting impacts in the Agricultural Energy Efficiency Upgrades. When the lighting-attributable portion of those kWh savings are considered, there is much closer convergence between actual Focus net kWh lighting-attributable impacts and the Potential Study projections.

For two other important Potential Study markets, Pump System Improvements and Commercial new construction, we find that Focus is capturing a total of five percent of net kWh savings from the corresponding measures. Thus, Focus does not appear to be realizing savings from either pump system improvements or commercial new construction at the levels suggested by the Potential Study as achievable annually. However, as with lighting, this does

not include pump systems improvements impacts embedded in the Agricultural Energy Efficiency Upgrades.

Table 2-18 also provides natural gas energy savings and potential for C&I markets. The Potential Study estimates that over 80 percent of the achievable potential is represented by Manufacturing/Industrial Process Upgrades. For FY06, about 14 percent of Focus savings were obtained from these process upgrades. The largest contribution to Focus therm savings was in the market category of Boiler Replacement and Systems Improvements (about 28% of therm savings), while the Potential Study suggests that about 7 percent of annual therm savings potential is achievable in this market. Another set of measures that Focus is exploiting involves, again, Agricultural upgrades, with almost 25 percent of FY06 therm savings attributable to these measures.

Table 2-18. Comparisons of Focus Energy Impacts (Net, FY06) and Achievable Potential (Average Annual Increments, 5-Year Horizon) Commercial and Industrial Markets

Market	Average Annual kWh Potential	Percent of Total Electric Energy Potential	Net kWh Savings	Percent kWh Savings	Average Annual Therm Potential	Percent of Total Therm Potential	Net Therm Savings	Percent Therm Savings
High Performance New Buildings	11,735,000	7.6%	0	0.0%	347,000	8.7%	0	0.0%
Unitary HVAC Replacement and System Improvements	1,725,000	1.1%	6,686,415	3.7%			1,510,633	8.1%
Lighting Remodeling and Replacement Upgrades	27,912,000	18.0%	54,676,899	30.1%			0	0.0%
Boiler Replacement and Systems Improvements			2,954,591	1.6%	283,000	7.1%	5,292,254	28.2%
Lighting System Retrofit Improvements	45,565,000	29.4%	1,461,898	0.8%			0	0.0%
Chiller Replacement and System Improvements	2,439,000	1.6%	5,116,976	2.8%			0	0.0%
Ventilation System Improvements	4,391,000	2.8%	2,628,280	1.4%	72,000	1.8%	31,939	0.2%
Refrigeration System Improvements	4,745,000	3.1%	1,578,409	0.9%			50,821	0.3%
Motors: New, Replacement and Repair Market	2,437,000	1.6%	7,769,178	4.3%			28,442	0.2%
Compressed Air Systems Improvements	8,649,000	5.6%	6,710,546	3.7%			32,512	0.2%
Fan and Blower Systems Improvement	3,449,000	2.2%	0	0.0%			0	0.0%
Pump Systems Improvement	21,762,000	14.1%	9,138,433	5.0%			0	0.0%
Manufacturing Process Upgrades	7,786,000	5.0%	15,982,837	8.8%	3,244,000	81.2%	2,673,428	14.3%

Market	Average Annual kWh Potential	Percent of Total Electric Energy Potential	Net kWh Savings	Percent kWh Savings	Average Annual Therm Potential	Percent of Total Therm Potential	Net Therm Savings	Percent Therm Savings
Water and Wastewater System Improvements	3,614,000	2.3%	4,278,371	2.4%			517,640	2.8%
Agriculture Energy Efficiency Upgrades	8,669,000	5.6%	45,221,146	24.9%	47,000	1.2%	4,665,347	24.9%
Savings not Mapped to Market			17,225,648	9.5%			3,937,719	21.0%
Total	**154,878,000**	**100.0%**	**181,429,627**	**100.0%**	**3,993,000**	**100.0%**	**18,740,736**	**100.0%**

B. RESIDENTIAL MARKETS

Table 2-19 presents comparisons of Focus energy impacts and achievable potential for residential markets. For electric energy savings, we again see lighting—specifically Incentives for CFLs—as the dominant market for energy savings, accounting for almost 60 percent of annual achievable potential. Focus savings are very close to realizing this potential with over 65 percent of FY06 energy savings attributable to incentivized CFLs. The market with the second largest potential, Retailer Promotion of ENERGY STAR Consumer Electronics (11.7% of total kWh achievable potential), is not currently a market that Focus programs are targeting for savings.

The market cited by the Potential Study as having the greatest achievable potential for residential natural gas therm savings is Remodeling Shell Improvements, estimated to contribute about 38 percent of total annual therm potential. Based on assignments of Focus measures to Potential Study markets, almost 27 percent of FY06 therm savings are attributable to Shell Improvements.

Also with respect to residential natural gas, Focus is clearly capturing significant therm savings from multi-family buildings. For example, about 22 percent of FY06 therm savings are attributable to Multi-family Heating System Replacements (versus estimated achievable potential of 3.9% of total potential). However, the Potential Study suggests that there is important achievable potential in the Multi-family Fuel Switching market (8.7% of total therm savings potential), and Homeowner Water Heater Purchases (23.1% of total therm savings potential).

Table 2-19. Comparisons of Focus Energy Impacts (Net, FY06) and Achievable Potential (Average Annual Increments—5-Year Horizon)—Residential Markets

Market	Average Annual kWh Potential	Percent of Total Electric Energy Potential	Net kWh Savings	Percent kWh Savings	Average Annual Therm Potential	Percent of Total Therm Potential	Net Therm Savings	Percent Therm Savings
ENERGY STAR Marketing	211,000	0.2%	0	0.0%	0	0.0%	0	0.0%
Retailer Promotion of ENERGY STAR Consumer Electronics	16,443,000	11.7%	0	0.0%	0	0.0%	0	0.0%
Incentives for CFLs	83,864,000	59.7%	47,158,294	65.6%	0	0.0%	0	0.0%
Multi-family Common Area Lighting—Direct Install Market	2,497,000	1.8%	1,568,996	2.2%	0	0.0%	0	0.0%
Incentives For Variable Speed Furnaces	11,411,000	8.1%	6,884,784	9.6%	0	0.0%	172,324	11.5%
Central AC/HVAC	2,601,000	1.9%	1,272,787	1.8%	0	0.0%	0	0.0%
Central A/C Savings Before Code Change			1,528,453	2.1%			0	0.0%
Multi-family Heating System Replacement—Medium and Larger Buildings	0	0.0%	210,273	0.3%	138,000	3.9%	328,714	21.9%
Multi-family Fuel Switching	0	0.0%	0	0.0%	307,000	8.7%	0	0.0%
Room AC	943,000	0.7%	66	0.0%	0	0.0%	0	0.0%
Homeowner Water Heater Purchases	5,944,000	4.2%	14,720	0.0%	818,000	23.1%	11,874	0.8%
Incentives for Energy Efficient (EE) New Home Construction	418,000	0.3%	41,783	0.1%	381,000	10.8%	148,429	9.9%
Dehumidifier Early Retirement	1,273,000	0.9%	2,650	0.0%	0	0.0%	0	0.0%
Dehumidifier Nondispatchable Load Control	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Direct Install Market	10,278,000	7.3%	2,444,483	3.4%	450,000	12.7%	78,675	5.2%
Shell Improvements including Remodeling (25.01)	1,600,000	1.1%	657,151	0.9%	1,343,000	37.9%	402,913	26.8%

Market	Average Annual kWh Potential	Percent of Total Electric Energy Potential	Net kWh Savings	Percent kWh Savings	Average Annual Therm Potential	Percent of Total Therm Potential	Net Therm Savings	Percent Therm Savings
Incentives for Homeowner Clothes Washer Purchases	2,612,000	1.9%	2,492,000	3.5%	88,000	2.5%	82,172	5.5%
Residential Solar Thermal (Hot Water)	265,000	0.2%	83,824	0.1%	19,000	0.5%	12,759	0.8%
Refrigerators & Freezers			587,706	0.8%			0	0.0%
Lighting Fixtures			4,643,621	6.5%			0	0.0%
Savings not Mapped to Market			2,283,357	3.2%			264,672	17.6%
Total	**140,360,000**	**100.0%**	**71,874,948**	**100.0%**	**3,544,000**	**100.0%**	**1,502,532**	**100.0%**

C. RENEWABLE ENERGY MARKETS

Table 2-20 contains results for comparisons of estimated achievable potential and FY06 Focus savings for renewable energy markets. Electric energy potential is dominated by Agriculture Anaerobic Digestion, contributing almost 62 percent of total achievable potential. Focus is exceeding the annual potential—both in absolute kWh and in percent of FY06 kWh savings—by capturing over 99 percent of FY06 savings from this technology. Focus is also obtaining nearly all of its FY06 therm savings from this technology. However, the Potential Study estimates that the greatest achievable therm savings are from Wood Residue for Commercial/Institutional Heat and Commercial Solar Thermal (hot water), two markets from which Focus is deriving little savings.

Table 2-20. Comparisons of Focus Energy Impacts (Net, FY06) and Achievable Potential (Average Annual Increments—5-Year Horizon)—Renewable Markets

Achievable Potential Study: Renewables Markets	Average Annual kWh Potential	% of Total Electric Energy Potential	Focus FY06 kWh Savings	% of Focus FY06 kWh Savings	Average Annual Therm Potential	% of Total Electric Energy Potential	Focus FY06 Therm Savings	% of Focus FY06 Therm Savings
Customer-sited, Grid-connected, Commercial Solar Photovoltaics (PV)			29,643	0.2%				
Commercial Solar Thermal (Hot Water)					172,000	22.2	13,708	0.7%
Residential Solar Thermal (Hot Water)	265,000	1.4						
Wood Residue for Commercial/Institutional Heat					604,000	77.8		

Achievable Potential Study: Renewables Markets	Average Annual kWh Potential	% of Total Electric Energy Potential	Focus FY06 kWh Savings	% of Focus FY06 kWh Savings	Average Annual Therm Potential	% of Total Electric Energy Potential	Focus FY06 Therm Savings	% of Focus FY06 Therm Savings
Customer-sited, Gird-connected, Commercial Wind Energy	6,783,000	37	83,600	0.7%				
Agriculture Anaerobic Digestion	11,311,000	61.6	12,366,960	99.1%			1,982,546	99.3%
Savings not Mapped to Market							102	0.0%
Total	**18,359,000**		**12,480,203**		**776,000**		**1,996,356**	

Note: See Table 2-19: Comparisons of Focus Energy Impacts (Net, FY06) and Achievable Potential (Average Annual Increments—5-Year Horizon)—Residential Markets for the Residential Solar Thermal (Hot Water) market.

3. BUSINESS PROGRAMS EVALUATION

3.1 OVERVIEW/KEY ACTIVITIES

Business Programs (BP) evaluation activities included development of work products, preparation of working memos, consultation, and work in progress toward future deliverables.

Table 3–1. Summary of Business Program Evaluation Activities During FY06

Activity	Process Evaluation	Impact Analysis	Market Effects	Metrics	Status
Revision to DEP to provide more attention to attribution and market effects issues and earlier inputs to FY07 planning.	X	X	X	X	Complete. Results reflected in this document.
Determination of verified gross and net savings associated with tracked energy impacts through the current period.		X		X	Complete. Results reported in this document.
Reviewing and accepting deemed savings formulas proposed by the Programs.		X			Some reviews and agreements completed this period. Additional reviews ongoing.
Estimation of attribution factors by end use and by customer categories.	X	X			Complete. Results reported in this document.
Estimation of participant end-user spillover effects from the first four years of the program.		X	X		Complete. Results reported in this document.
Illustrative calculation of a premium efficiency motors market growth index.			X	X	Memo complete.
Measure review to address attribution.	X				Complete. Results reported in this document.
Delivery process review to address attribution.	X				Complete. Results reported in this document.
Consultation and coordination with the evaluation of the WPS program.		X			FY07 DEP completed.
Consultation and coordination with the evaluation of the We Energies program.		X			Ongoing meetings and advisory memos.
Review of the new BP program tracking system (WATTS).	X	X			Initial memo complete. Additional review and discussion ongoing.
Consultation on the customer satisfaction surveys conducted internally by the BP.	X				Complete.
Definition of peak demand period for savings calculation.		X			Complete.
Advice and parameter estimation for societal and net CCE calculation.					Analysis complete. Results included in this report.
Agricultural program high-speed fan study.	X		X		Complete. Results reported in this document.
Report on recent customer experience.	X				Complete. Results reported in this document.
Analysis of component questions for determination of attribution.	X	X			Complete. Results reported in this document.
Development of NTG method selection framework with the broader evaluation team.		X			Complete.
FY06 lighting and motors market effects contract metrics assessment.	X	X	X	X	Draft report complete.

The Business Programs Evaluation team conducted the following key activities:

1. Determination of verified gross and net savings associated with tracked energy impacts through the current period (impact analysis).
2. Review and acceptance of deemed savings formulas proposed by the Programs (impact analysis).
3. Estimation of attribution factors by end use and by customer categories (impact analysis).
4. Estimation of participant end-user spillover effects from the first four years of the program (impact and market effects analysis).
5. Illustrative calculation of a premium efficiency motors market growth index (program metrics and goals).
6. Review of measures supported by the program in relation to attribution issues (process evaluation).
7. Review of program delivery processes in relation to attribution issues (process evaluation).
8. Behind-the-scenes look at the component questions determining attribution adjustment factors.
9. Report on recent customer experience.
10. Agricultural program high-speed fan study.

The first four activities address determination of savings from the programs and the factors contributing to those savings. The first three address tracked savings—that is, savings from measures tracked by the programs. The first element, gross and net savings determination, is the primary evaluation function of verified impact analysis. The second, development of agreed deemed savings formulas, is used in future impact analysis. The third, analysis of attribution factors, explores factors contributing to the difference between net and gross tracked savings. This analysis of factors affecting impact results also can be viewed as process evaluation.

The fourth task, estimation of spillover effects, provides estimates of a portion of untracked savings. This portion is the savings associated with additional measures implemented by participating customers as a result of the initial Focus effort, but without further Focus assistance. This quantification of untracked savings is part of the impact analysis. The further exploration of the associated changes in customer behavior is market effects analysis.

The fifth task produces an illustrative index of market effects, but does not explicitly calculate associated market effects savings.

The next three tasks, six, seven, and eight, provide further information on factors affecting program attribution and resulting suggestions on how to improve attribution. These tasks include the measure review in relation to attribution factors, the program delivery review, and the analysis of attribution component questions. This work addresses program design details and can be viewed as part of both impact and process evaluation.

The ninth task, the analysis of recent customer experience based on responses to the most recent impact evaluation surveys, is primarily focused on process issues.

The tenth task, the study of agricultural high-speed ventilation fans is an assessment of market effects. (The assessment of lighting and motors market effects contract metrics also addresses market effects, but is not yet complete in final form and is not included in this report.)

Each of these tasks or activities has produced findings and results described below. In addition, the BP evaluators have provided explicit input and advice on several issues. The outcome of these consultations is or will be reflected in other work products. These areas include:

- Consultation and coordination with the evaluation of the Wisconsin Public Service program.
- Consultation and coordination with the evaluation of the We Energies program.
- Review of the new BP program tracking system (WATTS).
- Consultation on the customer satisfaction surveys being conducted internally by the Business Programs.
- Definition of peak demand period for savings calculation.
- Advice and parameter inputs for calculation of societal and net cost of conserved energy (CCE) indices.

The findings from these activities are discussed below.

3.2 PROCESS EVALUATION

3.2.1 Overview

In the past two years, process evaluation has been given low priority in the evaluation effort. Given limited budget, the emphasis has been on development of reliable estimates of program accomplishments through impact evaluation.

This fiscal year has seen increasing attention being given to net savings and associated concerns over attribution factors that have been generally on the low side. As a result, there is now substantial interest in understanding the factors that contribute to improving attribution and net savings performance. In response to this concern, the FY06 BP evaluation plan was modified to include the following tasks:

- Estimation of most recent attribution factors by end use and by customer characteristics (completed in FY05).
- Review of measures supported by the programs.
- Review of program delivery processes.

An additional change to the evaluation plan was to add analysis of recent customer experience. This analysis is based on responses to process-related questions from the most recent impact evaluation survey of customers who implemented measures through Focus.

Results of the attribution factor analysis are discussed in the energy impact section. Findings from the measure review, delivery process review, and customer experience analysis follow.

3.2.2 Measure Review

The BP evaluation team conducted a preliminary review of the energy efficiency measures currently rebated by the Focus on Energy Business Programs in relation to factors affecting attribution (or free ridership). The goal of this review was to identify measures promoted by the programs that already have substantial adoption in the market or for which Business Programs support is unlikely to make large differences in customer decisions. In other words, this review was intended to identify changes to rebated measures likely to improve program attribution rates.

This work was based on a high-level assessment of basic Focus BP incentives without a detailed examination of the program rationale and delivery processes. Subsequent tasks reviewed program delivery issues and related factors affecting attribution. The results of these later tasks substantially reinforced the findings from the measure review.

A. GENERAL APPROACHES TO INCENTIVE DESIGN

Previous evaluation reports have indicated general approaches to designing incentives that can result in more effective programs and/or lower free-ridership rates. The current Business Programs designs have taken a variety of steps in these directions.

In the course of the present review and comparisons with other programs, we made the following general observations:

- Focus on Energy incentive levels tend to be lower than those offered through other programs. Low incentive levels tend to result in high free ridership (lower attribution) because the incentive is not enough to get customers to adopt the efficient product if they were not already inclined to. In general, increasing the incentive levels should result in higher attribution rates as the financial barrier is overcome for more consumers.

- Focus on Energy prescriptive incentives, in general, are tied to a specific technology and efficiency level, but do not differentiate between new and existing buildings. In many cases, the program does not have specific requirements regarding the equipment to be replaced, such as operating hours. Many of the other programs examined offer different incentives according to the situation in which the measure will be applied. Such context- or application-based distinctions can help limit rebates to situations where gross savings will be higher and/or where natural adoption (free ridership) is likely to be lower.

- Focus on Energy has a flat incentive structure for many technologies for which other programs use a tiered approach. A tiered approach can reduce free ridership by pushing participants to higher levels.

Based on these observations, we suggest considering the following types of changes:

- Distinguishing new, natural replacement, and retrofit contexts.
- Limiting incentives to "first timers" (i.e., no replacement or expansion of existing systems).
- Adding other distinctions or restrictions where relevant, such as size of business or operating hours.
- Increasing incentive levels where these are low compared to the market and other programs.
- Eliminating the incentive in a few cases.

Making such changes would have some down-sides. More distinctions or restrictions add to program complexity making it less attractive to both suppliers and customers, as well as more complicated to administer. Increasing incentive levels is challenging given limited program funds. Thus, these changes would need to be considered in an overall context of offering fewer types of incentives and potentially offering a smaller number of larger incentives for greater savings. Such changes would be consistent with the general direction the programs have taken toward greater concentration on specific technologies.

B. SUGGESTIONS BY MEASURE

The measures reviewed and our suggestions for each are summarized in the table below.

Table 3–2. Preliminary Suggestions by Measure

Measure	Focus Incentive Levels	Preliminary Suggestions		
		Continue Incentives?	Subgroup	Changes to Consider
Lighting				
CFLs	Low–Medium	Yes		Tiered by wattage
T8s	Low	Limited applications	Standard T8	Limit to hard-to-reach markets and/or high savings applications, if any
		Yes	High-performance T8	Higher incentive than current T8
				Adopt CEE definition of high-performance T8
		Not for Standard T8	New construction	Lower incentive than for existing
			T5	Higher incentive than high-performance T8
LEDs	Low	No	New construction	Eliminate incentive now
		No	Replacement lights	Eliminate incentive now
	Low–Medium	Yes, but not for long	Retrofit kits	Require incandescent replacement or minimum wattage reduction
				Phase out in 1–2 years
HVAC				
Boilers	Low–Medium	Yes	=300 Mbu	Increase incentive levels
				Increase number of tiers
				Tie incentives to system optimization and controls
Motors				
Motors	Low–Medium	Yes	ODP, TEFC	Higher incentive for TEFC versus ODP
				Constant $/hp for >5 hp
				Prescriptive bounties for downsizing and replacement instead of rewind
	Medium	Yes	VFDs	Incentives tied to operating hours
Heat Recovery (Ag)	Medium	No	New construction	Eliminate incentive now
		No	Large farms	Eliminate incentive
		No	Replacement or expansion	Eliminate incentive
		Yes	Retrofit	Consider phasing out
Compressed Air	Unknown	Yes	Studies	Higher maximum incentive for feasibility studies
		Yes	Equipment	Eliminate equipment-specific compressed air incentives

3.2.3 Delivery Review

A. MEASURES, INCENTIVES, AND NON-INCENTIVE PROCESSES

The Measure Review examined the specific measures currently supported by the Business Programs and suggested changes to the prescriptive or formula-based incentive structures. These changes are designed to help target rebates to situations where the measures have value, but end users are unlikely to adopt the measures on their own. The review of program delivery processes examined how the programs interact with end users and Trade Allies

apart from the incentives themselves. The goal of this examination was to identify ways for Business Programs to be involved most effectively in end-user decision making.

The types of measures supported by Business Programs, the related incentive structures, and the non-incentive aspects of program delivery are all closely related. If the programs are supporting measures that do not need support in the targeted markets or segments, no delivery process can make that program support effective. However, the delivery process can direct program effort toward areas where it can have the greatest value or influence. Thus, measure screening, rebate structures, and delivery processes can be mutually reinforcing. The recommendations on delivery processes therefore address all these aspects of program processes.

B. PROGRAM CONSTRAINTS

Business Programs staff members understand the basic factors that can lead to low program attribution. Most of the explanations and recommendations they offered are consistent with the (separately developed) findings from the Measure Review. At the same time, the Business Programs operate under a variety of constraints and pressures:

- The program mandate to serve all regions and sectors is often felt as a need to provide something to all end users.
- Energy Advisors who have close relationships with end users want to give those end users "good service."
- Programs need (and have) clear, fair rules as a matter of public policy and as a practical matter. There is no basis for denying an incentive to an end user who satisfies clear-cut rules, even if program staff is certain the end user would implement the project without program assistance. Even when the rules allow program discretion, turning down an applicant based on the suspicion of not needing program support can lead to dissatisfaction and challenges to the program.
- Even if the program rules allow Energy Advisors discretion on incentive awards, as has been true for custom measures, the Energy Advisors still feel uncomfortable denying an award without clear justification. From the end-user's perspective, denying an award to someone who wanted to do the right thing makes little sense.
- For many end-user segments, vendors are likely to be the primary introduction to energy-efficiency opportunities and Business Programs. The programs therefore need to work effectively with Trade Allies.
- Up to now, the program contract metrics have been based on gross savings, not net.

Any changes to program processes to improve attribution must operate within these constraints unless policy changes remove some of them. At the same time, any such changes must work well with Business Program's need to deliver its services in a cost-effective manner. The programs will need to weigh the cost of the actions recommended by the delivery review report with the expected gains in program attribution and therefore net energy savings. The goal then should be to design programs that maximize net savings given program budget constraints.

C. RECOMMENDATIONS

As noted above, if the programs are supporting measures that do not need support in the targeted markets or segments, no delivery process can make that program support effective. Thus, the starting point for improving attribution is to look at what measures are supported and subject to what requirements. Where incentives are a primary vehicle for promoting adoption of these measures, the incentive levels also must be addressed. Below, we offer suggestions on program delivery improvements that could be made in combination with some of the suggestions from the Measure Review to further improve attribution.

i. Incentives

The delivery review identified some additional changes to incentives that are worth considering in a similar vein to the suggestions in the Measure Review. These changes would need to be considered in an overall context of offering fewer different kinds of incentives and potentially offering a smaller number of larger incentives for greater savings. Such changes would be consistent with the general direction the programs have taken toward greater concentration on specific technologies. Suggestions include:

- Refining custom incentive approaches along similar principles to those described for prescriptive measures.
- Re-examine “attention-getter” rebates.

ii. Working with Trade Allies

For Business Programs to use the Trade Ally relationship to promote higher levels of energy efficiency than would occur without the program, we suggest the following.

- The starting point for achieving better attribution when working with Trade Allies is promoting measures the Trade Allies are not easily selling on their own or are not even trying to promote due to lack of knowledge about the technology. Then the incentives for these measures must be set high enough to make a difference to end users.
- Train Trade Allies on higher-efficiency measures as well as on the program structures.
- Piggyback onto Trade-Ally-driven participants.

iii. Energy Advisor Training

Provide additional training for Energy Advisors—Increasing restrictions on prescriptive and custom incentives should reduce the likelihood that Energy Advisors will provide incentives for projects that have a low potential for program attribution. However, more training for Energy Advisors would also be beneficial. Such training would include:

- Qualifying leads.
- Using the program rules to say no to “bad” projects without alienating end users or Trade Allies.

- Using the program structures to help push end users to higher efficiency levels, for example, with tiered incentives or requiring some less standard measures as a condition for giving incentives for measures that are likely to have low attribution.
- Probing for additional opportunities with end users who come in from other sources.
- Helping Trade Allies to see the value of the program and use it effectively.

If the recommended improvements in prescriptive and custom incentives are adopted, then there will also be a need to familiarize the Energy Advisors with the new incentives. Such training would focus not only on the changes in rebated technologies and incentive levels, but also on the reasons for these changes.

iv. Tracking

Two types of changes to the tracking system could facilitate developing better information on program attribution and the effectiveness of particular program elements.

1. Add systematic fields to identify the types of services a participating end user has received. The Business Programs have now taken steps in this direction.
2. Add a field in WATTS for program-estimated attribution.

3.2.4 Behind-the-Scenes Look at Attribution

The data source for this behind-the-scenes look is the impact evaluation survey that covered measures installed during the first half of fiscal year 2005 (July 1 through December 31, 2004). These are measures implemented 1½ to 2 years prior to the completion of this report. More recently, the programs have been adopting more sector and technology targeting, and more comprehensive supply channel approaches. Thus, the specific findings here may not fully reflect the state of the current programs. However, the relationships uncovered should still provide useful insights into factors that can improve program effectiveness.

A. GENERAL FINDINGS

The relationship between the attribution lead-in and component questions and the final attribution values varies across the four BP sectors. These differences reflect differences in the types of customers, their decision-making structures, the relevant technologies, and their relationships with Focus.

i. Savings by Attribution Level

A common conjecture about energy efficiency programs is that measures with higher savings, which tend to be associated with larger customers, are likely to have lower attribution levels. However, for most of the BP sectors, this relationship was not found. The attribution levels are similar for large and small projects or, in some cases, are higher for larger projects.

ii. Lead-in Questions

All else being equal, we would expect to find higher attribution levels in cases where:

- The customer hadn't installed the technology before.

- The customer hadn't been considering the technology before getting involved with Focus.
- Focus was involved early in the decision to implement the technology.
- The rebate provided was a higher fraction of total cost.
- Focus provided information on the technology to the customer.

The effect of Focus is multidimensional and varies across sectors, technologies, and individual customers. Many avenues can help lead a customer to adopt efficiency measures. As a result, if we consider any one of these factors in isolation, we may or may not see a consistent relationship between the factor and the attribution level. As it turns out, the relationship between each of these factors and the attribution levels varies across the four BP sectors.

The two primary services Focus provides are financial incentives and information. Some programs show a clear relationship between agreement that Focus provided information and high attribution. Others show a clear relationship between higher rebate levels (as a fraction of total cost) and higher attribution. Most programs do not show both relationships, which suggests that different drivers dominate in different cases. Recommendations on incentive structures and levels made in the Measure Review and Delivery Review reports could improve the effectiveness of the incentives.

iii. Effect of the Program on Efficiency, Quantity, and Timing

There are three broad categories of influence the program could have on an efficiency measure:

1. The measure was very unlikely to have been implemented without the program. Attribution to the program is essentially 100 percent.
2. The program had no influence on the implementation. Attribution to the program is 0.
3. It is at least somewhat likely that something would have been installed without the program, but the program increased the efficiency level, increased the quantity of efficient units installed, and/or accelerated the timing of the efficiency measure.

In most cases, measures were found to be either 100 percent attributable to the program or to have low attribution. Only a small fraction of gross savings in any sector is associated with measures that have a medium attribution level. Thus, in most cases the assignments are clear-cut.

Across the four sectors and three fuel units, measures accounting for less than a quarter of gross savings are classified as 100 percent attributable to the program (very unlikely to have been implemented without). Conversely, across sectors and fuels, up to 60 percent of the savings is associated with measures for which the program had no effect.

For a substantial fraction of gross savings, the effect of the program was on the timing or quantity installed but not on the efficiency level. That is, the program did not affect what was installed, only how soon or how much. This finding underscores the need to find ways to get customers to go beyond what they were already interested in doing. Recommendations made in the Measure Review and Delivery Review reports offer some ways to do this.

iv. General Recommendations

The current report reinforces and builds on the main recommendations from the two earlier reports. In particular:

- The efficiency level of measures supported by the program should be sufficiently beyond the standard that the program is truly pushing the market rather than accommodating suppliers or riding the current trends.
- The financial assistance provided by the program should be sufficiently high to encourage rebated measures to be installed by those other than early adopters.
- If without the program's help a potential participant is very likely to install a measure anyway, the program's resources are better spent elsewhere. Energy Advisors should use this criterion to ensure program resources are well spent. Restricting financial assistance to measures a customer has not installed before is one approach that can help with this effort in some contexts.
- If an Energy Advisor is working with a participant that came to the program on their own or through a supplier, the Energy Advisor should look for additional energy efficiency improvement opportunities that the participant should consider implementing.

3.2.5 Recent Customer Experience

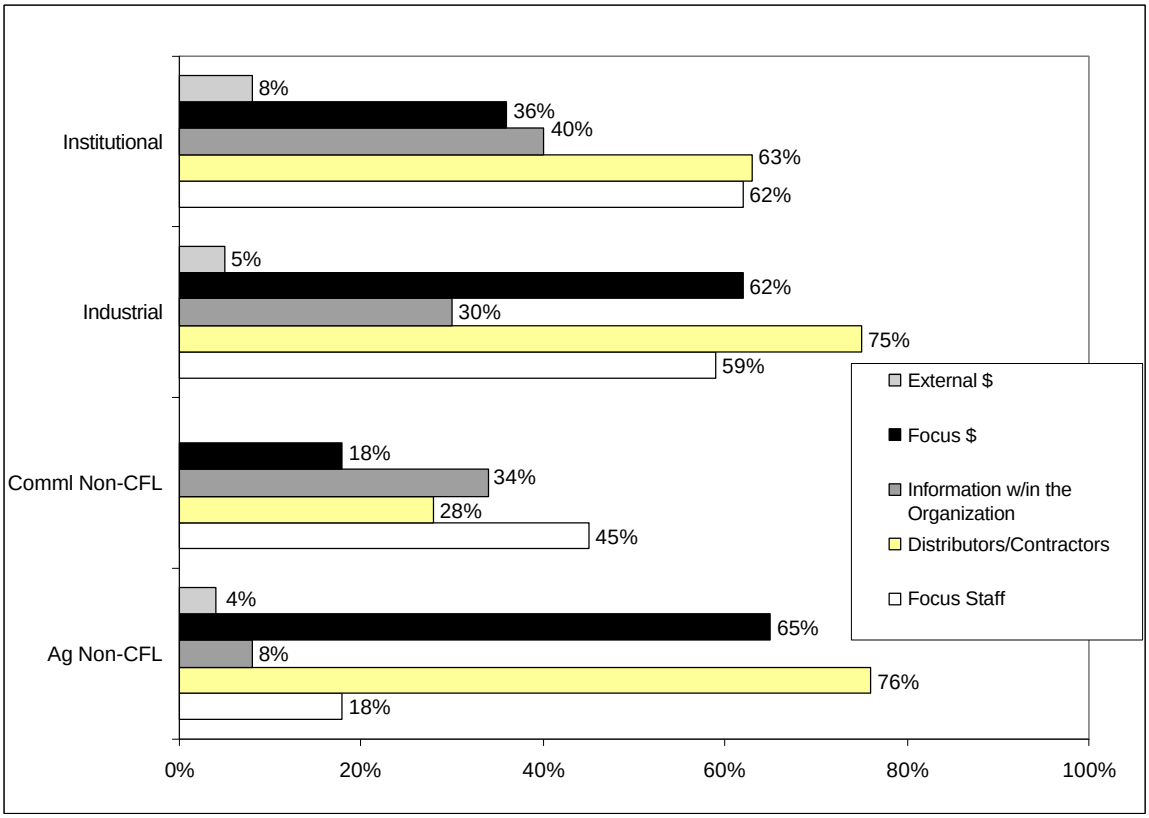
The intent of this analysis was to provide basic information that has been collected from recent BP customers on a limited set of questions. These results provide a point of comparison for customer satisfaction surveys conducted by the Business Programs under a separate contract. The findings are based on surveys of program partners (end users) who completed a project through Focus in the first half of FY05 (July through December 2004).

A. PROCESS FINDINGS

i. Influence on Energy-Efficiency Decisions

Factors influencing customer energy-efficiency decisions show distinctly different patterns across the four BP sectors (Figure 3–1). These differences reflect the different markets and the ways the programs interact with customers in each sector.

Figure 3–1. Percent of Participants Reporting High or Very High Influence



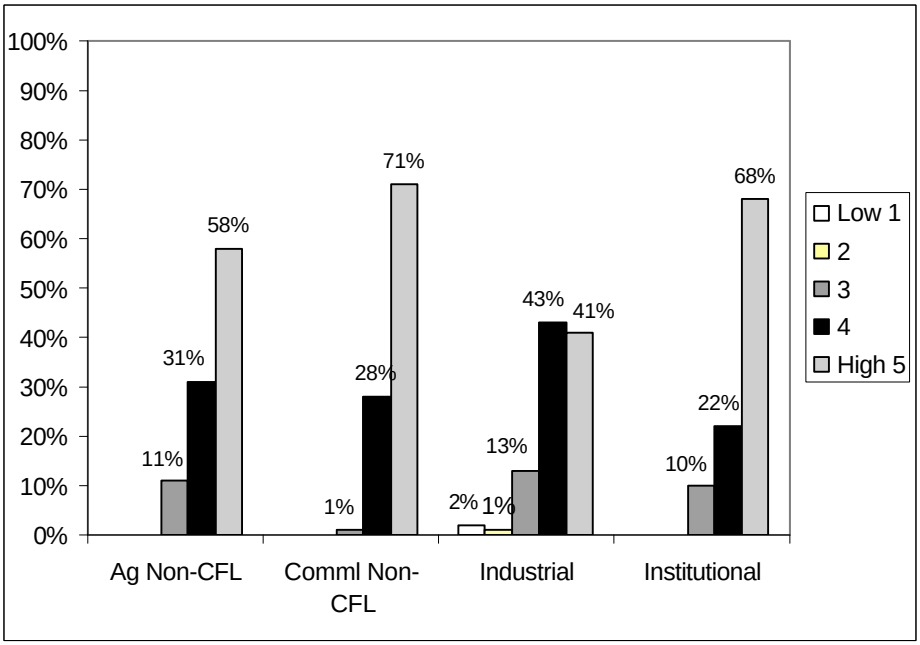
Note: Missing/blank bar indicates 0 responses reported in this category.

Broadly speaking, the levels of Focus influence reported by customers are consistent with the program attribution determined by the impact evaluation for each sector. Influence and attribution were determined from the same customer surveys at the same time, but are based on different questions.

ii. Customer Impressions of Focus

Customer impressions of Focus are generally quite favorable. The large majority rated their impressions as 4 or 5 out of 5, and only a small percentage indicated unfavorable impressions (Figure 3-2). The industrial sector had somewhat less favorable ratings than the others, which likely reflects the complexity of serving this sector.

Figure 3–2. Impressions of Focus

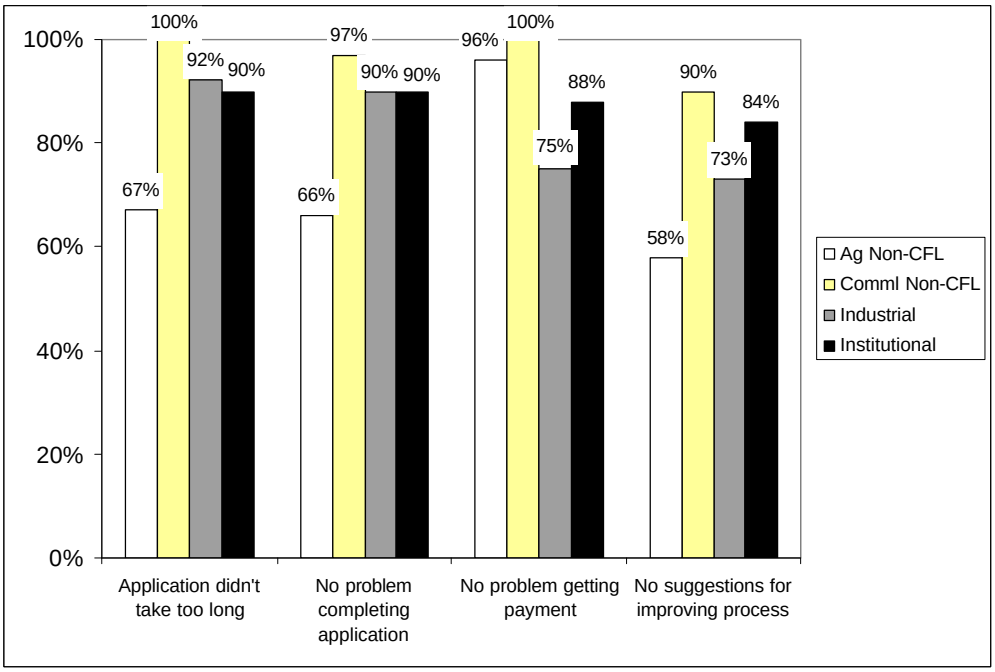


Note: Missing/blank bar indicates 0 responses reported in this category.

iii. Customer Experience with Business Programs Financial Assistance Processes

Consistent with the generally positive overall impressions, customer experience with BP financial assistance processes was generally favorable (Figure 3-3).

Figure 3–3. Experience with Financial Assistance

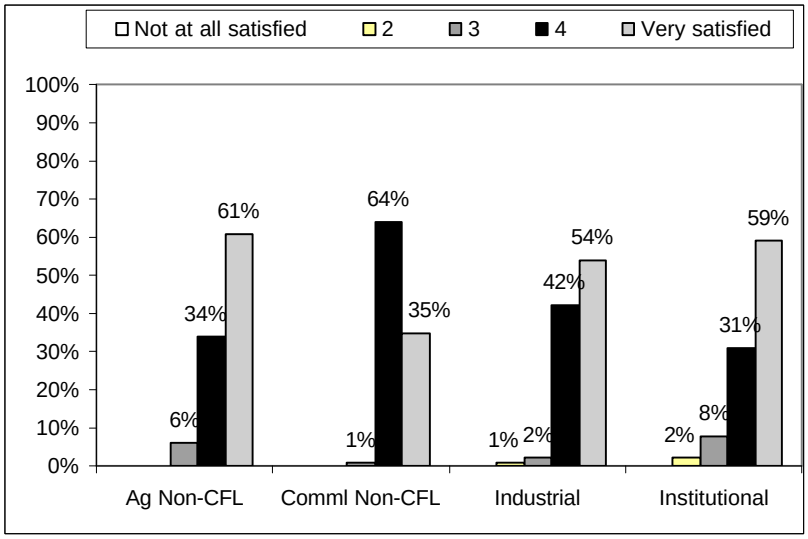


Note: These results exclude commercial and agricultural participants who received only CFLs.

iv. Customer Experience with Overall Business Program Services

Overall satisfactions levels generally mirrored the overall impression scores. Large majorities in each sector indicated they were satisfied or very satisfied, and very few indicated dissatisfaction (Figure 3-4).

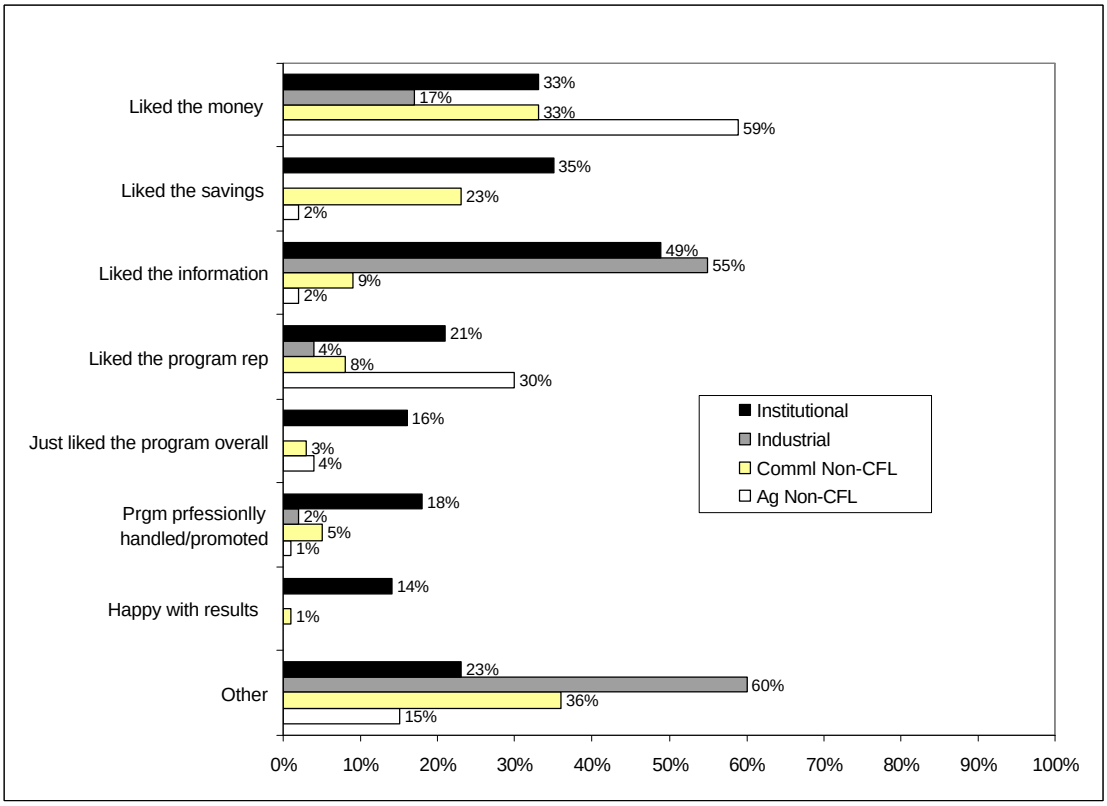
Figure 3–4. Satisfaction with Overall Program Services



Note: Missing/blank bar indicates 0 responses reported in this category.

Dominant reasons for satisfaction were they liked the money, liked the information, and liked the savings. What customers liked varied by sector. These differences reflect diversity in customer needs, market structures, and, resulting from these, how the sectors interact with customers (Figure 3-5).

Figure 3–5. Reasons for Satisfaction with Overall Program Services



Note: Missing/blank bar indicates 0 responses reported in this category.

B. MARKET FINDINGS

i. Barriers to Implementing Energy-Efficiency Projects

Reasons participants had not previously implemented the Focus measures were coded from open-ended responses. On the whole, the barriers identified through these surveys are consistent with those identified previously for each sector. These are:

- Lack of time/not a priority/hassle or transaction costs.
- Lack of capital/access to financing.
- Lack of knowledge/information or search costs.

Inability to identify measures (lack of knowledge) and financial limitations were reported by large fractions of customers in all sectors. Lack of time/not a priority manifested itself somewhat differently in the different sectors. In the agricultural and industrial sectors, and, to a lesser extent, institutional sectors, various responses indicated that nothing was being done until there was a need to deal with a piece of equipment. In the commercial sector, lack of time was identified directly by a large fraction of respondents.

ii. Lasting Effects of Participation

Customers were asked if, as a result of participating in Focus on Energy, various changes had occurred in their organizations' thinking or practices related to energy efficiency. High

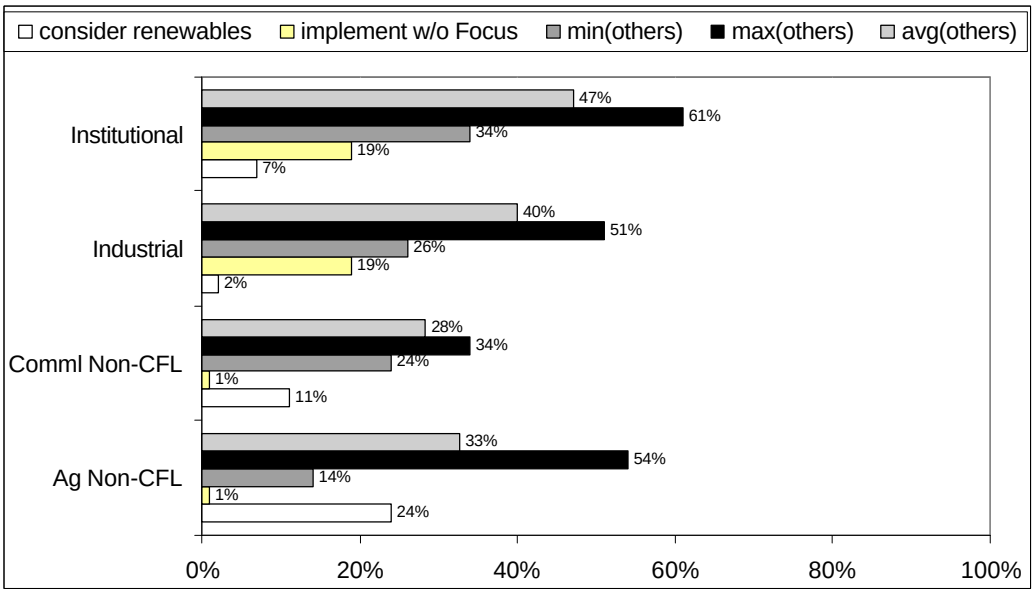
levels of agreement were reported for all these statements in all sectors, with the exception of being more likely to consider renewable energy technologies and being more likely to implement additional energy efficiency without further assistance.

The relatively low scores for considering renewables more are not surprising given that most customers' program experience did not involve renewable technologies. The small increase in the likelihood of implementing further efficiency measures without assistance is more disappointing.

Programs with long-term market transformation objectives often look to changes in thinking and practices around energy efficiency as precursors to the ultimate effect of interest: increased adoption of additional energy efficiency without direct program assistance. In the present case, however, many key precursors are indicated to be present without the ultimate effect. Participants report increased looking for and assessing energy-efficiency opportunities and more confidence in savings estimates, yet say they are no more likely than before to implement additional efficiency improvements without program support. Understanding in more detail how the program experience has changed customer behavior would require further investigation.

Figure 3-6 indicates the percent with very high agreement (5 on a 5-point scale) that they were more likely to consider renewables or more likely to implement efficiency without program assistance. Also shown in the figure are the minimum, maximum, and average levels of very high agreement across the remaining questions.

Figure 3–6. Percent Strongly Agreeing with Indicators of Lasting Effects



3.3 ENERGY IMPACTS

In this section, we provide the estimates of tracked and untracked savings for the program to date. We also present the status of the deemed savings review, which contributes to the estimation of impacts.

3.3.1 Verified Tracked Impacts

A. APPROACH

The evaluation team has implemented seven rounds of data collection and document review to estimate net energy savings for Business Programs. Each round has included a telephone survey of Wisconsin Focus on Energy (Focus) Business Programs participants who installed measures in the appropriate time frame. The most recent round included measures installed between July 1 and December 31, 2004, according to the Business Programs' tracking system in use at that time (STAR and rebates databases). The survey typically addresses measure installation and characteristics (e.g., quantities, equipment efficiencies, operating hours), program attribution, and program process issues, among other topics. Each round has also included an engineering review of program documentation on how the tracking gross savings were calculated, where the tracking gross savings are the gross savings reported in the STAR and rebates databases. Finally, each round has included on-site measurement at some participant sites to verify measure information and provide actual measured or metered data to support gross energy savings estimates. The results of the survey, engineering review, and on-site data are combined to create several adjustment factors described below.

The adjustment factors estimated from the data collection and analysis include:

- **Gross savings adjustment factor:** This factor adjusts tracking gross savings for installation and changes based on the 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 adjustment factors shown and/or applied in the eight tables that follow in this section are based on the data from the most recent round of data collection and documentation review. This round covers the first half of FY05 (July 1 through December 31, 2004).

The tables also provide indicators of the reliability of the estimates: the standard errors and sample sizes (n). Each table shows two standard error estimates for each adjustment factor. The standard error labeled "Jul04-Dec04" is the standard error of the adjustment factor when it is applied to the first half of FY05 tracking gross savings only. The standard error labeled "extrapolated" is used when the adjustment factor is applied to later periods.

B. ADJUSTMENT FACTORS

Table 3-3a shows the gross savings adjustment factors by primary segment.

Table 3–3a. Gross Savings Adjustment Factors By Primary Segment
Based on Samples from Participants Who Installed a Measure During the First Half of FY05

Segment	kWh			kW			Therms		
	Gross Savings Adjustment Factor	Standard Error[a]		Gross Savings Adjustment Factor	Standard Error[a]		Gross Savings Adjustment Factor	Standard Error[a]	
		Jul04-Dec04	Extrap-olated		Jul04-Dec04	Extrap-olated		Jul04-Dec04	Extrap-olated
Agriculture	68%	8.8%	11.3%	63%	7.7%	8.0%	102%	4.3%	7.5%
Commercial	76%	6.3%	7.3%	74%	6.6%	8.2%	91%	3.9%	5.0%
Industrial	94%	2.5%	5.2%	99%	0.4%	0.5%	105%	1.7%	6.0%
Institutional	96%	2.5%	2.8%	95%	3.2%	4.1%	94%	2.9%	4.4%
Business Programs Overall	88%	2.7%	3.6%	86%	3.1%	3.7%	100%	1.1%	3.1%

Note: The standard errors shown are conservative; they are calculated using an approximation that overstates the standard error.

For the industrial and institutional sectors, as well as for therms in the agricultural and commercial sectors, the verified gross savings was close to the tracking value, as has generally been true in past evaluations of the program. The lower adjustment factors for electric savings in the agricultural and commercial sectors are primarily due to a finding of lower hours of use for CFLs compared to the program tracking assumptions. The program is now using a deemed savings value for CFLs, which is based largely on the impact evaluation findings. Therefore, in future impact evaluations, the effect of CFLs on the gross savings adjustment factors will be through the installation rate as well as any errors in the assignment of the deemed savings value.

The attribution factors by primary segment are provided in Table 3-3b. The estimated free ridership rate is 100 percent minus the attribution factor.

Table 3–3b. Attribution Factors By Primary Segment
Based on Samples from Participants Who Installed a Measure During the First Half of FY05

Segment	kWh				kW				Therms			
	n	Attribution Adjustment Factor	Standard Error		n	Attribution Adjustment Factor	Standard Error		n	Attribution Adjustment Factor	Standard Error	
			Jul04-Dec04	Extrap-olated			Jul04-Dec04	Extrap-olated			Jul04-Dec04	Extrap-olated
Agriculture	66	58%	5.8%	7.0%	60	48%	7.5%	8.3%	10	37%	5.7%	9.4%
Commercial	65	62%	5.9%	7.0%	58	59%	6.9%	7.9%	18	30%	9.1%	10.4%
Industrial	27	43%	7.1%	15.8%	25	38%	8.4%	17.7%	12	51%	15.8%	20.9%
Institutional	23	48%	11.9%	19.5%	23	48%	9.3%	14.0%	19	56%	13.3%	20.8%
Business Programs Overall	181	49%	4.9%	10.1%	166	47%	4.6%	8.8%	59	48%	10.1%	13.3%

Table 3-3c gives the realization rates by primary segment. The realization rates simply combine the effect of all the adjustments. They are the product of the gross savings adjustment factors and the attribution factors.

Table 3-3c. Realization Rates By Primary Segment
Based on Samples from Participants Who Installed a Measure During the First Half of FY05

Segment	kWh			kW			Therms		
		Standard Error[a]			Standard Error[a]			Standard Error[a]	
	Realization Rate	Jul04-Dec04	Extrap-olated	Realization Rate	Jul04-Dec04	Extrap-olated	Realization Rate	Jul04-Dec04	Extrap-olated
Agriculture	40%	6.5%	8.1%	30%	6.0%	6.5%	37%	6.0%	9.9%
Commercial	47%	6.0%	7.0%	44%	6.4%	7.6%	27%	8.3%	9.5%
Industrial	41%	6.8%	15.1%	38%	8.4%	17.6%	53%	16.6%	22.2%
Institutional	46%	11.5%	18.8%	46%	9.0%	13.5%	53%	12.6%	19.8%
Business Programs Overall	43%	4.5%	9.1%	41%	4.2%	7.8%	48%	10.1%	13.4%

Note: The standard errors shown are conservative; they are calculated using an approximation that overstates the standard error.

C. *EVALUATED TRACKED ENERGY IMPACTS*

For FY06 (July 1, 2005, through June 30, 2006), Table 3-4a gives tracking and verified gross savings and net savings by sector or program and for Business Programs overall. These estimates are based on the savings tracked for this period with the most recent available adjustment factors. That is, the estimates of the adjustment factors by primary segment reported above are used to calculate verified gross savings and net savings for this time period. 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. Multiplying verified gross savings, in turn, by the attribution factor alone yields net savings. (Net savings may also be obtained by multiplying tracking gross savings by the realization rate.)

Table 3-4a. All Business Programs: Tracked Energy Impacts
FY06 (July 1, 2005–June 30, 2006)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
Agriculture	16,224,519	4,058	173,454	11,032,673	2,556	176,923	6,489,808	1,217	64,178
Commercial	47,543,745	10,031	1,686,469	36,133,246	7,423	1,534,687	22,345,560	4,414	455,347
Industrial	52,655,169	9,758	5,220,644	49,495,859	9,661	5,481,676	21,588,619	3,708	2,766,941
Schools & Government	15,578,960	4,558	2,639,091	14,955,801	4,330	2,480,746	7,166,321	2,097	1,398,718
Total	**132,002,393**	**28,405**	**9,719,657**	**111,617,580**	**23,970**	**9,674,031**	**57,590,309**	**11,436**	**4,685,184**

Table 3-4b summarizes tracking and verified gross savings and net savings for Business Programs overall for the program-to-date (July 1, 2001, through June 30, 2006).

Table 3-4b. All Business Programs: Tracked Energy Impacts
Program to Date (July 1, 2001–June 30, 2006)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
Agriculture	55,584,121	13,342	589,780	40,149,817	9,702	590,846	22,873,870	5,099	286,052
Commercial	182,508,666	40,686	4,906,154	151,021,413	33,231	4,669,552	84,060,646	19,375	2,270,053
Industrial	280,248,963	43,742	21,936,304	259,986,424	39,035	22,046,529	124,492,781	17,732	14,839,040
Industry of the Future	15,691,186	1,638	1,232,175	14,261,719	1,628	1,235,995	9,899,569	1,033	833,074
MM Renewables	0	0	1,686,050	0	0	1,009,155	0	0	887,143
New Buildings	143,000	113	18,049	143,000	113	18,049	143,000	46	0
Schools & Government	70,578,465	17,372	9,320,492	69,109,890	15,585	8,075,116	40,950,696	8,491	4,184,624
Total	**604,754,401**	**116,893**	**39,689,003**	**534,672,264**	**99,295**	**37,645,242**	**282,420,563**	**51,776**	**23,299,987**

Table 3-4c gives the same results for FY05. These estimates are based on the savings tracked for FY05, with the same adjustment factors as are used for the most recent period in Table 3-4a.

Table 3-4c. All Business Programs: Tracked Energy Impacts
FY05 (July 1, 2004–June 30, 2005)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
Agriculture	15,305,374	3,661	260,696	10,407,654	2,306	265,910	6,122,150	1,098	96,458
Commercial	44,218,407	9,807	1,018,762	33,605,989	7,257	927,073	20,782,651	4,315	275,066
Industrial	68,609,333	9,899	4,156,407	64,492,773	9,800	4,364,227	28,129,827	3,762	2,202,896
Schools & Government	16,672,117	4,072	1,848,561	16,005,232	3,868	1,737,647	7,669,174	1,873	979,737
Total	**144,805,231**	**27,438**	**7,284,426**	**124,511,649**	**23,231**	**7,294,858**	**62,703,801**	**11,048**	**3,554,156**

Table 3-4d. All Business Programs: Tracked Energy Impacts
FY04 (July 1, 2003–June 30, 2004)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
Agriculture	15,993,401	3,541	93,405	11,035,447	2,868	87,801	5,917,558	1,558	73,790
Commercial	42,261,364	9,346	593,651	37,190,000	9,439	593,651	19,440,227	5,420	516,476
Industrial	81,359,302	11,917	9,700,577	72,409,779	7,627	10,088,600	41,493,244	4,171	8,730,519
Schools & Government	18,524,713	3,952	2,652,086	18,709,960	3,518	1,909,502	13,893,535	2,016	1,273,001
Total	**158,138,780**	**28,756**	**13,039,719**	**139,345,186**	**23,452**	**12,679,554**	**80,744,565**	**13,165**	**10,593,787**

Tables 3-4d through 3-4f provide tracking and verified gross savings and net savings by program and for Business Programs overall for FY04 (July 1, 2003, through June 30, 2004), FY03, and FY02 (July 1, 2001, 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.

Table 3-4e. All Business Programs: Tracked Energy Impacts
FY03 (July 1, 2002–June 30, 2003)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
Agriculture	7,129,148	1,805	60,906	6,716,370	1,721	58,896	3,905,347	1,134	51,161
Commercial	40,224,819	9,535	1,200,268	36,403,461	7,870	1,205,549	17,662,718	4,634	878,596
Industrial	59,313,579	8,356	1,836,381	56,964,761	7,743	1,759,437	21,477,447	2,974	915,620
Industry of the Future	15,691,186	1,638	1,232,175	14,261,719	1,628	1,235,995	9,899,569	1,033	833,074
MM Renewables	0	0	701,849	0	0	678,267	0	0	677,705
Schools & Government	14,297,817	2,656	1,502,405	14,314,974	2,521	1,266,227	9,669,614	1,864	292,218
Total	**136,656,549**	**23,990**	**6,533,984**	**128,661,286**	**21,483**	**6,204,370**	**62,614,695**	**11,639**	**3,648,373**

Table 3-4f. All Business Programs: Tracked Energy Impacts
FY02 (July 1, 2001–June 30, 2002)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
Agriculture	931,679	278	1,319	957,673	250	1,316	439,007	91	466
Commercial	8,260,331	1,967	407,004	7,688,716	1,243	408,591	3,829,489	592	144,568
Industrial	18,311,580	3,811	1,022,295	16,623,252	4,204	352,590	11,803,644	3,117	223,065
MM Renewables	0	0	984,201	0	0	330,888	0	0	209,438
New Buildings	143,000	113	18,049	143,000	113	18,049	143,000	46	0
Schools & Government	5,504,858	2,135	678,349	5,123,922	1,349	680,995	2,552,052	642	240,950
Total	**33,151,448**	**8,304**	**3,111,217**	**30,536,563**	**7,159**	**1,792,429**	**18,767,193**	**4,488**	**818,486**

3.3.2 Verified Tracked Energy Impacts by Technology/End-use Categories and Business Programs Sector (Verified Gross for Program-to-Date and for FY05)

The following tables present the verified gross energy impacts for Business Programs by sector (agricultural, commercial, industrial, and schools/government). For each sector, energy impacts are presented for July 1, 2005, through June 30, 2006 (FY06), and for July 2001 through June 30, 2006 (program to date). 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 text summary for each sector includes observations based on the Business Programs tracking data (upon which the tables are based) and captures highlights of the empirical results presented in the tables without additional analysis or interpretation.

Agricultural

The measure category-specific electric energy impacts for the agricultural sector indicate a trend toward greater diversification of savings across measures. While the program to date still shows that about 46 percent of kWh savings have come from lighting measures (Table 3-5b), this share of end use-specific impacts has decreased to about 39 percent in FY06 (Table 3-5a). Gaining the most over time in relative share of kWh savings has been HVAC, with small relative gains by pumps and water heating.

Agricultural therm savings have been dominated program to date by dryers, heat recovery, and miscellaneous. Relative shares of measure category-specific therm savings in FY06 indicate even greater concentration in these three measure categories (Table 3-5a).

Table 3-5a. Agricultural
FY06 (July 1, 2005–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Boiler	235,848	2.1%	45	1.8%	7,046	4.0%
CFL	3,921,192	35.5%	931	36.4%	0	0.0%
Commercial Washer	8,140	0.1%	0	0.0%	0	0.0%
Compressor	113,744	1.0%	39	1.5%	0	0.0%

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Dryer	39,365	0.4%	0	0.0%	98,807	55.8%
ES Equipment	18,923	0.2%	0	0.0%	1,626	0.9%
Furnace	2,406	0.0%	0	0.0%	1,654	0.9%
Heat Exchanger	475,300	4.3%	141	5.5%	0	0.0%
Heat Recovery	536,557	4.9%	182	7.1%	39,660	22.4%
HVAC	1,315	0.0%	1	0.1%	1,196	0.7%
HVLS Fans	590,216	5.3%	184	7.2%	0	0.0%
Insulation/Sealing	0	0.0%	0	0.0%	381	0.2%
Lighting - Other	365,437	3.3%	66	2.6%	0	0.0%
Miscellaneous	569,546	5.2%	121	4.7%	65,582	37.1%
Motors & Drives	617,472	5.6%	45	1.8%	0	0.0%
Process	312,763	2.8%	53	2.1%	4,494	2.5%
Pump	1,330,436	12.1%	301	11.8%	0	0.0%
Refrigeration	90	0.0%	0	0.0%	0	0.0%
Steam Trap	0	0.0%	0	0.0%	12,240	6.9%
T8/T5 Fluorescent Lighting	326,293	3.0%	62	2.4%	0	0.0%
Ventilation	536,794	4.9%	174	6.8%	0	0.0%
Water Heating	1,030,838	9.3%	211	8.2%	-55,764	-31.5%
Total	**11,032,673**	**100.0%**	**2,556**	**100.0%**	**176,923**	**100.0%**

Table 3-5b. Agricultural
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Aeration System	6,854	0.0%	0	0.0%	0	0.0%
Air Conditioning	222	0.0%	1	0.0%	0	0.0%
Boiler	609,725	1.5%	118	1.2%	75,077	12.7%
CFL	17,629,661	43.9%	4,739	48.8%	0	0.0%
Commercial Washer	21,706	0.1%	0	0.0%	383	0.1%
Compressed Air	49,131	0.1%	4	0.0%	0	0.0%
Compressor	543,339	1.4%	77	0.8%	0	0.0%
Controls	34,315	0.1%	25	0.3%	0	0.0%
Dryer	184,666	0.5%	80	0.8%	270,643	45.8%
ES Equipment	76,167	0.2%	0	0.0%	5,448	0.9%
Furnace	2,406	0.0%	0	0.0%	2,233	0.4%
Heat Exchanger	2,337,887	5.8%	464	4.8%	2,795	0.5%
Heat Recovery	1,680,092	4.2%	465	4.8%	196,461	33.3%
HVAC	49,939	0.1%	6	0.1%	1,196	0.2%
HVLS Fans	2,529,199	6.3%	882	9.1%	0	0.0%
Insulation/Sealing	815	0.0%	0	0.0%	381	0.1%
Lighting - Other	811,267	2.0%	142	1.5%	0	0.0%
Miscellaneous	1,080,206	2.7%	366	3.8%	137,977	23.4%
Motors & Drives	1,549,911	3.9%	126	1.3%	0	0.0%
Process	364,038	0.9%	57	0.6%	23,211	3.9%
Pump	4,483,767	11.2%	833	8.6%	0	0.0%
Refrigeration	451	0.0%	0	0.0%	0	0.0%

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Steam Trap	0	0.0%	0	0.0%	98,105	16.6%
T8/T5 Fluorescent Lighting	976,229	2.4%	179	1.8%	0	0.0%
Ventilation	757,022	1.9%	247	2.5%	0	0.0%
Water Heating	4,370,802	10.9%	890	9.2%	-223,064	-37.8%
Total	**40,149,817**	**100.0%**	**9,702**	**100.0%**	**590,846**	**100.0%**

Commercial

From the program to date perspective, the electric savings from this sector have again been dominated by "lighting – other" measures (representing over 59% of evaluated gross kWh impacts and over 69% of kW, as shown in Table 3-6b). These are attributable to CFLs, with even a greater dominance of lighting revealed when T8/T5 fluorescent are added to the total impacts for this end use. In FY06, two other measure categories gained in relative share of electric verified gross impacts: controls and HVAC (Table 3-6a), but lighting measures still accounted for a significant majority of commercial electric impacts.

For commercial therm savings, HVAC, miscellaneous, and water heater measure categories accounted for over three-fourths of savings in FY06 (Table 3-6a). This represents a greater concentration of savings in these measures compared to program to date, where less than two-thirds of savings were attributable to these categories (Table 3-6b).

Table 3-6a. Commercial
FY06 (July 1, 2005–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Boiler	652	0.0%	0	0.0%	248,849	16.2%
CFL	14,802,105	41.0%	4,095	55.2%	0	0.0%
CFL-DI	90,143	0.2%	25	0.3%	0	0.0%
Chiller	1,105,668	3.1%	364	4.9%	0	0.0%
Commercial Washer	1,021	0.0%	0	0.0%	2,730	0.2%
Compact Fluorescent Lighting	1,155	0.0%	0	0.0%	0	0.0%
Compressed Air	4,432	0.0%	2	0.0%	0	0.0%
Controls	6,286,042	17.4%	279	3.8%	70,833	4.6%
ES Equipment	25,032	0.1%	2	0.0%	1,809	0.1%
Feasibility Study	0	0.0%	0	0.0%	0	0.0%
Furnace	116,734	0.3%	11	0.2%	36,421	2.4%
Geothermal	9,335	0.0%	33	0.4%	6,122	0.4%
Heat Recovery	-55,611	-0.2%	13	0.2%	47,701	3.1%
HVAC	1,545,118	4.3%	842	11.3%	182,977	11.9%
Insulation/Sealing	4,727	0.0%	0	0.0%	24,408	1.6%
LED Lighting	188,545	0.5%	21	0.3%	0	0.0%
Lighting - Other	1,946,416	5.4%	391	5.3%	0	0.0%
Miscellaneous	2,063,746	5.7%	137	1.8%	340,361	22.2%
Motors & Drives	1,206,038	3.3%	150	2.0%	0	0.0%
Payment	0	0.0%	0	0.0%	0	0.0%
Pool Cover	0	0.0%	0	0.0%	976	0.1%
Pump	1,965,453	5.4%	0	0.0%	0	0.0%

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Refrigeration	59,940	0.2%	5	0.1%	1,937	0.1%
Rooftop Unit Upgrade	2,608	0.0%	1	0.0%	0	0.0%
Steam Trap	0	0.0%	0	0.0%	228,960	14.9%
T8/T5 Fluorescent Lighting	3,947,608	10.9%	886	11.9%	0	0.0%
VAV System	262,741	0.7%	0	0.0%	5,278	0.3%
Water Heating	553,597	1.5%	168	2.3%	335,325	21.8%
Total	**36,133,246**	**100.0%**	**7,423**	**100.0%**	**1,534,687**	**100.0%**

Table 3-6b. Commercial
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Aeration System	0	0.0%	0	0.0%	2,837	0.1%
Air Conditioning	3,198	0.0%	9	0.0%	0	0.0%
Boiler	19,477	0.0%	5	0.0%	683,255	14.6%
CFL	79,343,190	52.5%	21,284	64.0%	0	0.0%
CFL-DI	184,296	0.1%	45	0.1%	0	0.0%
Chiller	2,631,544	1.7%	772	2.3%	0	0.0%
Commercial Washer	1,201,590	0.8%	608	1.8%	100,206	2.1%
Compact Fluorescent Lighting	20,975	0.0%	10	0.0%	0	0.0%
Compressed Air	226,088	0.1%	13	0.0%	0	0.0%
Controls	15,827,286	10.5%	753	2.3%	573,666	12.3%
ES Equipment	82,968	0.1%	6	0.0%	4,962	0.1%
Feasibility Study	889,863	0.6%	28	0.1%	0	0.0%
Furnace	165,986	0.1%	11	0.0%	113,800	2.4%
Geothermal	-4,000	0.0%	33	0.1%	8,336	0.2%
Heat Recovery	-70,707	0.0%	85	0.3%	349,278	7.5%
HVAC	7,094,963	4.7%	2,158	6.5%	415,503	8.9%
Insulation/Sealing	709,122	0.5%	49	0.1%	185,826	4.0%
LED Lighting	1,070,892	0.7%	132	0.4%	0	0.0%
Lighting - Other	9,997,329	6.6%	1,740	5.2%	3	0.0%
Miscellaneous	4,544,425	3.0%	576	1.7%	805,605	17.3%
Motors & Drives	2,213,744	1.5%	205	0.6%	127,833	2.7%
Payment	0	0.0%	0	0.0%	0	0.0%
Pool Cover	18,867	0.0%	0	0.0%	6,651	0.1%
Pump	3,042,945	2.0%	3	0.0%	14,700	0.3%
Refrigeration	541,837	0.4%	59	0.2%	13,555	0.3%
Renewable	0	0.0%	0	0.0%	3,158	0.1%
Rooftop Unit Upgrade	243,530	0.2%	87	0.3%	7,441	0.2%
Steam Trap	0	0.0%	0	0.0%	432,618	9.3%
T8/T5 Fluorescent Lighting	17,905,573	11.9%	3,797	11.4%	0	0.0%
VAV System	606,007	0.4%	6	0.0%	34,493	0.7%
Ventilation System Upgrade	822,102	0.5%	125	0.4%	45,580	1.0%
Water Heating	1,688,324	1.1%	633	1.9%	740,248	15.9%
Total	**151,021,413**	**100.0%**	**33,231**	**100.0%**	**4,669,552**	**100.0%**

Industrial

For industrial sector verified gross electric impacts, two lighting measure categories (T8/T5 and other) combined to generate well over one-half of impacts in FY06 (Table 3-7a). This relative share for the lighting end use increased somewhat in FY06 compared to the approximate share of about 46 percent program to date (Table 3-7b).

Industrial sector therm savings program to date were mostly attributable to HVAC (28.4%), miscellaneous (16.4%), and biomass – thermal (9.6%), as shown in Table 3-7b. Table 3-7a indicates that in FY06 the relative therm savings shares were concentrated even more in HVAC (33.3%) and miscellaneous (20.5%), but with gains in shares for heat recovery (19.6%) and process (13.3%).

Table 3-7a. Industrial
FY06 (July 1, 2005–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Aeration System	1,013,530	2.0%	122	1.3%	0	0.0%
Boiler	0	0.0%	0	0.0%	1,281,681	23.4%
CFL	132,262	0.3%	21	0.2%	0	0.0%
Chiller	643,999	1.3%	130	1.3%	0	0.0%
Compressed Air	5,628,440	11.4%	699	7.2%	2,810	0.1%
Compressor	3,096,744	6.3%	440	4.6%	20,534	0.4%
Controls	447,897	0.9%	38	0.4%	145,227	2.6%
Feasibility Study	247,059	0.5%	53	0.6%	0	0.0%
Furnace	4,465	0.0%	0	0.0%	1,294	0.0%
Heat Recovery	621,493	1.3%	97	1.0%	1,076,306	19.6%
HVAC	1,432,136	2.9%	120	1.2%	830,040	15.1%
Insulation/Sealing	0	0.0%	0	0.0%	10,659	0.2%
LED Lighting	162,150	0.3%	19	0.2%	0	0.0%
Lighting - Other	3,384,436	6.8%	696	7.2%	0	0.0%
Miscellaneous	716,275	1.4%	106	1.1%	1,138,789	20.8%
Motors & Drives	2,011,167	4.1%	268	2.8%	11,471	0.2%
Payment	0	0.0%	0	0.0%	0	0.0%
Process	2,838,987	5.7%	477	4.9%	728,329	13.3%
Pump	2,303,900	4.7%	428	4.4%	0	0.0%
Refrigeration	1,568,947	3.2%	337	3.5%	49,203	0.9%
Rooftop Unit Upgrade	25,646	0.1%	28	0.3%	978	0.0%
Steam Trap	0	0.0%	0	0.0%	162,726	3.0%
T8/T5 Fluorescent Lighting	23,194,354	46.9%	5,585	57.8%	0	0.0%
Ventilation	21,973	0.0%	-6	-0.1%	17,306	0.3%
Water Heating	0	0.0%	0	0.0%	4,325	0.1%
Total	**49,495,859**	**100.0%**	**9,661**	**100.0%**	**5,481,676**	**100.0%**

Table 3-7b. Industrial
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Aeration System	14,961,589	5.8%	1,969	5.0%	0	0.0%
Biogas - Thermal	0	0.0%	0	0.0%	376,603	1.7%
Biomass - Thermal	0	0.0%	0	0.0%	2,114,582	9.6%
Boiler	2,093,426	0.8%	216	0.6%	4,132,674	18.7%
CFL	202,365	0.1%	33	0.1%	0	0.0%
Chiller	6,519,681	2.5%	886	2.3%	22,375	0.1%
Compact Fluorescent Lighting	14,183	0.0%	3	0.0%	0	0.0%
Compressed Air	35,466,483	13.6%	4,200	10.8%	164,987	0.7%
Compressor	20,635,209	7.9%	2,704	6.9%	216,562	1.0%
Controls	2,605,901	1.0%	359	0.9%	405,946	1.8%
Diffusers	610,344	0.2%	33	0.1%	0	0.0%
Disconnect	1,341,995	0.5%	160	0.4%	0	0.0%
Dryer	989,846	0.4%	23	0.1%	928,780	4.2%
Feasibility Study	4,081,927	1.6%	1,445	3.7%	1,380	0.0%
Furnace	40,457	0.0%	3	0.0%	2,264	0.0%
Heat Recovery	1,695,826	0.7%	241	0.6%	1,744,710	7.9%
HVAC	6,462,656	2.5%	700	1.8%	2,438,632	11.1%
Insulation/Sealing	91,932	0.0%	8	0.0%	278,829	1.3%
IR Emitter Reduction	0	0.0%	0	0.0%	287,919	1.3%
Kiln	949,529	0.4%	38	0.1%	522,985	2.4%
LED Lighting	293,949	0.1%	36	0.1%	1,016,543	4.6%
Lighting - Other	27,397,041	10.5%	3,872	9.9%	158	0.0%
Miscellaneous	13,576,726	5.2%	1,834	4.7%	3,710,485	16.8%
Motors & Drives	5,267,471	2.0%	535	1.4%	32,548	0.1%
Payment	0	0.0%	0	0.0%	0	0.0%
Process	4,081,311	1.6%	702	1.8%	1,932,384	8.8%
Pulping	0	0.0%	0	0.0%	0	0.0%
Pump	10,299,248	4.0%	1,946	5.0%	40,322	0.2%
Refrigeration	7,289,936	2.8%	1,503	3.9%	57,615	0.3%
Renewable	0	0.0%	0	0.0%	37,877	0.2%
Rooftop Unit Upgrade	358,074	0.1%	188	0.5%	4,433	0.0%
Steam Trap	0	0.0%	0	0.0%	1,318,360	6.0%
T8/T5 Fluorescent Lighting	90,847,225	34.9%	15,119	38.7%	0	0.0%
Turn Off	39,876	0.0%	1	0.0%	0	0.0%
Ventilation	124,726	0.0%	48	0.1%	59,231	0.3%
Water Heating	1,647,491	0.6%	228	0.6%	197,347	0.9%
Total	**259,986,424**	**100.0%**	**39,035**	**100.0%**	**22,046,529**	**100.0%**

Schools/Government

Program to date electric impacts for the schools/government sector are, like other sectors, primarily attributable to lighting measure categories, with Table 3-8b showing over 56 percent of kWh savings from T8/T5 fluorescent, other, and LED lighting. This end use also claims just

under two-thirds of the verified gross kW program to date. For FY06 (Table 3-8a) lighting measure categories declined somewhat to under 50 percent of kWh savings, with gains in relative shares for chillers, HVAC and motors/drives measure categories.

Almost three-fourths of therm savings in FY06 were attributable to HVAC and miscellaneous measure categories (Table 3-8a). This indicates a significantly greater relative therm savings share for HVAC program to date, where Table 3-8b shows 26 percent for HVAC and 24.5 percent for steam traps (steam traps declined in FY06 to 5.9% of sector therm savings).

Table 3-8a. Schools/Government
FY06 (July 1, 2005–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Boiler	176,329	1.2%	18	0.4%	360,045	14.5%
CFL	1,370,591	9.2%	333	7.7%	0	0.0%
CFL-DI	4,610	0.0%	1	0.0%	0	0.0%
Chiller	1,546,429	10.3%	141	3.2%	0	0.0%
Compact Fluorescent Lighting	23,332	0.2%	8	0.2%	0	0.0%
Controls	823,138	5.5%	1,495	34.5%	72,627	2.9%
ES Equipment	9,665	0.1%	2	0.0%	0	0.0%
Feasibility Study	0	0.0%	1	0.0%	31,962	1.3%
Furnace	10,596	0.1%	1	0.0%	11,617	0.5%
Heat Recovery	8,102	0.1%	9	0.2%	49,058	2.0%
HVAC	1,245,712	8.3%	447	10.3%	50,507	2.0%
Insulation/Sealing	0	0.0%	0	0.0%	86,823	3.5%
LED Lighting	626,033	4.2%	115	2.7%	0	0.0%
Lighting - Other	1,831,801	12.2%	468	10.8%	0	0.0%
Miscellaneous	868,432	5.8%	137	3.2%	468,637	18.9%
Motors & Drives	1,259,388	8.4%	55	1.3%	6,545	0.3%
Payment	518	0.0%	0	0.0%	0	0.0%
Pool Cover	0	0.0%	0	0.0%	14,431	0.6%
Process	22,963	0.2%	28	0.7%	-183	0.0%
Pump	90,084	0.6%	6	0.1%	0	0.0%
Refrigeration	47,575	0.3%	46	1.1%	0	0.0%
Rooftop Unit Upgrade	79,596	0.5%	16	0.4%	1,556	0.1%
Steam Trap	0	0.0%	0	0.0%	1,181,316	47.6%
T8/T5 Fluorescent Lighting	3,529,535	23.6%	930	21.5%	0	0.0%
Turn Off	1,186,325	7.9%	0	0.0%	0	0.0%
VAV System	85,728	0.6%	0	0.0%	612	0.0%
Vending Miser	46,914	0.3%	0	0.0%	0	0.0%
Water Heating	62,403	0.4%	74	1.7%	145,192	5.9%
Total	**14,955,801**	**100.0%**	**4,330**	**100.0%**	**2,480,746**	**100.0%**

Table 3-8b. Schools/Government
Program to Date (July 1, 2001–June 30, 2006)

Measure Category	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Boiler	612,088	0.9%	102	0.7%	1,155,915	14.3%
CFL	3,698,019	5.4%	972	6.2%	0	0.0%
CFL-DI	4,610	0.0%	1	0.0%	0	0.0%
Chiller	2,575,092	3.7%	629	4.0%	0	0.0%
Commercial Washer	384	0.0%	0	0.0%	19	0.0%
Compact Fluorescent Lighting	156,375	0.2%	20	0.1%	0	0.0%
Compressed Air	8,160	0.0%	0	0.0%	0	0.0%
Controls	9,054,151	13.1%	2,420	15.5%	1,103,898	13.7%
ES Equipment	10,053	0.0%	2	0.0%	16	0.0%
Feasibility Study	145,675	0.2%	10	0.1%	47,546	0.6%
Furnace	10,596	0.0%	1	0.0%	14,724	0.2%
Geothermal	121,104	0.2%	114	0.7%	74,698	0.9%
Heat Recovery	-25,105	0.0%	-32	-0.2%	106,473	1.3%
HVAC	3,563,847	5.2%	857	5.5%	328,232	4.1%
Insulation/Sealing	80,062	0.1%	28	0.2%	472,520	5.9%
LED Lighting	6,644,464	9.6%	1,591	10.2%	2,739	0.0%
Lighting - Other	10,503,686	15.2%	2,680	17.2%	30	0.0%
Miscellaneous	3,194,057	4.6%	738	4.7%	859,239	10.6%
Motors & Drives	2,169,232	3.1%	270	1.7%	8,031	0.1%
Payment	518	0.0%	0	0.0%	0	0.0%
Pool Cover	85,408	0.1%	0	0.0%	95,413	1.2%
Process	22,963	0.0%	28	0.2%	-183	0.0%
Pump	306,046	0.4%	24	0.2%	930	0.0%
Refrigeration	143,993	0.2%	62	0.4%	0	0.0%
Renewable	0	0.0%	0	0.0%	2,873	0.0%
Rooftop Unit Upgrade	917,892	1.3%	82	0.5%	24,796	0.3%
Steam Trap	34,837	0.1%	0	0.0%	3,014,810	37.3%
T8/T5 Fluorescent Lighting	18,173,860	26.3%	4,608	29.6%	13,301	0.2%
Turn Off	3,454,728	5.0%	150	1.0%	0	0.0%
VAV System	170,239	0.2%	8	0.1%	4,186	0.1%
Vending Miser	3,165,415	4.6%	67	0.4%	0	0.0%
Water Heating	107,440	0.2%	153	1.0%	744,910	9.2%
Total	**69,109,890**	**100.0%**	**15,585**	**100.0%**	**8,075,116**	**100.0%**

3.3.3 Verified Non-tracked Energy Savings: Participant Spillover Effects

In this period, we developed estimates of savings associated with participant end-user spillover. This is only one component of potential non-tracked savings. As the Business Programs strengthen their technology-specific and market focuses, and as data available for these markets improve, it may become meaningful and practical to quantify non-tracked savings from broader market effects.

The total estimated participant spillover savings are summarized in the table below. These savings represent the best estimate currently available of total participating end-user spillover savings from program start through the present. These spillover savings result from approximately four years of program activity. For participants counted in the base in-program savings, the average elapsed time since measure implementation through the program is about three years.

Table 3-9. Evaluated Non-tracked Energy Impacts
BP Participant End-User Spillover Savings to Date

	Total		
Spillover Savings	**kWh**	**kW**	**therms**
CFL Participant Total			
Basic estimate	16,196,526	4,609	0
Robust estimate	1,108,813	298	0
Non-CFL Participant Total	629,248	154	845
Grand Total			
Basic estimate	16,825,774	4,763	845
Robust estimate	1,738,061	452	845
Total as % program tracking savings			
Basic estimate	4.00%	5.90%	0.00%
Robust estimate	0.41%	0.56%	0.00%

The savings associated with the CFL participant spillover measures cannot be assessed definitively because the results are strongly affected by a single respondent with a very high level of spillover CFL installation. Based on different treatments of this outlier case, we estimate spillover savings from CFL participants at between 2 and 36 percent of the in-program savings.

For the non-CFL participants, the spillover savings is less than one percent of the in-program savings. Non-CFL participants account for approximately 90 percent of in-program savings. Thus, the total spillover savings for CFL and non-CFL participants combined ranges from less than one percent to six percent of in-program savings.

Our current best estimate of total net savings from the BP programs to date is the sum of the grand total robust estimate in Table 3-9 and the BP net totals shown in Table 3-4b above. We will continue to expand our ability to provide comprehensive accounting of both tracked and untracked net savings. This ability is enhanced as the programs pursue approaches with stronger technology and market channel focus, and provide more concrete data on their associated efforts. Our formal evaluation plans for this year include exploration of alternative approaches to developing net savings estimates that reflect the orientation of the programs.

3.3.4 Deemed Savings

Deemed savings values and formulas agreed to by the Business Programs and evaluation team are used in the calculation of program reported and evaluation verified gross savings. For this task, we reviewed deemed savings proposals put forth by Business Programs and reached agreement on the deemed savings values. The proposal format and content provides the evaluation team what it needs to assess and accept the proposed deemed savings value. (Business Programs staff and the evaluation team designed the deemed

savings proposal format and content in FY05.) Table 3-10 lists the deemed savings proposals reviewed by the evaluation team to date and the current status of these proposals.

Table 3-10. Deemed Savings Proposal Status

Deemed Savings Proposal	Status	
	Current	Previous Semi-annual Report (Sept 2006)
4.17 High efficiency furnace	Program revising based on initial comments	(New)
1.25 Mid efficiency steam boiler		
1.27 High efficiency hot water boiler		Accepted (review and revision process complete), but program is revising
Boiler OA reset/cutout controls		Program revising based on initial comments
Set up/back thermostat		
1.26 Mid efficiency hot water boiler	Accepted	Accepted (review and revision process complete), but program is revising
CFL fixture[a]		Accepted
CFL screw in[a]		
High efficiency motor		
LED exit sign		
Low-flow, pre-rinse sprayer		
Steam trap repair/replacement		

Note: The evaluation team accepts the CFL fixture and CFL screw in deemed savings proposals assuming the recommended changes to the review schedule are made. (These recommended changes were provided in an e-mail from Valy Goepfrich to Chuck Sasso on August 23, 2005.)

3.3.5 Attribution Factors

Participant attribution factors at the sector level are reported in Table 3-3b above. These factors represent the fraction of tracked, verified gross savings that can be attributed to Focus. The factors are developed and applied at the sector level for calculation of sector and total BP net savings.

To understand better the situations associated with low attribution rates, attribution factors were calculated separately by measure end use category as well as by certain customer characteristics in addition to sector. Two sets of results were developed. One set of results is based on FY03 and FY04 impact evaluation data and the other set of results is based on FY05 impact evaluation data. The latter data are for the most recent impact evaluation of results under the current program administrator and also are the basis for the attribution factors applied to the most recent period of reported savings (FY06 to date).

The analysis suggests that the type of measure installed has consequences for the proportion of savings attributable to Focus Business Programs. It also suggests that participant size, number of locations, headquarters' location, and owner versus rental status are secondary factors affecting attribution, if they are factors at all.

The FY03/FY04 results and the FY05 results are summarized in Table 3-11. Based on both sets of results, attribution appears to vary by end use, but the pattern of results across end uses does not appear to be consistent over program years. In addition, when end-use mix is controlled for to the extent possible in this analysis, attribution does not appear to vary very much by participant size, number of locations, headquarters' location, or own/lease status.

Table 3–11. Summary of FY05 and FY03/FY04 Results

Characteristic	Evidence Characteristic Affects Attribution	
	FY03, FY04	FY05
End use	Substantial, ranking smallest to largest: Building shell Lighting (excl CFLs), **41% or 44%** HVAC, **57% to 64%** Mnfctrng prcss, **66% to 83%** CFLs	Substantial, but different ranking: (Building shell, insufficient data) Lighting (excl CFLs), **65% or 70%** HVAC, **36%** (therms inconclusive) Mnfctrng prcss, **32% or 40%** (therms insufficient data) CFLs
Participant size	Limited	Limited
Number of locations	Limited--therms only	None
Headquarters' location	None	Insufficient data
Own/lease	Limited--therms only	None

The specific findings on which end uses have better or worse attribution rates differ for the two time periods studied. These differences may reflect differences in the specific technologies rebated in each period, changes in market conditions, and/or particular effects of a limited number of large projects in each period.

The primary recommendations from the completed analysis of attribution factors by end use and customer characteristics are the following:

- *Both the FY03/FY04 and FY05 results suggest Business Programs should continue to rebate CFLs.* In both analyses, compact fluorescent lamps (CFLs) have relatively high attribution factors, between 61 and 72 percent.
- *Business Programs should proceed with caution when a project has large gross savings.* Although the analysis does not show participant size to be a primary determinant of attribution, the attribution associated with a large project will have a large effect on the associated sector-level attribution factor.

The development of adjustment factors by end use as well as by customer characteristics raises the question of which set of factors is most appropriate for estimating savings for a particular subgroup or for determining the total program savings. The evaluation samples were designed to provide as reliable estimates as possible at the sector level. Thus, the sector-level adjustment factors displayed in Tables 3–3a through 3–3c above remain the primary estimates and the basis for determining program-area savings. However, the end-use estimates developed in this task, together with the measure and market review findings, provide substantial useful information on program effectiveness.

Designing a comprehensive evaluation at the technology level is challenging for BP for several reasons:

- The program addresses a very large number of technologies as indicated in the measure category tables beginning with Table 3-5a.
- The program tracking system has not provided a clean basis for classification in the past. While the situation is improving, difficulties will continue in identifying and classifying projects by technology groups.
- The program also has a strong desire for estimates at the sector level unaffected by results from other sectors in the interests of accountability and control.

As the program continues to increase its technology emphasis and to improve its tracking systems, we will continue to work with them to provide information at a sufficient level of detail to be useful. In the process, we will continue to reassess the trade-offs among different kinds of information wanted and the associated costs and accuracy.

3.3.6 Definition of Peak Demand Period

Coordination between the Focus and We Energies evaluation has led to a re-assessment of the definition of the peak time period for calculating peak demand savings. Since program start, Focus has defined kW savings as the average demand savings for all the hours 1 pm to 4 pm on summer (June, July, August) workdays. The PSC has accepted a definition for We Energies using the hours 1 pm to 4 pm on the peak (rather than average) summer workday. Going forward, both programs will define the peak periods as 1 pm to 4 pm on a system peak day, for all measures. This approach provides consistency between Focus and We, as well as across measures. Consistency across measures is important for the total savings across measures to be meaningful. Use of a system peak day is also consistent with the PSC's historical interest in demand savings.

For non-weather-dependent effects, savings on a system peak day are essentially the same as the savings on an average summer weekday. Thus, the change in definition affects savings primarily for cooling measures.

Even for the measures that are affected, there may be minimal change to the engineering adjustment factors that evaluation uses to produce verified gross savings from reported savings. The adjustments based on the engineering review are typically associated with corrections to factors such as total capacity, numbers of units installed, or general operating conditions. These parameters would tend to affect all time periods or all warm time periods, similarly. Hence, the evaluation adjustment factor for an average weekday afternoon will tend to be similar to the factor that would be used for a system peak day afternoon.

In principle, the program has consistently used the average summer weekday in the past and consistently uses system peak day now. Under this assumption, the factors based on prior reviews with the old peak definition can reasonably apply to the current program reported savings with the new definition.

The next round of engineering review is scheduled to be conducted beginning in July 2006. Any adjustments necessary to bring kW to a consistent system peak day definition will be incorporated in the resulting new gross savings adjustment factors.

3.4 MARKET EFFECTS

The spillover study explored a variety of aspects of Focus effects on participating customers in addition to estimating the total participant spillover savings. Other BP evaluation activities in this period related to market effects include the following:

- Development of illustrative motor market index—reported below under Program Metrics.
- Market study of agriculture program high-speed fans—reported below.

The findings from the spillover study on energy savings are reported above as non-tracked energy impacts. Other dimensions of spillover effects are described next.

3.4.1 Spillover Effects

A. SPILLOVER ISSUES EXPLORED

Participant spillover is the energy savings associated with energy efficiency actions taken by program participants outside of the program as a result of previous participation in the program. We completed a spillover study with three broad objectives:

1. To characterize the effects of participation in the Business Programs beyond tracked energy savings.
2. To describe, in particular, the ways that Focus measures have resulted in energy savings to implementing participants beyond those tracked by the program as direct savings.
3. To provide a basis for specific quantitative estimates of participant spillover savings. These savings estimates may be used in the next benefit-cost analysis of Focus.

The findings were based on surveys conducted with 304 customers who installed measures through Business Programs more than one year earlier. These customers participated in the program anytime between the start of the program and September 30, 2004. The surveys were designed to mitigate common problems with spillover surveys of this type. In particular, special steps were taken to:

- Find a knowledgeable respondent.
- Avoid double counting Focus measures.
- Remind the respondent of the role the Business Programs played in their decisions to install previous Focus measures.
- Clarify the effect of the program on any subsequent implementation.
- Obtain details of that subsequent implementation to allow estimation of energy savings.

B. MEASURES IMPLEMENTED SUBSEQUENT TO FOCUS

Experience with the Business Programs has resulted in installation of additional energy efficiency measures outside the program (spillover) for 12 percent of participants who

received only a CFL rebate through the program (CFL participants) and 5 percent of participants who installed Focus non-CFL measures (non-CFL participants). This additional implementation has occurred over a period averaging two to three years since program participation.

The figures below indicate the distribution of post-Focus measure implementation for CFL and non-CFL participants who implemented measures through the program at least a year ago (prior to October 1, 2004). Sixty-four percent of these CFL participants and 78 percent of the non-CFL participants have not made any energy efficiency improvements since participating in the program. Six percent of CFL participants and 8 percent of non-CFL participants have made subsequent energy efficiency improvements only through the program. We expect these measures to be in the program-tracking database. Another 12 percent of CFL participants and 9 percent of non-CFL participants have installed subsequent measures outside the program, but none of them were installed as a result of previous participation in the program. Lastly, 12 percent of CFL participants and 5 percent of prior non-CFL participants have installed some measures outside the program that result, at least in part, from their previous participation in the program. These measures have spillover savings.

Figure 3-7. Distribution of CFL Participants' Subsequent Energy Efficiency Implementation

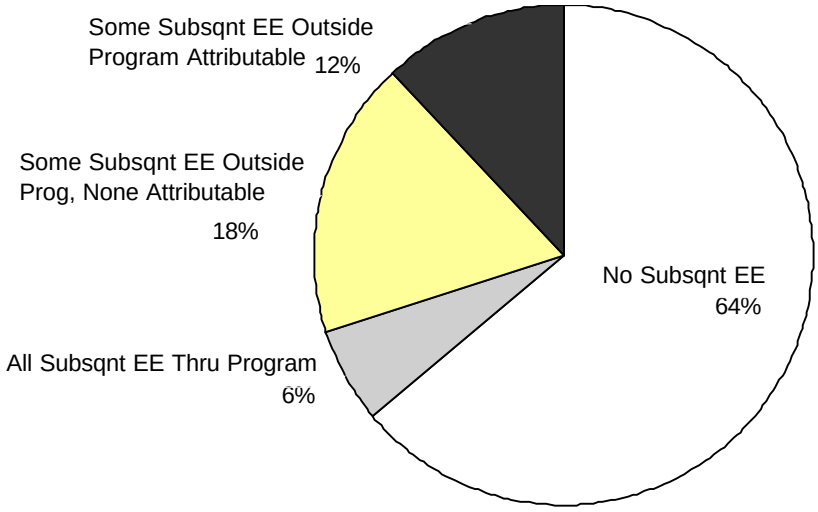
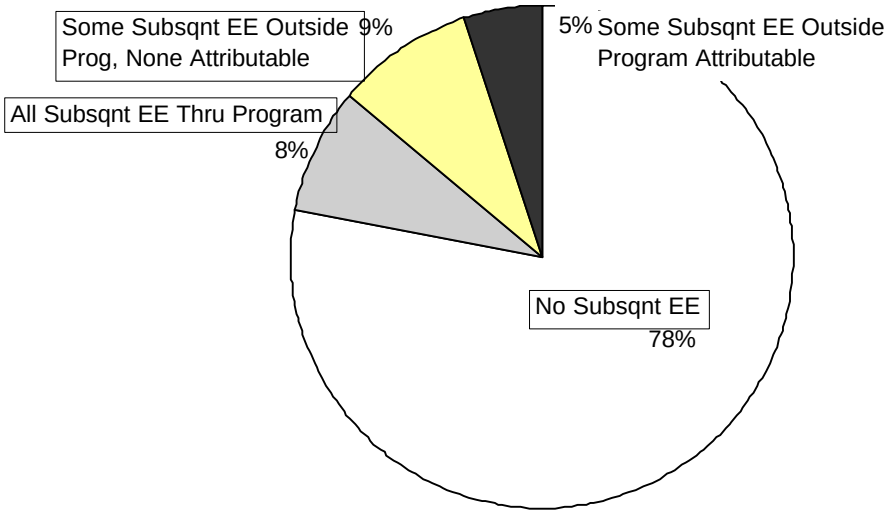


Figure 3-8. Distribution of Non-CFL Participants' Subsequent Energy Efficiency Implementation



C. SPILLOVER MEASURES INSTALLED

For the CFL participants, all the spillover measures reported were lighting measures, and five of the six in the sample were additional CFL installations. This finding is not surprising given that the only direct interaction of the program with the customer is the CFL rebate.

For most of the non-CFL participants with spillover savings, the spillover measure was for a different end use than the original Focus measure. While the total number of spillover measures is small, the finding that Focus participation can lead to additional adoption of other types of efficiency measures is encouraging.

Also encouraging is the finding that seven of the eleven non-CFL participant spillover measures in the sample were for end uses other than lighting. While the original Focus measures also included many non-lighting measures, we might have expected to find a preponderance of lighting among the spillover measures that were for a different end use than the original.

D. OTHER INDICATORS OF MARKET EFFECTS

Implementation of additional energy efficiency measures is the ultimate market effect of interest. However, other changes in participant perceptions and practices can be the forerunner of this ultimate effect.

Non-CFL participants were asked if their participation had changed their practices or perceptions in relation to some of the common barriers to adoption of energy efficiency measures. They were asked whether their experience with Focus had:

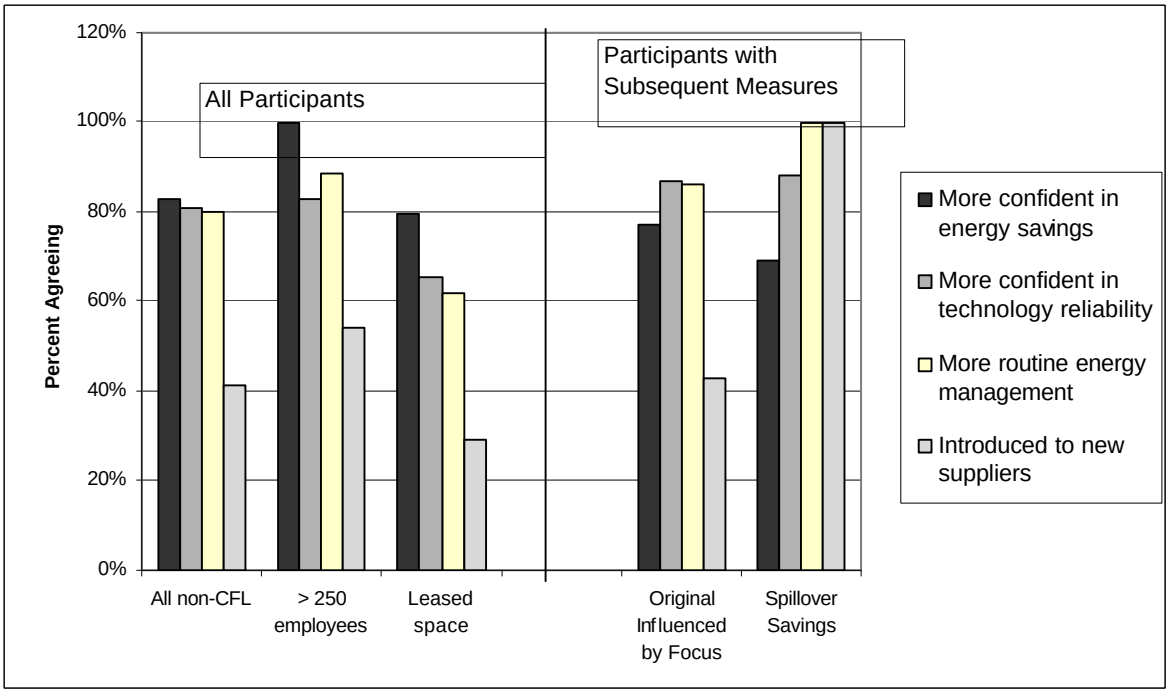
- Increased their confidence in the energy savings from efficiency measures.
- Increased their confidence in the reliability of energy-efficient technology.
- Improved their energy management practices.
- Introduced them to new suppliers.

Eighty-nine percent of non-CFL participants agreed that Focus had helped in at least one of these four ways.

Figure 3-9 summarizes the results for all non-CFL participants and selected subsets. Larger non-CFL participants tended to agree more with the statements that Focus had helped in these intermediate ways. Those in leased space tended to agree less.

Participants with subsequent measures whose original in-program measure was influenced by Focus show a similar pattern of agreement to that for the larger group of participants. For participants with spillover savings, the one dramatic difference compared to other participants is in the proportion who indicated that the original measure and program participation introduced them to new suppliers—100 percent of spillover participants compared with around 50 percent or less for others. Introducing customers to new suppliers who will subsequently promote other energy efficiency measures is one means by which Focus would like to stimulate ongoing energy efficiency improvements outside the program. While the total number of participants with spillover savings is small, this finding suggests that the role of suppliers is one factor that makes a difference to whether participants have subsequent spillover savings or not.

Figure 3–9. Market Effects Indicators for Non-CFL Participants



3.4.2 HVLS Fans in the Wisconsin Dairy Industry

A. MARKET OVERVIEW

Currently, there are seven dealers in Wisconsin selling HVLS fans for agricultural applications, plus one out-of-state manufacturer selling directly to customers. Although neither the dealers nor the manufacturer began selling HVLS fans in Wisconsin because of Focus on Energy, they give the program credit for increasing awareness of HVLS fans among Wisconsin farmers and increasing sales of the fans. They point out that the Focus rebate is

an important factor because the HVLS fans have been and continue to be very expensive. Therefore, although Focus is not responsible for creating the market for HVLS fans in agricultural applications in Wisconsin, it is increasing the demand for HVLS fans among Wisconsin farmers and helping to sustain the market.

In recent years sales of HVLS fans in Wisconsin for agricultural applications have been growing significantly. According to the dealers, awareness of HVLS fans among Wisconsin farmers has grown significantly over the last three years as has recognition of the fan's benefits. The trend in the Wisconsin dairy industry towards larger barns, larger herds, and greater emphasis on cow comfort should expand the market opportunities for HVLS fans.

However, significant barriers remain to greater acceptance of HVLS fans by farmers in Wisconsin. The high first cost—about $5,000 for a 24-foot fan before installation—is a major barrier. Other concerns include falling milk prices that will curb dairy farmer spending, lingering farmer uncertainty and unfamiliarity with the technology, and misinformation about the fan spread by rival fan dealers. Other states with HVLS fan rebate programs like California have encountered similar barriers.

B. RECOMMENDATIONS

- *Increase efforts to show HVLS fan installations to farmers.* The HVLS fan manufacturers, the fan dealers, and the Focus on Energy staff all characterized current purchasers of the fans as progressive farmers and early adopters of new technology.
- *Consider raising the rebate level for these fans.* The $350–$700 HVLS fan rebates that Focus on Energy is offering are much lower than the $1,000 rebates being offered in states like California and Maine or in the We Energies service territory and is a small fraction of the high first cost of the HVLS fan.
- *Make the process for obtaining a rebate more transparent.* One of the HVLS fan manufacturers said that he and his customers had difficulty finding out how to obtain the Focus on Energy HVLS fan rebate.
- *Support efforts to demonstrate the non-energy benefits of the HVLS fan and refute misinformation about the fan*. The HVLS fans manufacturers have touted many non-energy benefits of their product such as higher milk production, lower maintenance costs than alternative fans, better air quality, drier barns, less clustering of cows, and fewer birds and flies. Yet most of these claims are based only on anecdotal evidence.

3.5 PROGRAM METRICS AND GOALS

3.5.1 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 June 30, 2006.

Table 3-13. Verified Gross Program Savings Versus Program Targets FY06 (July 1, 2005–June 30, 2006)

Program	kWh			kW			Therms		
	Goal	Verified Gross	% of Goal	Goal	Verified Gross	% of Goal	Goal	Verified Gross	% of Goal
Program Portfolio Totals	123,500,000	111,617,300	90%	21,487	23,970	112%	7,472,500	9,674,031	129%

3.5.2 Market Effects Metrics: Motors Sales Growth Index

The evaluation team has worked with the Business Programs to establish a set of meaningful and measurable program metrics related to market effects. In this period, work was completed on the illustrative calculation of a motors sales growth index.

One of the FY05 contract metrics for BP is the increase in shipments of NEMA premium efficiency motors in Wisconsin relative to the increase for the US as a whole. The data necessary to evaluate this index for FY05 will be available in July 2006. We have calculated the corresponding index for FY04. The index was not a formal contract metric for that period. The calculation is provided as a basis for understanding the starting point against which an improvement would be shown in the FY05 calculation as well as describing the data limitations that may affect the formal metric.

A. FINDINGS

For the period 2003–2004, the relative market growth index calculated from the available data is 1.24. Changes in the data series definition from 2003 to 2004 make any conclusions from this calculated index somewhat speculative. If these data definition issues were not a concern, the overall index of 1.24 would be an indication that premium efficiency motor sales in Wisconsin have improved from 2003 to 2004 relative to what would be expected from the pattern in the rest of the US.

For calculation of the 2005 index, we expect the definition excluding OEMs to be the same as in 2004. As with any market-reported series, we will need to assess the effects of any changes in which manufacturers are reporting.

B. INDEX DEFINITION

The relative market share index for 2005 is calculated as:

$$(NSW_{2005}/NSW_{2004})/[(NSUS_{2005}-NSW_{2005})/(NSUS_{2004}-NSW_{2004})]$$

where:

NSW = annual shipments of NEMA Premium motors to Wisconsin

NSUS = annual shipments of NEMA Premium motors in the US

2004, 2005 indicates the year of the data.

This “relative” index (Wisconsin ratio versus rest of US ratio) is used to control for general changes in the economy that might increase or decrease total motors shipments as well

as general increases in adoption of energy-efficient equipment apart from Focus. Since shipment data are available for premium efficiency motors but not for all motors, it is not possible to calculate the change in Wisconsin premium efficiency motors relative to all motor purchases in the state.

The index is calculated separately for each size (hp) category. An overall index is calculated as the weighted average of the separate indices using the midpoint hp of each category as the weight.

C. DATA ISSUES

NEMA data on premium motors shipments are available at the state and national level for 2003 and 2004. The 2004 data differ from the 2003 data in two ways:

1. Shipments to original equipment manufacturers (OEMs) are included in the 2003 totals, but not the 2004 totals. The data excluding OEMs are more relevant to our analysis and will be the form of future data provided.
2. In 2004, 2 of the 12 manufacturers that had provided data in 2003 did not provide data to NEMA. (One of the two makes only OEM motors so that their data are effectively included as 0 in the 2004 total.)

As a result of these two issues, if we observe an index greater than one for 2004 versus 2003, this result could reflect any of the following:

1. An increase in the share of premium efficiency motors sold in Wisconsin.
2. A smaller proportion of premium motor shipments of OEMs to Wisconsin compared to the proportion in the rest of the US.
3. A smaller proportion of premium motor shipments being provided by the manufacturer who dropped out of the reporting in Wisconsin compared to the proportion provided by this manufacturer in the rest of the US.

4. RESIDENTIAL PROGRAMS EVALUATION

This chapter describes our evaluation of Residential Programs, overall and by individual program area:

- ENERGY STAR® Products (ESP).
- Wisconsin ENERGY STAR Homes (WESH) (This includes the Wisconsin ENERGY STAR Homes program and measures installed through the Efficient Heating and Cooling Initiative in new homes before FY06.)
- Home Performance with ENERGY STAR (This includes the Home Performance with ENERGY STAR program and measures installed through the Efficient Heating and Cooling Initiative in existing homes before FY06.)
- Targeted Home Performance with ENERGY STAR.
- Apartment and Condominium Efficiency Services (ACES).
- Efficient Heating and Cooling Initiative (EHCI).

4.1 OVERALL

4.1.1 Evaluated Energy Impacts

The residential evaluation team has placed primary emphasis on strengthening verified gross and verified net impact savings estimates for the residential programs. Table 4-1 below shows program portfolio targets against verified gross program savings and percentage of goal achieved. Savings shown are as of June 30, 2006. As discussed in subsection 4.1.2, the savings reported in the tables below do not include energy savings attributable to the Focus effort that are not directly "tracked" by program administrators.

Table 4-1. Verified Gross Program Savings Versus Program Portfolio Targets FY06 (July 1, 2005–June 30, 2006)

Program	kWh			kW			Therms		
	Goal	Verified Gross	% of Goal	Goal	Verified Gross	% of Goal	Goal	Verified Gross	% of Goal
Program Portfolio Totals	**73,898,534**	73,991,451	100%	**10,424**	11,132	107%	**1,229,920**	1,602,851	130%

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

a. FY06: July 1, 2005, through June 30, 2006
b. Program to date: July 1, 2001, through December 31, 2005
c. FY05: July 1, 2004, through June 30, 2005
d. FY04: July 1, 2003, through June 30, 2004
e. FY03: July 1, 2002, through June 30, 2003

f. FY02: July 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).

In the following discussions of individual programs below, tables on the energy savings totals and any new research to modify verified gross energy savings or net energy savings numbers are discussed.

Table 4-2a. All Residential Programs: Tracked Energy Impacts
FY06 (July 1, 2005–June 30, 2006)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
ACES	5,823,105	469	576,753	5,804,980	466	571,948	5,804,980	466	571,948
EHCI	11,431,814	8,391	258,196	10,911,590	7,107	274,116	9,653,486	7,572	234,464
ENERGY STAR Products	71,480,367	4,175	339,665	56,403,947	3,250	148,477	55,583,207	3,250	121,119
Home Performance	995,068	373	484,986	426,233	240	368,884	375,817	204	335,247
Targeted Home Performance	371,904	59	92,366	371,904	59	92,040	371,904	59	92,040
WESH	76,674	12	147,666	72,797	10	147,386	71,999	10	147,358
Total	**90,178,932**	**13,478**	**1,899,632**	**73,991,451**	**11,132**	**1,602,851**	**71,861,393**	**11,560**	**1,502,176**

Table 4-2b. All Residential Programs: Tracked Energy Impacts
Program to Date (July 1, 2001–June 30, 2006)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
ACES	46,503,595	4,784	3,322,420	50,447,879	4,782	3,612,933	50,447,879	4,782	3,612,933
EHCI	11,431,814	8,391	258,196	10,911,590	7,107	274,116	9,653,486	7,572	234,464
ENERGY STAR Products	349,124,422	20,088	1,296,974	260,494,322	18,844	900,179	243,030,516	16,196	842,935
Home Performance	36,130,238	22,876	2,361,198	31,167,011	22,523	2,126,030	29,475,468	22,282	1,880,722
Targeted Home Performance	1,873,122	385	573,768	1,724,587	323	477,461	1,724,587	323	477,461
WESH	4,249,652	1,308	712,871	3,511,208	1,349	716,831	3,499,409	1,349	716,417
Total	**449,312,844**	**57,831**	**8,525,427**	**358,256,596**	**54,928**	**8,107,549**	**337,831,345**	**52,503**	**7,764,931**

Table 4-2c. All Residential Programs: Tracked Energy Impacts
FY05 (July 1, 2004–June 30, 2005)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
ACES	16,662,736	846	797,619	16,663,250	846	797,619	16,663,250	846	797,619
ENERGY STAR Products	85,099,296	2,229	365,702	55,291,501	3,230	158,319	54,394,921	3,230	128,433
Home Performance	9,084,502	6,901	582,559	8,513,449	6,845	476,907	7,409,292	6,727	418,652
Targeted Home Performance	593,163	115	167,477	276,544	44	68,440	276,544	44	68,440
WESH	1,507,010	669	221,526	1,492,621	672	217,666	1,481,620	672	217,280
Total	**112,946,708**	**10,760**	**2,134,884**	**82,237,365**	**11,638**	**1,718,951**	**80,225,627**	**11,520**	**1,630,424**

Table 4-2d. All Residential Programs: Tracked Energy Impacts
FY04 (July 1, 2003–June 30, 2004)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
ACES	10,811,378	558	510,518	10,807,724	557	510,518	10,807,724	557	510,518
ENERGY STAR Products	98,548,116	6,228	355,295	64,848,034	4,637	357,071	63,010,344	4,328	357,071
Home Performance	13,606,210	8,038	554,150	11,812,890	8,044	554,194	11,691,121	7,994	508,287
Targeted Home Performance	708,507	148	220,606	921,628	172	250,391	921,628	172	250,391
WESH	1,615,776	628	184,913	1,584,518	632	184,724	1,584,518	632	184,724
Total	**125,289,987**	**15,600**	**1,825,482**	**89,974,794**	**14,042**	**1,856,899**	**88,015,335**	**13,684**	**1,810,992**

Table 4-2e. All Residential Programs: Tracked Energy Impacts
FY03 (July 1, 2002–June 30, 2003)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
ACES	10,570,777	2,355	1,031,053	14,719,150	2,392	1,326,371	14,719,150	2,392	1,326,371
ENERGY STAR Products	75,701,267	5,670	180,793	65,198,387	5,435	180,793	55,722,159	3,841	180,793
Home Performance	9,385,086	5,919	334,938	7,355,067	5,750	330,051	7,293,113	5,725	306,702
Targeted Home Performance	183,949	58	86,348	143,464	44	61,918	143,464	44	61,918
WESH	1,050,192	0	95,517	215,696	35	94,854	215,696	35	94,854
Total	**96,891,272**	**14,003**	**1,728,649**	**87,631,763**	**13,657**	**1,993,987**	**78,093,581**	**12,037**	**1,970,638**

Table 4-2f. All Residential Programs: Tracked Energy Impacts
FY02 (July 1, 2001–June 30, 2002)

Program	Gross kWh	Gross kW	Gross Therms	Verified Gross kWh	Verified Gross kW	Verified Gross Therms	Net kWh	Net kW	Net Therms
ACES	2,635,599	556	406,476	2,452,775	521	406,476	2,452,775	521	406,476
ENERGY STAR Products	18,295,376	1,786	55,519	18,752,453	2,292	55,519	14,319,885	1,546	55,519
Home Performance	3,059,372	1,644	404,564	3,059,372	1,644	395,993	2,706,125	1,633	311,834
Targeted Home Performance	15,598	5	6,971	11,047	3	4,671	11,047	3	4,671
WESH	0	0	63,249	145,576	0	72,201	145,576	0	72,201
Total	**24,005,945**	**3,991**	**936,780**	**24,421,223**	**4,460**	**934,860**	**19,635,409**	**3,703**	**850,701**

4.1.2 Market Effects

The residential evaluation team placed primary emphasis on strengthening verified gross and verified net impact reporting for this report. However, the team also gave additional attention to understanding potential market effects for the residential programs.

The evaluation team interviewed the key market players involved in the distribution of CFLs to assess the effect of the ESP on the manufacture, distribution, and sale of CFLs. These key players included CFL manufacturers, corporate-level retailers, and individual store level retailers. The team also analyzed the CFL program database, which provides a rich source of information regarding the progress of the CFL program. Finally, the evaluation team measured the market effects metrics that have been established for each program.

The combination of these activities provided insight into the extent to which residential programs are showing promise toward permanently altering the marketplace for energy-efficient products, practices, and services.

4.1.3 Program Metrics and Goals

A key focus of the Residential Program evaluation team for this report was to address the program's metrics, which was agreed to as part of the FY06 Detailed Evaluation Plan submitted to DOA.[v] The Metrics goals were a key aspect of Wisconsin Energy Conservation Corporation's (WECC) FY05 contract for delivery of the Residential Programs.[vi]

4.2 ENERGY STAR® PRODUCTS (ESP)

FY06 evaluation efforts for ESP focused on the following:

- Interviewing the key market players involved in the distribution of CFLs.[vii]
- Assessing CFL installation rates.[viii]
- Reviewing the CFL delta Watts estimates.[ix]
- Making net-to-gross adjustments for CFLs.[x]
- Recalculating gross savings values.[xi]
- Making net-to-gross adjustments for clothes washers.[xii]
- Analyzing the CFL program database.[xiii]
- Addressing the ESP program metrics.[xiv]

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

- Process Findings and Issues.
- Evaluated Energy Impacts.
- Market Effects.

- Program Metrics and Goals.

4.2.1 Process Findings and Issues

A. PROCESS EVALUATION INTERVIEWS WITH KEY MARKET PLAYERS

Below are the major process-related findings from interviews with key market players involved in the distribution of CFLs.

All respondents are satisfied with the program and WECC's performance. Manufacturers think the program is easy for them to be involved with and provides good lead times for ordering and delivering product to the retailers. Manufacturers also appreciate WECC's understanding of the market and ability to work successfully with retailers. Corporate-level retailers value the relationships that WECC staff have with individual stores. Corporate-level retailers also report that WECC helps retailers with the execution of the program, from helping with the promotion of CFLs to making sure that each retailer has sufficient product available and that it is labeled correctly. Individual store retailers think that the rebate works well and that the program has increased awareness and education among their customers on the benefits of CFLs. Individual store retailers also mention that the program has helped increase traffic into their stores and improved the image of their store as a helpful place for customers.

Manufacturers and corporate-level retailers were asked to compare and contrast programs that provide customer incentives—e.g., the Focus CFL Initiative— with programs that use manufacturer/retailer buy-downs—e.g., programs offered in California and the Northwest. The perspectives of the manufacturers are valuable given they work with both types of programs across the country. The responses given by corporate-level retailers, while still valuable, must be interpreted carefully, because the retailers we interviewed were participants in the Focus CFL initiative and therefore not representative of all Wisconsin retailers who sell residential lighting products.[5]

The opinion of manufacturers was split. Positive aspects of the buy-down approach cited by manufacturers included flexibility to include all retailer types; easier for manufacturers to select a retail partner; and less hassle. Shortcomings of the buy-down approach included inability to provide sales documentation and more work for the manufacturer to get up and running. Positive aspects of the customer incentive approach included ability to collect customer information; customers seeing the actual market price so that the product was not devalued; and money going directly to the customers. Shortcomings of the customer incentive approach included some major retailer types not able or willing to process the incentives, which precludes these retailers from participating.

All corporate-level retailers[6] prefer programs that incorporate customer incentives to buy-down programs.[xv] Corporate-level retailers prefer programs that use customer incentives because incentives allow the customer to see the actual price and thus the true value of the CFLs, whereas the customer only sees the discounted price with buy-downs. Corporate-level

[5] Business Programs notes that these corporate-level retailers are participating retailers.

[6] Business Programs notes this is in relation to *participating* corporate-level retailers who have been interviewed.

retailers also think that incentive programs are easier for their retailers to implement, incentives get the customer's attention, and the buy-downs may not filter to the retailer.

Although satisfied with the program and WECC's performance, respondents did cite weaknesses with the program and made suggestions to improve it. All of the weaknesses cited by manufacturers were related to limited involvement among certain key retail channels—specifically food, drug, and mass merchant—due to issues regarding incentive processing and funding limitations. Manufacturer suggestions for improving the program were related to not requiring collection of customer information; coordinating with other utility efforts; having more flexibility in use of advertising funds; broadening involvement of other key retailer types; using a buy-down approach; and increasing advertising funding. Corporate-level retailers mentioned weaknesses related to funding shortages, lack of statewide coverage, and the possibility of a key manufacturer leaving the program. Corporate-level retailer suggestions were mostly related to ensuring broader coverage within Wisconsin and across the Midwest. Weaknesses reported by individual store retailers were related to difficulty in keeping CFLs stocked, advertising, and rewards processing. Individual store retailers' suggestions were related to improvements in advertising, including funding levels and types, and a shorter, more focused promotional period.

We conclude that WECC is working very effectively in facilitating the CFL program with key market players involved in the distribution of compact fluorescent light bulbs.

We recommend that WECC consider methods to expand the program approach to include a buy-down option, in addition to customer incentives, to accommodate those manufacturers and retailers that are only able to work with buy-down approaches. This would increase the number of market channels in which CFLs are offered, thereby increasing the exposure of CFLs to a broader customer base. Key issues for consideration are DOA requirements for tracking CFL sales as part of buy-down efforts and how to successfully integrate a buy-down component without detracting from the customer incentive approach that WECC has been able to implement successfully.

B. PROCESS EVALUATION FINDINGS IN THE CFL INSTALLATION RATE STUDY

Some process-related questions and issues were also identified and explored in the CFL installation rate study. Pertinent process-related findings from this study are summarized in the remainder of this subsection.

Consistent with the installation rate study completed in FY04, the FY06 study found that participating Wisconsin residents, the ultimate sponsors of the Focus initiative, are highly satisfied with the CFLs they have received through ESP. This is evidenced by the fact that 74 percent of CFL reward recipients provided CFL satisfaction ratings of 8, 9, or 10 on a 10-point scale. In addition to high levels of satisfaction, the program continues to demonstrate impressive success in reaching a substantial number of Wisconsin residents who never purchased CFLs before. The previous (FY04) study found that approximately two-thirds of participants had never purchased a CFL prior to their program involvement. This meant that out of approximately 115,000 FY04 participants, approximately 77,000 new CFL purchasers were reached—a significant accomplishment. The FY04 study also found that the program, particularly the instant initiative, was reaching a 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. Also in FY04, we saw 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.

Jumping ahead to the FY06 study, it seems reasonable, relative to the previous study, to expect growing percentages of current-year CFL program participants to have purchased in previous program years. However, in FY06 we saw a continuation of the trends we saw in FY04. Specifically, we continued to see the program attracting first-time CFL purchasers at an impressive rate—about two-thirds of the 150,000+ FY06 study participants were new purchasers, representing approximately 100,000 people. We also saw the program continuing to reach a diverse group of purchasers whose demographic characteristics closely matched those of the Wisconsin population. In particular, the program continued to demonstrate success in reaching groups with lower incomes and levels of education that have traditionally been underrepresented in energy efficiency programs. We also saw significant progress in FY06 in the few areas identified in FY04 as possible areas for improvement. Specifically, the program made significant strides in closing the gender gap by attracting women (as CFL purchasers) in record numbers. Finally, the mail-in portion of the program, which historically had greater appeal to those with higher incomes and levels of education, made progress in reaching a more "typical" Wisconsin consumer.

4.2.2 Evaluated Energy Impacts

Because a significant portion of ESP's reported savings are attributable to CFLs, the evaluation team's plans for FY06 placed the highest evaluation priority for impact analysis on CFLs.

The evaluation team conducted a CFL installation rate study to quantify the extent to which CFLs purchased through ESP are being installed in Wisconsin residences. Study participants were primarily single-family homeowners (the target audience for this initiative) who purchased CFLs through either a mail-in or instant reward during FY04. Key findings include:

- The overall rewarded CFL installation rates are 75% and 85% for instant and mail-in reward participants, respectively (Table 4-3). Nearly all of the CFLs not installed (both instant and mail-in rewards) are in storage, and according to survey respondents, highly likely to be installed in the future.

Table 4-3. CFL Installation Rates (By Reward Type)

	Percent of CFLs	
Status of CFL	Instant Reward	Mail-in Reward
Installed	75%	85%
Installed and Removed	4%	4%
Storage	19%	11%
Don't Know/Not Sure	2%	0%
(Number of CFLs)	(n = 1,695)	(n = 806)

- Instant and mail-in installation rates have significantly improved over the past two years. Since the FY04 study, the instant installation rate has improved by 8 percentage points (from 67% to 75%) and the mail-in installation rate has improved by 10 percentage points (from 75% to 85%). At least one factor contributing to the increase in overall installation rates would appear to be the fact that the program has gradually reduced the number of CFLs an individual customer can purchase (currently

at 12 or less).[xvi] As demonstrated in the FY04 study, installation rates are significantly lower among groups of customers who purchased 11 or more rewarded CFLs.[xvii] Other factors that could possibly contribute to increased installation rates include: increased customer satisfaction, better quality products, better consumer education materials, more retail store experience, and more customer experience.

- Nearly all of the rewarded CFLs that are installed replaced regular incandescent light bulbs. The survey data indicate that only 1.4% and 4.8% of rewarded instant and mail-in CFLs, respectively, replaced existing CFLs.

This evaluation team reviewed the types of CFLs installed during FY05 to assess whether the current estimate of *Delta Watts*—a key input to calculating verified gross energy and demand savings for CFLs rewarded through the ESP—was still appropriate. The review showed that the current estimate of 51.9 W was still reasonable.

The evaluation team explored issues surrounding net-to-gross adjustments for CFLs rewarded through the ESP for FY04 and FY05. For any such analysis, the principle research issue is relatively simple, although the information needed to answer the question with complete certainty can be challenging to obtain. The research involves determining, based on the information available, whether or not the program (in this case, the residential CFL initiative) induced customers to take actions (i.e., purchase CFLs) that they would not have taken in absence of the program. The major finding outlined in this report is that ESP is, indeed, inducing large numbers of Wisconsin residential customers to purchase CFLs; and, more importantly, the analysis finds that total number of CFLs rewarded through ESP is nearly identical to the result one gets when subtracting baseline CFL sales (i.e., the number of CFLs that would have been sold in Wisconsin in absence of ESP) from the total number of CFLs sold in Wisconsin. Thus, the report concludes that the net-to-gross ratio for FY04 and FY05 should be 100 percent. Essentially, this says that ESP has produced energy savings that, we believe given the data available, would not have occurred if ESP were not offered.[xviii]

The evaluation team recalculated clothes washer gross savings values for FY05 and FY06 because the federal standard for clothes washers changed on January 1, 2004. The federal standard represents the baseline from which ENERGY STAR® qualified clothes washer gross savings values are calculated. The new values are 242 kWh and 8 therms for clothes washers rewarded through ESP and 230 kWh and 9 therms for clothes washers rewarded through WESH.

The evaluation team explored issues surrounding net-to-gross adjustments for clothes washers rewarded through ESP during FY05. As discussed with CFLs, the principle research issue is relatively simple, although the information needed to answer the question with complete certainty can be challenging to obtain. The research involves determining, based on the information available, whether or not the program (in this case ESP) induced customers to take actions (i.e., purchase ENERGY STAR® qualified clothes washers) that they would not have taken in absence of the program.

The major finding outlined in this report is that the number of clothes washers rewarded through Focus (15,135) overestimates what is reasonable for the number of clothes washers induced by Focus efforts. Therefore, we recommend a net-to-gross adjustment of 75 percent. Although Wisconsin has a higher market share than states without programs, the market share in states without programs is increasing at a faster rate than the market share in

Wisconsin.[xix] The change in the net-to-gross adjustment from 100 to 75 percent from FY04 to FY05 is a direct result of the faster rate of growth in states without programs.

Table 4-4. ENERGY STAR Products Program: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Reward	Air Conditioning	2	66	0.0%	0	0.0%	0	0.0%
Reward	Ceiling Fan	124	21,700	0.0%	0	0.0%	0	0.0%
Reward	CFL	1,080,919	46,878,190	83.1%	3,029	93.2%	0	0.0%
Reward	ES-Clothes Washer	9,102	2,202,684	3.9%	0	0.0%	72,816	49.0%
Reward	ES-Dehumidifier	26	1,300	0.0%	1	0.0%	0	0.0%
Reward	ES-Dishwasher	751	67,590	0.1%	0	0.0%	3,755	2.5%
Reward	ES-Miscellaneous	1	42	0.0%	0	0.0%	0	0.0%
Reward	ES-Refrigerator	515	33,990	0.1%	5	0.2%	0	0.0%
Reward	Lighting	49,494	4,621,921	8.2%	120	3.7%	0	0.0%
Spiffs	CFL	4,244	280,104	0.5%	8	0.3%	0	0.0%
Spiffs	ES-Clothes Washer	4,577	1,107,634	2.0%	0	0.0%	36,616	24.7%
Spiffs	ES-Dehumidifier	27	1,350	0.0%	1	0.0%	0	0.0%
Spiffs	ES-Dishwasher	7,058	635,220	1.1%	0	0.0%	35,290	23.8%
Spiffs	ES-Refrigerator	8,366	552,156	1.0%	84	2.6%	0	0.0%
Total		**1,165,206**	**56,403,947**	**100.0%**	**3,250**	**100.0%**	**148,477**	**100.0%**

Table 4-5. ENERGY STAR Products Program: Tracked Energy Impacts By Measure Program to Date (July 1, 2001–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Appliance Turn In	Appliance Turn In	20,007	27,632,568	10.6%	4,649	24.7%	0	0.0%
Reward	Air Conditioning	7,522	248,226	0.1%	1,278	6.8%	0	0.0%
Reward	Appliance Turn In	376	212,440	0.1%	489	2.6%	0	0.0%
Reward	Ceiling Fan	510	89,250	0.0%	0	0.0%	0	0.0%
Reward	CFL	4,475,483	204,297,832	78.4%	11,179	59.3%	0	0.0%
Reward	ES-Clothes Washer	42,777	10,936,674	4.2%	0	0.0%	683,256	75.9%
Reward	ES-Dehumidifier	14,653	732,650	0.3%	733	3.9%	0	0.0%
Reward	ES-Dishwasher	4,891	440,190	0.2%	0	0.0%	24,455	2.7%
Reward	ES-Miscellaneous	1	42	0.0%	0	0.0%	0	0.0%
Reward	ES-Refrigerator	5,918	390,588	0.1%	59	0.3%	0	0.0%
Reward	Lighting	70,047	9,236,628	3.5%	263	1.4%	0	0.0%
Spiffs	CFL	13,298	877,668	0.3%	27	0.1%	0	0.0%
Spiffs	ES-Clothes Washer	11,459	2,803,174	1.1%	0	0.0%	109,228	12.1%
Spiffs	ES-Dehumidifier	27	1,350	0.0%	1	0.0%	0	0.0%
Spiffs	ES-Dishwasher	16,648	1,498,320	0.6%	0	0.0%	83,240	9.2%
Spiffs	ES-Refrigerator	16,617	1,096,722	0.4%	166	0.9%	0	0.0%
Total			**260,494,322**	**100.0%**	**18,844**	**100.0%**	**900,179**	**100.0%**

4.2.3 Market Effects

A. INTERVIEWS WITH KEY MARKET PLAYERS

Below are the key market effects findings from interviews with key market players involved in the distribution of CFLs.

CFL Production and Trends. The decisions of manufacturers on how many CFLs to produce and of corporate-level retailers on how many CFLs to order are highly dependent upon CFL program activity. Manufacturers and corporate-level retailers said that production-related decisions are primarily based on the program allocation, program funding levels, and past program sales. This result means that CFL programs have a substantial influence on the short-term manufacture, distribution, and sales of CFLs due to the program's direct impact on the near-term, supply-side decision-making of manufacturers and corporate-level retailers.

Manufacturers that reported production of CFLs through joint ventures with production facilities in China said they require lead times in the range of 30–90 days to receive CFL orders.

Manufacturers who produce both CFLs and incandescent light bulbs, corporate-level retailers, and individual store retailers reported that CFLs are an important part of their overall lighting sales. Interestingly, manufacturers, corporate-level retailers, and individual stores acknowledge or express concerns about the effect that an increase in CFL market share will have on decreasing future light bulb sales, given that CFLs last up to seven times longer than incandescent light bulbs. The rationale for placing importance on CFLs despite a future decrease in sales is based on the belief that the incandescent light bulb market will never go away, but since the market is moving in the direction CFLs anyway, they want to position themselves to serve the growing CFL market. A benefit is that the profit margin for CFLs is higher than that for incandescent light bulbs. Another sentiment expressed was that in the long-run it doesn't matter anyway because of the emergence of LEDs, an emerging lighting technology with a lifetime that greatly exceeds that of CFLs.

CFL Sales Activity. All interviewed corporate-level retailers mentioned potential difficulties in providing actual sales information, though some were willing to provide general information on a percentage split basis.

Corporate-level and individual store retailers reported that CFLs are displayed and promoted much more prominently during promotional periods. This means that the program may be significantly altering the retail setting in a way that many consumers would not be able to recognize. Examples of the ways in which the retail setting has changed during promotional periods include: end caps and point-of-sale displays in prominent areas of the store, such as main aisles and checkouts; inclusion of CFLs in regular ads, such as circulars, mailers, newspapers, and newsletters; signage in prominent areas of the store, such as checkouts, main aisles, and marquis; and off-site promotions at facilities with large numbers of employees, such as manufacturing plants.

Manufacturers and corporate-level retailers said that CFL market share is much lower in states/regions without CFL programs. This means that baseline CFL sales are likely low. Further, manufacturers and corporate-level retailers predict that the CFL market would substantially decline in the absence of program activity. These results indicate the potential for continued significant program effects.

Manufacturers, corporate-level retailers, and individual store retailers reported that the price of CFLs has decreased over time. A few respondents explicitly attribute this decrease to CFL rebate programs. The retail price of CFLs has decreased from the $6–$10 range to the $3–$4 range. The cost is $0.99 to the customer who buys a CFL through a customer incentive or manufacturer/retailer buy-down program.

Manufacturers and corporate-level retailers cited a variety of reasons why customers purchase incandescent light bulbs instead of CFLs. Reasons are related to price, availability, familiarity, quality, and applicability.

While manufacturers and corporate-level retailers anticipate continued growth for the CFL market, they also mention the need for CFL programs and continued education in order to sustain this continued growth.

Conclusions and Recommendations. Although the NEEA report[xx] provides a few indications of longer-term effects, the residential evaluation team concluded that the program is primarily impacting the CFL market in the short-term. This implies the continued need for CFL programs in the near-term. We recommend that WECC incorporate into its program logic the development of a set of market progress indicators that would be annually tracked to signal the onset of longer-term market effects. The evaluation team is available to work with WECC and DOA staff to develop and track these indicators.

B. MARKET EFFECTS INFORMATION FROM THE CFL PROGRAM DATABASE

Below are the key findings from an analysis of the CFL program database, which provides a rich source of information regarding the progress of the CFL program.

CFL Reward History. The program has rewarded over three million CFLs since its inception in FY99 and over one million CFLs in each of the previous two FYs (FY04 and FY05). Instant rewards have dominated the program. Eighty percent of rewarded CFLs have been purchased via instant rewards compared to 19 percent via mail-in rewards and one percent via other mechanisms. Almost 60 percent of CFLs purchased through the program have been rewarded during the four months of the year (November, December, January, and February) in which the instant reward campaign is most heavily promoted.

Manufacturer and Retailer Activity. Three manufacturers comprise two-thirds of the CFLs rewarded through the program. Manufacturers who produce only CFLs comprise 27 percent of rewarded CFLs. The remaining rewarded CFLs are from manufacturers who also produce incandescent lamps.

The vast majority (84 percent) of rewarded CFLs have been sold through the home improvement and hardware channels. The mass merchant channel represents 12 percent of rewarded CFLs, and the food and drug channels each comprise less than one percent of rewarded CFLs. The program's distribution of rewarded CFLs by retailer channel is quite different from the national distribution of residential lamp sales.

Almost half of the CFLs have been rewarded through two retailers, Ace Hardware (29 percent) and Menard's (28 percent). Since the program's inception, over 1,100 stores have sold CFLs through the program. The top 10 stores have accounted for almost a third of CFL rewards, with the most active store accounting for nine percent. Almost two-thirds of CFL

rewards have been accounted for by the top 50 stores and about 95 percent have been comprised by the top 200 stores.

Customer Activity. Overall, about 420,000 customers have purchased a CFL through the program. Over 100,000 customers have purchased CFLs through the program in each of the last three FYs (FY03, FY04, and FY05). The program is continuing to reach new customers. For example, about 130,000 customers first purchased a CFL through the program in FY05. These customers represent 30 percent of all customers who have purchased a CFL through the program since its inception.

Customers who purchased CFLs through the program are making repeat purchases through the program. In particular, 16 percent of customers who have purchased CFLs through the program have made multiple purchases through the program. An analysis of trends in repeat purchasing by FY seems to indicate that the percent of customers who will make a repeat purchase through the program may level off in the 30–35 percent range. We still need more time, however, to see if this trend persists.

Seventy percent of customers who have made multiple purchases through the program have made two purchases, 19 percent have made three purchases, six percent have made four purchases, and four percent have made five or more purchases. Among customers who made multiple purchases, the interval between the first and last purchase was six months or less for about a third, between seven and twelve months for 18 percent, and one year or more for about half.

Multiple purchasers, on average, purchase the same number of CFLs (six) on their initial purchase as customers who have made only one purchase through the program. Multiple purchasers then come back and purchase, on average, an additional ten CFLs. This seems to suggest that the initial propensity to invest in CFLs is the same among those customers who purchase again versus those who do not. This raises the issue, possibly for future research to explore, of why the customers who have made only one purchase do not make a repeat purchase through the program, especially in light of the fact that survey research conducted as part of the installation rate studies shows that both instant and mail-in reward participants are highly satisfied with the CFLs they purchased through the program.

Household Penetration. As of the end of FY05, almost 20 percent of Wisconsin households have made at least one CFL purchase through the program since its inception. Because the program has been reaching new customers consistently during the last three years of high activity, household penetration has increased roughly six percentage points each FY since FY03 (from 6.9 to 13 percent between FY03 and FY04 and from 13 to 18.7 percent between FY04 and FY05). Each of the three largest counties in terms of number of households (Milwaukee, Dane, and Waukesha) has a penetration higher than the statewide average.

One interesting market effects-related finding from the CFL installation rate study is the fact that the percentage of instant reward purchasers mentioning cost as a reason for not previously purchasing CFLs went down from 57% in the FY04 study to 30% in FY06. Cost also went down as a reason for not purchasing in the past among mail-in reward participants—from 36% in the FY04 study to 27% in FY06. Clearly, cost has become less of a barrier than it was several years ago. The CFL installation rate study also found that the ESP 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, the Installation Rate Report also noted that 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, or CFL sales data from both participating and nonparticipating retailers becomes available, it will remain difficult to reliably assess lasting long-term market effects. Nevertheless, the report states that given the results to date, the probability of lasting market effects would appear to be on the rise.

Finally, the FY06 metric measurement process provided some findings related to ESP market effects. These findings are summarized next in the *Program Metrics and Goals* section.

4.2.4 Program Metrics and Goals

The ESP program had two contract metric goals for FY05. As stipulated in the FY06 DEP, we measured one of these metrics during the first half of FY06. A summary of the FY05 Metrics results is provided below in Table 4-6.

Table 4-6. FY05 Metrics Achievement Summary—ENERGY STAR® Products Program

Results	Metric Met?
FY05 Metric #1: Increase statewide (ENERGY STAR) clothes washer market share by 4 percentage points from the market share reported in the 2nd calendar quarter of 2004 using data triangulated from 3 sources: WECC retailer sales data, D&R International, and AHAM.[xxi] **Measurement Approach and Results:** The evaluation team attempted to address this metric, as proposed, through triangulation of information drawn from three sources: the Association of Home Appliance Manufacturers (AHAM), D&R International, and WECC Retailers. We were unable, however, to secure AHAM data for this purpose.[xxii] Therefore, the analysis is based strictly on information drawn from D&R International and WECC Retailers. Furthermore, D&R International data for the 1st and 2nd quarters of 2005 were not available at the time of the analysis. Therefore, we had to choose different pre- and post-periods on which to base the analysis. We decided to compare the 4th quarter of 2004 (post) to the 1st quarter of 2004 (pre). We choose the 1st quarter of 2004 rather than the 4th quarter of 2003 due to the change in ENERGY STAR criteria that took effect on January 1, 2004.[xxiii] Choosing the first quarter of 2004 ensures that the pre- and post-periods are comparable regarding the types of clothes washers that qualify. Our analysis indicates that ESP has met the goal for this metric. The evaluation team's review of ENERGY STAR clothes washer market share, as reported by D&R International and WECC Retailers, indicates that 44.9 percent of the clothes washers sold in Wisconsin during the 4th quarter of 2004 were ENERGY STAR qualified, compared to 36.7 percent during the 1st quarter of 2004. This represents an 8.2 percentage point increase, which exceeds the metric goal of 4 percentage points.[xxiv]	Yes
FY05 Metric #2: 5 percentage point increase in consumer's understanding of the ENERGY STAR label from that reported in a RDD survey of 400 Wisconsin households (implemented by the evaluation team) during the 4th calendar quarter of 2004. **Logic for Not Measuring Metric:** This metric was not measured. The evaluation team conducted a similar assessment for the past (i.e., FY04) fiscal year and found just a 2 percentage point increase in understanding from the previous fiscal year (FY03). In recognition of limited budgets, this measurement process will not take place again until FY07.	Not Measured

4.3 WISCONSIN ENERGY STAR® HOMES

These results include the Wisconsin ENERGY STAR Homes (WESH) program and measures installed through the Efficient Heating and Cooling Initiative (EHCI) in new homes prior to FY06.

FY06 evaluation efforts for new construction focused on the following:

- Addressing the WESH program metrics.

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

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

4.3.1 Process Findings and Issues

The Residential Program evaluation team did not formally included process-related evaluation tasks as part of our FY06 Detailed Evaluation Plan submitted to DOA. The evaluation team, however, stayed abreast of process-related issues by monitoring program changes and issues based on regular communications with the program manager.

4.3.2 Evaluated Energy Impacts

Because evaluation activities conducted during FY04 and FY05 have satisfactorily addressed the pertinent energy impact issues for WESH, we did not plan any energy impact activities for FY06.

The tables below show energy impacts for new construction program activity. This includes WESH activity and measures installed through the Efficient Heating and Cooling Initiative in new homes.

Table 4-7. Wisconsin ENERGY STAR Homes: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
New Construction	Air Conditioning	14	2,750	3.8%	7	69.2%	0	0.0%
New Construction	Ceiling Fan	68	11,900	16.3%	0	0.0%	0	0.0%
New Construction	CFL	179	11,814	16.2%	0	3.8%	0	0.0%
New Construction	ECM Furnace	21	16,233	22.3%	2	22.0%	420	0.3%
New Construction	ES-Clothes Dryers	20	9,900	13.6%	0	0.0%	-341	-0.2%
New Construction	ES-Clothes Washer	14	3,220	4.4%	0	0.0%	126	0.1%
New Construction	ES-Dishwasher	19	798	1.1%	0	0.0%	133	0.1%
New Construction	ES-Refrigerator	23	1,518	2.1%	0	2.4%	0	0.0%
New Construction	Home	1,458	0	0.0%	0	0.0%	145,800	98.9%

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
New Construction	Lighting	61	6,344	8.7%	0	2.6%	0	0.8%
New Construction	Ventilation	7	0	0.0%	0	0.0%	0	100.0%
Renewable Energy	Solar Water Heating	11	8,320	11.4%	0	0.0%	1,248	0.0%
Total		**1,895**	**72,797**	**100.0%**	**10**	**100.0%**	**147,386**	**0.0%**

Starting in FY04, technology rewards for the Efficient Heating and Cooling Initiative (EHCI) were expanded to include all new homes, regardless of WESH certification. The table below presents year-to-date impacts broken out by measure within both WESH and EHCI.

Table 4-8. Wisconsin ENERGY STAR Homes: Tracked Energy Impacts Program to Date (July 1, 2001–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
EHCI	Air Conditioning	1,066	342,229	9.7%	821	60.9%	0	0.0%
EHCI	ECM Furnace	1,285	1,446,910	41.2%	129	9.5%	25,700	3.6%
EHCI	Furnace	102	0	0.0%	0	0.0%	9,996	1.4%
EHCI	Heating	3	0	0.0%	0	0.0%	0	0.0%
EHCI	Water Heating	1	3,680	0.1%	0	0.0%	(195)	0.0%
New Construction	Air Conditioning	448	121,234	3.5%	291	21.6%	0	0.0%
New Construction	Ceiling Fan	218	38,150	1.1%	0	0.0%	0	0.0%
New Construction	CFL	1,518	100,188	2.9%	3	0.2%	0	0.0%
New Construction	ECM Furnace	555	429,015	12.2%	56	4.1%	11,100	1.5%
New Construction	ES-Clothes Dryers	703	410,400	11.7%	0	0.0%	(14,136)	-2.0%
New Construction	ES-Clothes Washer	563	74,666	2.1%	0	0.0%	12,187	1.7%
New Construction	ES-Dishwasher	1,696	71,232	2.0%	0	0.0%	11,872	1.7%
New Construction	ES-Refrigerator	882	58,212	1.7%	9	0.7%	0	0.0%
New Construction	GSHP	2	1,000	0.0%	2	0.2%	0	0.0%
New Construction	Home	6,374	361,272	10.3%	35	2.6%	657,089	91.7%
New Construction	Lighting	425	44,200	1.3%	2	0.1%	0	0.0%
New Construction	Miscellaneous	1	500	0.0%	1	0.1%	0	0.0%
New Construction	Solar Water Heating	2	0	0.0%	0	0.0%	280	0.0%
Renewable Energy	Solar Water Heating	18	8,320	0.2%	0	0.0%	2,938	0.4%
Whole House	Heating	1	0	0.0%	0	0.0%	0	0.0%
Total			**3,511,208**	**100.0%**	**1,349**	**100.0%**	**716,831**	**100.0%**

4.3.3 Market Effects

The FY05 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

The WESH program had three contract metric goals for FY05. As stipulated in the FY06 DEP, we did not measure these metrics during the first half of FY06. Instead, we assessed trends that are indicators of WESH's progress in the marketplace. The three metrics and the logic for not measuring them are discussed below in Table 4-9.[xxv] The analysis of trends is discussed following the table.

Table 4-9. FY05 WESH Metrics Achievement Results

Results	Metric Met?
FY05 Metric #1: Increase the frequency and quality of the interaction that participant builders have with consultants on the use of program practices (Goals: transition builders in "consultant" stage to more advanced stages—20% for builders joining in FY02; 15% for FY03 builders; 10% for FY04 builders; and 5% for FY05 builders.) **FY05 Metric #2:** Increase the frequency and quality of the interaction that participant builders (and consultants) have with builders' subcontractors on the use of WI ENERGY STAR Homes practices. (Goal: transition builders in "consultant" stage to more advanced stages—20% for builders joining in FY02; 15% for FY03 builders; 10% for FY04 builders; and 5% for FY05 builders.) **FY05 Metric #3:** Increase extent to which participating builders incorporate WI ENERGY STAR Homes materials and information in promoting the homes they build. (Goal: 25% increase in "homebuyer" stage overall.) **Logic for Not Measuring Metrics:** These three metrics were originally designed to measure the market progression of builders through WESH by classifying each WESH builder into one of four stages based on the relationship and level of interaction with WESH. Although this approach provided insightful results, a shortcoming is that it relies on a number of subjective indicators. In the absence of viable alternatives, we would propose continued use of this method; however, the infiltration analysis conducted during FY05 demonstrated that trends in air tightness among builders can be used to assess a builder's adoption of WESH recommended practices and provide an objective indicator of this progress.[xxvi] Furthermore, analysis of air tightness provides results on individual builders that can be acted upon by the program manager. In essence, the analysis serves simultaneously as an indicator of past performance and a management tool for improving future performance. Given the viability and benefits of this alternative approach, future metrics for FY06 incorporate trends in infiltration rates. We, therefore, recommended that the FY05 metric measurement activities not incorporate the subjective classification approach, but rather address additional analysis of infiltration rate data to set a baseline for future metrics.[xxvii]	Not Measured

Although we did not conduct the analysis of trends in the market progression of WESH builders by classifying them into one of four stages, we did assess trends that are indicators of WESH's progress in the marketplace. These trends were assessed as part of the FY04 metrics analysis and were assessed again as part of the FY05 metrics analysis to give an indication of WESH's progress in these areas in lieu of the classification analysis.[xxviii]

We found that about half of the builders who had certified a home through WESH during a previous FY did not certify a home through WESH during FY05. Despite this result, the overall number of homes certified by each builder cohort has increased from each cohort's first year of participation to FY05. Further, the number of homes certified in each FY has continued to grow steadily over time. Although movement into the "no activity" stage is not a favorable indicator, two factors have helped mitigate the potential negative effects of this movement. First, builders moving to this stage tend to be lower volume builders; thus, the loss of their potential program activity is minimal compared to the loss of higher volume builders. Second, the program has been successful at increasing the number of builders who

are building higher volumes of homes through the program. Each of these findings is discussed below.

Endnotes in Appendix E include sources and references supporting the above findings.

4.4 HOME PERFORMANCE WITH ENERGY STAR®

This section contains results for the Home Performance with ENERGY STAR (HPWES) program, as well as measures installed through the Efficient Heating and Cooling Initiative (EHCI) in existing homes.

FY06 evaluation efforts for existing homes focused on the following:

- Addressing the accuracy of the savings estimates for HPWES insulation measures. [xxix]
- Making net-to-gross adjustments for adjustments for 12/13+ SEER CACs and ECM furnaces. [xxx]
- Addressing the HPWES and EHCI program metrics. [xxxi]

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

- Process findings and issues.
- Evaluated 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 FY06 Detailed Evaluation Plan submitted to DOA. However, the evaluation team stayed abreast of process issues by monitoring via regular communications with the program manager any program changes and upcoming issues.

4.4.2 Evaluated Energy Impacts

The evaluation team addressed the accuracy of the savings estimates for HPWES insulation measures. This task was warranted because research conducted as part of the Wisconsin Achievable Potential Study (Potential Study) indicated that HPWES savings estimates for insulation measures are considerably higher than estimates from other studies. The major finding outlined in this memo is that the savings estimates from the Potential Study represent the best available estimates for insulation measures installed in Wisconsin. Therefore, we recommend the application of the Potential Study estimates to HPWES savings estimates retrospectively to FY05 and prospectively for FY06 and beyond until research is conducted to verify these savings values in the field.

The evaluation team explored issues surrounding net-to-gross adjustments for 12/13+ SEER central air conditioners (CACs) and forced air furnaces (FAFs) with electronically commutated motors (ECMs) rewarded through EHCI during FY05. For any such analysis, the principle research issue is relatively simple, although the information needed to answer the question

with complete certainty can be challenging to obtain. The research involves determining, based on the information available, whether or not the program (in this case, the residential EHCI) induced customers to take actions (i.e., purchase 12/13+ SEER CACs and ECM furnaces) that they would not have taken in absence of the program.

The report concludes that net-to-gross adjustments of 0 percent for 12 SEER CACs, 128 percent for 13+ SEER CACs, and 80 percent for ECM furnaces are reasonable based on the market data available. For 12 SEER CACs, this means that the number of units rewarded through the program is no greater than would be expected in the absence of the program. For 13+ SEER CACs, the implication is that the program is inducing sales above and beyond what the program is tracking.[xxxii] For ECM furnaces, the program is inducing sales, but at 80 percent of the level being tracked through the program.

The tables below (4-10 and 4-11) show energy impacts for HPWES program activity.

Table 4-10. Home Performance with ENERGY STAR: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
EHCI	Furnace	1	0	0.0%	0	0.0%	98	0.0%
Whole House	Insulation	1,814	335,663	78.8%	239	99.5%	224,089	60.7%
Whole House	Lighting	2	346	0.1%	0	0.0%	0	0.0%
Renewable Energy	SDHW System	1	0	0.0%	0	0.0%	312	0.1%
Whole House	Sealing		0	0.0%	0	0.0%	121,312	32.9%
Renewable Energy	Solar Water Heating	231	75,504	17.7%	0	0.0%	11,199	3.0%
EHCI	Water Heating	4	14,720	3.5%	1	0.5%	-780	-0.2%
Whole House	Water Heating	111	0	0.0%	0	0.0%	12,654	3.4%
Total		**123,476**	**426,233**	**100.0%**	**240**	**100.0%**	**368,884**	**100.0%**

Table 4-11. Home Performance with ENERGY STAR: Tracked Energy Impacts Program to Date (July 1, 2001–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
EHCI	Air Conditioning	26,707	8,019,243	25.7%	19,243	85.4%	0	0.0%
EHCI	ECM Furnace	20,755	16,501,799	52.9%	2,120	9.4%	415,100	19.5%
EHCI	Furnace	923	0	0.0%	0	0.0%	82,894	3.9%
EHCI	Water Heating	1,263	1,840,000	5.9%	150	0.7%	-10,518	-0.5%
Energy Saver Kits	Water Heating	4,722	838,523	2.7%	9	0.0%	323,996	15.2%
Renewable Energy	SDHW System	1	0	0.0%	0	0.0%	312	0.0%
Renewable Energy	Solar Water Heating	417	133,024	0.4%	0	0.0%	30,987	1.5%
Whole House	Furnace Fuel Switch	91	1,700,790	5.5%	0	0.0%	-72,163	-3.4%
Whole House	Insulation	6,353	2,010,978	6.5%	999	4.4%	935,211	44.0%
Whole House	Lighting	16	2,768	0.0%	0	0.0%	0	0.0%
Whole House	Sealing		0	0.0%	0	0.0%	382,808	18.0%
Whole House	Water Heating	568	119,886	0.4%	1	0.0%	37,404	1.8%
Total			**31,167,011**	**100.0%**	**22,523**	**100.0%**	**2,126,030**	**100.0%**

4.4.3 Market Effects

The FY05 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

The HPWES and EHCI programs had seven contract metric goals for FY05. A summary of the FY05 HPWES and EHCI Metrics results is discussed below in Table 4-12.[xxxiii]

Table 4-12. FY05 HPWES and EHCI Metrics Achievement Results

Results	Metric Met?
FY05 Metric #1: Increase the knowledge base of new and existing program providers and retain 90% of consultants and qualified contractors that enter the program after training. **Measurement Approach and Results:** The evaluation team measured the second part of this metric (retain 90% of consultants and qualified contractors that enter the program after training) by analyzing the program database to assess trends in program activity for each consultant and qualified contractor. The first part of this metric (increase the knowledge base of new and existing program providers) was measured as part of FY04 evaluation efforts. The results indicated that the program has established a network of program providers that have the knowledge and skills necessary to deliver the program.[xxxiv] Because the program achieved its goal, we recommended that further measurement of this aspect of the metric was not necessary. Our analysis indicates that HPWES has met this metric. During FY04, 52 consultants and qualified contractors provided services through the program. Only four of these 52 did not provide services through the program in FY05. This represents a retention rate of 92 percent, which exceeds the metric goal of 90 percent.	Yes
FY05 Metric #2 Increase the number of remodeling/home improvement companies with whom consultants and qualified contractors have developed relationships from 32 and 72 in FY03 and FY04, respectively, to 93 in FY05.[xxxv] **Measurement Approach and Results:** The evaluation team measured this metric by analyzing the program database to assess trends in program activity for each remodeling/home improvement company involved with the program. Our analysis indicates that HPWES has not met this metric. During FY05, a total of 75 remodeling/home improvement companies provided services through the program. This is fewer than the metric goal of 93.	No
FY05 Metric #3: Increase the number of referrals received by consultants and qualified contractors from remodeling/home improvement companies from 33 and 87 in FY03 and FY04, respectively, to 118 in FY05.[xxxvi] **Measurement Approach and Results:** The evaluation team measured this metric by analyzing the program database to assess trends in number of referrals received by consultants and qualified contractors from remodeling/home improvement companies. Our analysis indicates that HPWES has not met this metric. During FY05, a total of 116 referrals were received from remodeling/home improvement companies. This is two less than the metric goal of 118.	No
FY05 Metric #4: Increase the number of ratings and assessments performed by consultants and qualified contractors from 691 and 1,078 in FY03 and FY04, respectively, to 1,136 in FY05.[xxxvii] **Measurement Approach and Results:** The evaluation team measured this metric by analyzing the program database to assess trends in number of ratings and assessments performed by consultants and qualified contractors. Our analysis indicates that HPWES has met this metric. A total of 1,330 assessments/ratings were completed during FY05. This exceeds the metric goal of 1,136.	Yes

Results	Metric Met?
FY05 Metric #5: Increase the percent of assessments and ratings that result in the installation of at least one major measure related to building performance from 47% and 71% in FY03 and FY04, respectively, to 80% in FY05. **Measurement Approach and Results:** The evaluation team measured this metric by analyzing the program database to assess trends in the percent of assessments and ratings that involve the installation of at least one major measure related to building performance.[xxxviii] Our analysis indicates that HPWES has not met this metric. Although the total number of assessments/ratings completed increased from 1,078 in FY04 to 1,330 in FY05, the percent of assessments/ratings involving the installation of at least one major measure related to building performance remained relatively constant at 70 percent in FY05. This is less than the metric goal of 80 percent.	No
FY05 Metric #6: Increase market share of CAC SEER 13 and up by 2%. **Measurement Approach and Results:** The evaluation team measured this metric by analyzing trends in annual 13+ SEER CAC market share as reported by FACTS.[xxxix] Data for the 2nd quarter of 2005 (the last quarter of FY05) was not available at the time of the analysis. Therefore, 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 2004 and ending with the 1st quarter of 2005 (post) to the year beginning with the 2nd quarter of 2003 and ending with the 1st quarter of 2004 (pre). Our analysis indicates that EHCI has met its goal for this metric. The market share for 13+ SEER CACs increased from 5.9 percent to 10.4 percent. This represents a 4.5 percentage point increase, which exceeds the goal of 2 percentage points.[xl]	Yes
FY05 Metric #7: Increase in market share for 90+ furnaces with ECM by 2% as compared to the baseline set in FY04. **Measurement Approach and Results:** The evaluation team measured this metric by analyzing trends in annual ECM market share as reported by FACTS.[xli] Data for the 2nd quarter of 2005 (the last quarter of FY05) was not available at the time of the analysis. Therefore, 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 2004 and ending with the 1st quarter of 2005 (post) to the year beginning with the 2nd quarter of 2003 and ending with the 1st quarter of 2004 (pre). Our analysis indicates that EHCI has not met its goal for this metric. The market share for ECM furnaces decreased from 20.8 percent to 20.1 percent.[xlii] It is important to note that the reward was reduced from $150 to $100 during part of the post period.	No

4.5 TARGETED HOME PERFORMANCE WITH ENERGY STAR®

4.5.1 Introduction

PA conducted a mini-process evaluation of the Targeted Home Performance with ENERGY STAR (Targeted HPWES) and We Energies' low-income weatherization pilot in the Milwaukee area. The primary objective of the mini-process evaluation was to look at how Targeted HPWES and the We Energies pilot coordinate and affect each other.

Results are based on four in-depth interviews conducted in April 2006. Interviews were conducted with the Targeted HPWES program manager, the We Energies low income weatherization program manager, a DOA manager and an energy efficiency service provider in the Milwaukee area that weatherizes homes for both programs.

The mini-process evaluation indicates that at this time and under the current conditions, the programs are having little to no positive or negative impacts on each other. Results are presented in the following sections:

- Targeted HPWES and We Energies low income weatherization program comparison.
- Program coordination.
- Conclusion and key findings.

4.5.2 Targeted HPWES and We Energies low income weatherization program comparison

Targeted HPWES is administered by the residential administrator for Focus on Energy (Wisconsin Energy Conservation Corporation or WECC). This program provides weatherization services to households with incomes just over the income eligibility requirements for the state Weatherization Assistance Program (WAP)—households between 150% and 200% of the federal poverty level (FPL). The program was designed to build upon the existing infrastructure of state low-income energy services by using WAP agencies as the foundation for service delivery for one to four unit homes. Targeted HPWES began in 2002.

We Energies' low-income weatherization pilot is operating during the 2006 calendar year (January 1, 2006, to December 31, 2006). Its annual goal is to weatherize 150–175 homes in We Energies' service territory in the Milwaukee area. The program services low-income homeowners, but has flexible income eligibility requirements. While the program does not serve households that or at or below 150% FPL who are eligible for WAP, it can serve households above 200% FPL, which Targeted HPWES does not. Franklin Energy is implementing the program.

While both programs are providing weatherization services to low-income customers in the Milwaukee area that are not eligible for WAP, there are key differences between the programs. These are:

- **Targeted HPWES is a more comprehensive program.** Targeted HPWES offers a number of measures that result in both therm and electric savings for customers. The We Energies pilot only provides measures that result in therm (natural gas) savings.
- **Targeted HPWES requires customer co-pay.** Customers receiving services through Targeted HPWES are required to contribute 10% of the cost of the weatherization services they receive. The Targeted HPWES program manager reports that the program has only had one customer drop from the program due to the inability to pay the contribution after an audit has been completed. (This does not, however, include customers who may choose not to apply to the program in the first place because of the contribution.) The We Energies program does not have a customer contribution. The We Energies program manager reports they decided not to implement a customer contribution because they are targeting customers who are having financial difficulty in meeting their bills and they didn't want to make their difficulties greater.
- **We Energies is selectively recruiting for the pilot.** We Energies is targeting their program to their customers who have historically been good customers, but have had trouble paying their bills because of the 40%–60% increase in natural gas prices. They are mainly identifying customers through their Call Center. We Energies also accepts referrals from the Focus on Energy Call Center. Targeted HPWES has a

much broader marketing effort. Targeted HPWES does a direct mail to households who applied to WAP, but were over-income. Targeted HPWES also works with WHEAP and WAP agencies to receive referrals as well as utility call centers.

- **We Energies only serves homeowners.** Targeted HPWES also serves eligible renters.
- **We Energies income eligibility is more open.** Targeted HPWES is limited to eligible households from 150% to 200% FPL whereas We Energies serves low-income households that are above as well as below 200% FPL. The We Energies program manager reported that she believes We Energies low-income participants tend to have slightly higher incomes than Targeted HPWES participants and mainly serves households from 200% to 250% FPL.
- **Targeted HPWES is an ongoing program.** Targeted HPWES, as part of Wisconsin Focus on Energy, is an ongoing program and is not expected to be discontinued in the near future. On the other hand, We Energies weatherization pilot is expected to be a one-year only program. The We Energies pilot was only approved for one year and at the time of the interview, the We Energies program manager did not expect the pilot to continue after 2006.

4.5.3 Program Coordination

There is limited direct coordination between the We Energies and Targeted HPWES program. The only issue of direct coordination was We Energies agreed to pay the 10% customer contribution for Targeted HPWES for 65 homes weatherized through June 30, 2006 (the end of Targeted HPWES's program year)[7].

The main coordination issue for We Energies and Targeted HPWES is that both programs are drawing upon the same contactor infrastructure in the Milwaukee area to deliver the program. There was concern between the programs that using the same contractor would put strain on the programs(s), due to each program drawing on limited resources.

The interviewed weatherization service provider reported that both programs were running smoothly. At the time of the interview, both programs had ramped up their levels of activity and were approaching full production. He had expected that having both the Targeted HPWES and We Energies program would put a strain on the contractor infrastructure. However, he reported that had not happened yet. He had been able to bring in and train two new insulation contractors to respond to the programs' needs. He reported there are plenty of HVAC contractors to serve both programs.

"*I had anticipated a bigger strain but they're both running smoothly*."

The provider did express concern about ramifications about the difference in the programs' customer contribution. He reported that he was beginning to see conflict for customers who want to know why they have to pay a 10% customer contribution when others don't.

[7] Since the interviews, additional integration between the two programs has taken place. Targeted HPWES has agreed to pick up 90% of the electric measures installed for We Energies pilot participants that fall within the 150%–200% FPL guidelines.

"*I am worried about how fast the word will get out about the contribution*."

He said the difference in the contribution hadn't been a big issue yet, but he was starting to see the issue come up more. He said as a result he is worried that We Energies may slow down applications for Targeted HPWES and stop them from reaching their goals.

"*This can happen if they are both receiving quality services but one isn't paying anything*."

The Targeted HPWES program manager voiced a similar concern that We Energies' lack of a customer contribution may deter customers from participating in Targeted HPWES. She is especially concerned about this if We Energies does not pay for customer contributions after June 30, 2006, while We Energies is still operating their program.

4.5.4 Conclusion and Key Findings

The largest percent of Targeted HPWES's weatherized units are completed in the Milwaukee area. It could be argued that the We Energies weatherization pilot could adversely impact Targeted HPWES's ability to meet its annual goals. At this time, we do not believe this is likely to happen for the following reasons:

1. The We Energies pilot is not expected to continue past 2006.
2. The We Energies pilot is most likely fully subscribed at this time (200 applications are currently in process for a total number of jobs of 150–175).
3. The short duration of the We Energies pilot and small number of participants is most likely not significant enough to create an expectation of no customer contribution toward weatherization services in the Milwaukee market.
4. The contractor infrastructure in the Milwaukee area appears to be able to serve both the We Energies pilot and Targeted HPWES in a timely manner.

However, if any of the above conditions were to change—the We Energies pilot continue past 2006, the We Energies pilot expand its target number of customers, or the contractor infrastructure did not have enough resources to serve both programs—the pilot could have an adverse impact on Targeted HPWES.

The most prominent concern if the We Energies weatherization pilot expands or continues is that it will set a customer expectation of no contribution for weatherization services. Three interviewees believe that a customer contribution has positive impacts on customer participation.

"*The 10% contribution encourages homeowner participation in energy savings*. *We get improved customer coordination and cooperation with a customer co-payment and less complaints.*"

"*It could establish a precedent in the market for no customer co-pay and we have established that some customer co-pay is useful."*

Therefore, circumstances that discourage a customer contribution could have negative consequences in the Milwaukee market.

The mini-process evaluation indicates that at this time and under the current conditions, the programs are having little to no positive or negative impacts on each other.

4.5.5 Evaluated Energy Impacts

Table 4-13. Targeted Home Performance with ENERGY STAR: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)

Sub-program	Measure Type	Quantity	Evaluated Gross kWh	%	Evaluated Gross kW		Evaluated Gross Therms	
Existing Homes	Weatherization	312	371,904	100.0%	59	100.0%	92,040	100.0%
Total			**371,904**	**100.0%**	**59**	**100.0%**	**92,040**	**100.0%**

Table 4-14. Targeted Home Performance with ENERGY STAR: Tracked Energy Impacts Program to Date (July 1, 2001–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Existing Homes	Air Conditioning	32	4,934	0.3%	12	3.7%	0	0.0%
Existing Homes	CFL	4,991	140,382	8.1%	4	1.3%	0	0.0%
Existing Homes	Controls	384	0	0.0%	0	0.0%	5,907	1.2%
Existing Homes	ES-Refrigerator	195	85,904	5.0%	27	8.4%	0	0.0%
Existing Homes	Heating	758	54,315	3.1%	5	1.7%	99,045	20.7%
Existing Homes	Insulation	1,940	258,165	15.0%	99	30.8%	94,137	19.7%
Existing Homes	Lighting	16	2,412	0.1%	0	0.0%	0	0.0%
Existing Homes	Other	41	0	0.0%	0	0.0%	0	0.0%
Existing Homes	Sealing	409	0	0.0%	0	0.0%	15,946	3.3%
Existing Homes	Water Heating	1,045	158,123	9.2%	12	3.7%	9,906	2.1%
Existing Homes	Weatherization	856	1,020,352	59.2%	163	50.4%	252,520	52.9%
Total			**1,724,587**	**100.0%**	**323**	**100.0%**	**477,461**	**100.0%**

4.6 APARTMENT AND CONDOMINIUM EFFICIENCY SERVICES (ACES)

Given that ACES program funding was relatively small compared to the funding of other residential programs, the evaluation team did not evaluate ACES during FY06.

4.6.1 Evaluated Energy Impacts

Table 4-15. ACES: Tracked Energy Impacts FY06 (July 1, 2005–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
CSG In Unit Exchange	CFL	28,137	1,857,042	32.0%	55	11.8%	0	0.0%
CSG In Unit Exchange	Lighting	81	5,346	0.1%	0	0.0%	0	0.0%

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
CSG In Unit Exchange	Water Heating	7,346	571,758	9.8%	0	0.0%	78,675	13.8%
CSG Lighting	CFL	1,823	394,491	6.8%	26	5.6%	0	0.0%
CSG Lighting	Controls	3	526	0.0%	0	0.0%	0	0.0%
CSG Lighting	Lighting	5,217	813,774	14.0%	56	12.1%	0	0.0%
New Construction	Air Conditioning		496	0.0%	0	0.0%	0	0.0%
New Construction	Boiler	1	43,520	0.7%	0	0.0%	19,229	3.4%
New Construction	ES-Miscellaneous	1,099	119,354	2.1%	4	0.9%	8,549	1.5%
New Construction	Heating	13	436,709	7.5%	44	9.5%	48,271	8.4%
New Construction	Insulation	1	30,956	0.5%	5	1.1%	7,484	1.3%
New Construction	Lighting	52	675,148	11.6%	74	15.8%	-445	-0.1%
New Construction	Ventilation		27,338	0.5%	0	0.0%	2,629	0.5%
New Construction	Water Heating	129	76,428	1.3%	11	2.3%	45,374	7.9%
Whole Building Existing	Air Conditioning	195	63,500	1.1%	0	0.0%	195	0.0%
Whole Building Existing	Boiler	1,302	77,032	1.3%	0	0.0%	176,907	30.9%
Whole Building Existing	ES-Miscellaneous	473	39,574	0.7%	171	36.7%	722	0.1%
Whole Building Existing	Heating	996	133,241	2.3%	0	0.0%	151,807	26.5%
Whole Building Existing	Insulation	47	60,787	1.0%	0	0.0%	6,008	1.1%
Whole Building Existing	Lighting	1,578	369,859	6.4%	19	4.1%	0	0.0%
Whole Building Existing	Ventilation	2	8,101	0.1%	0	0.0%	0	0.0%
Whole Building Existing	Water Heating	16	0	0.0%	0	0.0%	26,543	4.6%
Total			**5,804,980**	**100.0%**	**466**	**100.0%**	**571,948**	**100.0%**

Table 4-16. ACES: Tracked Energy Impacts
Program to Date (July 1, 2001–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
Appliance Turn In	Appliance Turn In	467	0	0.0%	0	0.0%	0	0.0%
Comprehensive Assessment	Miscellaneous	1	1,170,894	2.3%	0	0.0%	295,318	8.2%
CSG In Unit Exchange	CFL	82,136	5,420,778	10.7%	161	3.4%	0	0.0%
CSG In Unit Exchange	Lighting	81	5,346	0.0%	0	0.0%	0	0.0%
CSG In Unit Exchange	Water Heating	9,720	727,062	1.4%	0	0.0%	106,785	3.0%
CSG Lighting		1		0.0%		0.0%		0.0%
CSG Lighting	CFL	19,234	4,027,816	8.0%	157	3.3%	0	0.0%
CSG Lighting	Controls	5	876	0.0%	0	0.0%	0	0.0%
CSG Lighting	Lighting	31,315	5,544,788	11.0%	363	7.6%	0	0.0%
CSG Lighting	Miscellaneous	20	6,570	0.0%	0	0.0%	0	0.0%
In Unit Exchange	Lighting	27,127	1,790,382	3.5%	54	1.1%	0	0.0%
In Unit Exchange	Water Heating	29,531	4,472,658	8.9%	0	0.0%	286,795	7.9%
New Construction	Air Conditioning	11	119,003	0.2%	60	1.3%	0	0.0%
New Construction	Boiler	11	43,520	0.1%	0	0.0%	56,636	1.6%
New Construction	ES-Miscellaneous	2,498	342,476	0.7%	12	0.2%	18,139	0.5%
New Construction	Heating	116	470,544	0.9%	44	0.9%	159,425	4.4%
New Construction	Insulation	13	40,262	0.1%	5	0.1%	16,232	0.4%
New Construction	Lighting	289	1,740,791	3.5%	189	3.9%	2,118	0.1%

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
New Construction	Miscellaneous	46	11,219	0.0%	8	0.2%	16,028	0.4%
New Construction	Ventilation		27,338	0.1%	0	0.0%	2,629	0.1%
New Construction	Water Heating	296	342,605	0.7%	11	0.2%	53,325	1.5%
Renewables-New	Water Heating	9	0	0.0%	0	0.0%	11,012	0.3%
Reward	Air Conditioning	331	15,226	0.0%	36	0.8%	0	0.0%
Reward	Appliance Turn In	16	9,040	0.0%	21	0.4%	0	0.0%
Reward	Ceiling Fan	21	3,675	0.0%	0	0.0%	0	0.0%
Reward	CFL	59,542	7,246,900	14.4%	221	4.6%	0	0.0%
Reward	ES-Clothes Washer	94	21,714	0.0%	0	0.0%	2,068	0.1%
Reward	ES-Dehumidifier	87	4,350	0.0%	4	0.1%	0	0.0%
Reward	ES-Dishwasher	31	2,790	0.0%	0	0.0%	155	0.0%
Reward	ES-Refrigerator	61	4,026	0.0%	1	0.0%	0	0.0%
Reward	Lighting	852	128,788	0.3%	4	0.1%	0	0.0%
Whole Building Existing	Air Conditioning	307	285,336	0.6%	111	2.3%	3,715	0.1%
Whole Building Existing	Boiler	1,595	671,623	1.3%	99	2.1%	652,491	18.1%
Whole Building Existing	Controls	226	398,025	0.8%	0	0.0%	314	0.0%
Whole Building Existing	ES-Miscellaneous	738	171,861	0.3%	171	3.6%	13,734	0.4%
Whole Building Existing	Heating	3,406	2,761,264	5.5%	331	6.9%	870,442	24.1%
Whole Building Existing	Insulation	1,046	874,427	1.7%	33	0.7%	131,852	3.6%
Whole Building Existing	Lighting	33,312	6,870,370	13.6%	787	16.4%	3,264	0.1%
Whole Building Existing	Miscellaneous	38	13,583	0.0%	2	0.0%	0	0.0%
Whole Building Existing	Ventilation	6	27,706	0.1%	0	0.0%	3,998	0.1%
Whole Building Existing	Water Heating	269	1,751,628	3.5%	94	2.0%	46,731	1.3%
Whole Building Existing DI	Miscellaneous	80,646	2,678,127	5.3%	1,760	36.8%	862,269	23.9%
Whole Building Existing-Pilot	Boiler	4	149,949	0.3%	34	0.7%	(3,002)	-0.1%
Whole Building Existing-Pilot	Heating	1	0	0.0%	0	0.0%	460	0.0%
Whole Building Existing-Pilot	Lighting	29	52,543	0.1%	11	0.2%	0	0.0%
Total			**50,447,879**	**100.0%**	**4,782**	**100.0%**	**3,612,933**	**100.0%**

4.7 EFFICIENT HEATING AND COOLING INITIATIVE (EHCI)

4.7.1 Evaluated Energy Impacts

Table 4-17. EHCI: Tracked Energy Impacts
FY06 (July 1, 2005–June 30, 2006)

Sub Program	Measure Type	Quantity	Verified Gross kWh	%	Verified Gross kW	%	Verified Gross Therms	%
EHCI	Air Conditioning	8,791	2,520,319	23.1%	6,051	85.1%	0	0.0%
EHCI	Boiler	642	0	0.0%	0	0.0%	62,916	23.0%
EHCI	ECM Furnace	10,560	8,391,271	76.9%	1,056	14.9%	211,200	77.0%
Total		**20,473**	**10,911,590**	**100.0%**	**7,107**	**100.0%**	**274,116**	**100.0%**

Note: For EHCI, program to date and year to date are the same figures, since the program began in 2006.

5. RENEWABLE ENERGY PROGRAM EVALUATION

5.1 OVERVIEW/KEY ACTIVITIES

This chapter describes our evaluation of the Renewable Energy Program in Fiscal Year 06. This chapter summarizes the following:

- Reports Delivered in FY06.
- Program Activities.
  - Count of projects installed.
  - Program-reported gross energy impacts.
- Net Energy Impacts.
  - Estimated FY06 Net Energy Impacts (July 1, 2005–June 30, 2006).
  - Final FY05 Net Energy Impacts.
- FY05 Performance Metric Review.
- Dairy Biogas Study.
- Non-energy Benefits Secondary Research.
- Upcoming FY06 Evaluation Activities.

5.1.1 Reports Delivered in Fiscal Year 06

During the first half of FY06, the Renewable Energy evaluation team submitted the following reports:

- FY04—Annual Overview.
- FY05—Semiannual Report.
- Focus Renewable Energy Program Fiscal Year 05 Performance Metric Review—final memo December 9, 2005.
- Dairy Biogas Study memo.
- Non-energy Benefits memo.

5.2 ENERGY IMPACTS

5.2.1 Program Activities

Table 5-1 shows that the program increased the total number of renewable energy system installations for the fifth consecutive fiscal year. A total of 39 nonresidential and 54 residential installations were funded by the program between July 1, 2005, and June 30, 2006 (FY06). Residential photovoltaic (PV) systems continue to be the dominant residential technology with 48 installations, followed by wind with five installations. During FY06 the program funded 16 thermal bioenergy projects, surpassing the entire program's prior thermal bioenergy total of 10 projects. The program credits the increase in wood burning applications to record

increases in natural gas prices.[8] High natural gas prices may result in higher free ridership rates for thermal applications as this results in a faster pay back period for the customer. In FY06 the number of installations for most of the remaining nonresidential technologies is the same or higher than in FY05[9].

Table 5-1. Projects Implemented by Type and Year

Technology	Completed Projects					
	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	Program To Date
Commercial and Industrial Projects						
Solar Water Heating	0	0	0	4	5	**9**
Biogas	0	0	1	4	7	**12**
Thermal Bioenergy	0	0	3	7	16	**26**
Solar Electric	1	2	3	9	9	**24**
Wind Machine	0	2	2	5	1	**10**
Hydroelectric	0	1	0	1	0	**2**
Other	0	0	0	1	1	**2**
All Nonresidential	**1**	**5**	**9**	**31**	**39**	**85**
Residential Projects						
Solar Electric (PV)	0	20	40	35	48	**143**
Wind Machine	0	1	8	2	5	**16**
Other	0	0	0	1	1	**2**
All Residential	**0**	**21**	**48**	**38**	**54**	**161**
All Projects	**1**	**26**	**57**	**69**	**93**	**246**

5.2.2 FY06 Program-reported Gross Energy Impacts

Table 5-2 provides the gross energy savings for all projects completed in FY06 that received a Cash-Back Reward or a grant that has associated energy impacts. The program-reported gross impacts for the Renewable Energy Program by technology and segment are provided for FY05, FY06, and program to-date. Therm savings in FY06 are almost five times as large as those achieved in all of FY05. This is largely driven by the thermal bioenergy projects. Electric savings decreased considerably in FY06 compared to FY05, but this is due to the completion of one very large project that was completed in FY05. The gross electric savings for FY06 are still substantially larger than all years prior to FY05.

[8] Focus on Energy Renewable Energy Program Quarterly Report. October through December 2005.

[9] The exceptions are Wind Machines and Hydroelectric, for which there were more installations in FY05 than in FY06.

Table 5-2. Renewable Energy Program Gross Energy Impacts[10]
By Segment and Technology

Segments	Technology	Energy Impacts	Completed		
			FY05 Jul 04–Jun 05	FY06 Jul 05–Jun 06	Program To Date July 1, 2001–June 30, 2006
Nonresidential	Solar Water Heating	Kilowatts	0	0	0
		Annual kilowatt-hours	0	0	0
		Annual therms	20,481	13,708	34,189
	Biogas	Kilowatts	2,270	1,586	3,886
		Annual kilowatt-hours	18,714,864	12,366,960	31,294,166
		Annual therms	18,965	0	108,653
	Thermal Bioenergy	Kilowatts	0	0	0
		Annual kilowatt-hours	0	0	0
		Annual therms	406,318	1,982,546	2,478,234
	Solar Electric	Kilowatts	46	24	88
		Annual kilowatt-hours	57,382	29,643	112,680
		Annual therms	0	0	1,283
	Wind Machine	Kilowatts	240	65	391
		Annual kilowatt-hours	343,758	83,600	562,614
		Annual therms	0	0	0
	Hydroelectric	Kilowatts	700	0	1,300
		Annual kilowatt-hours	2,956,800	0	6,473,600
		Annual therms	0	0	0
	Other	Kilowatts	0	0	0
		Annual kilowatt-hours	0	0	0
		Annual therms	1,056	102	1,158
	All Nonresidential	**Kilowatts**	**3,256**	**1,675**	**5,665**
		Annual kilowatt-hours	**22,072,804**	**12,480,203**	**38,443,060**
		Annual therms	**446,820**	**2,071,844**	**2,623,517**
Residential	Solar-PV and Thermal[11]	Kilowatts	48	135	290
		Annual kilowatt-hours	69,521	177,638	386,800
		Annual therms	0	0	3,776
	Wind Machine	Kilowatts	38	106	229

[10] Gross energy impacts are from the Program tracking system maintained by WECC.

[11] "Solar PV and Thermal" includes residential PV installations and projects that combine PV with solar thermal technologies. The therm savings are from both the combined projects and PV installations that were off-grid and displacing fossil fuel generators on-site.

Segments	Technology	Energy Impacts	Completed		
			FY05 Jul 04–Jun 05	FY06 Jul 05–Jun 06	Program To Date July 1, 2001–June 30, 2006
		Annual kilowatt-hours	49,218	123,346	319,021
		Annual therms	0	0	0
	Other	Kilowatts	0	0	0
		Annual kilowatt-hours	0	-15,545	-15,545
		Annual therms	372	1,881	2,253
	All Residential	**Kilowatts**	**87**	**241**	**519**
		Annual kilowatt-hours	**118,739**	**285,439**	**690,276**
		Annual therms	**372**	**1,881**	**6,029**
TOTAL	**All Projects**	**Kilowatts**	**3,343**	**1,916**	**6,184**
		Annual kilowatt-hours	**22,191,543**	**12,765,642**	**39,133,336**
		Annual therms	**447,192**	**2,073,725**	**2,629,546**

5.3 NET ENERGY IMPACTS

This section explains the calculation of estimated energy impacts for FY06 and final FY05 energy impacts. Final fiscal year energy impacts are determined following the end of the fiscal year. They are based on surveys with program participants and calculated for all projects completed in that fiscal year. For example, final FY05 adjustment factors were calculated during the first half of FY06 based on all projects completed in FY05.

This report includes estimated FY06 net energy impacts based upon the final FY05 net adjustment factors. (The final FY06 adjustment factors, based on projects completed between July 1, 2005, and June 30, 2006, will be reported in the January 2007 semi-annual report.) In this report we present the final FY05 adjustment factors, final FY05 energy impacts, and estimated energy impacts for the first half of FY06 using the final FY05 adjustment factors.

5.3.1 Estimated FY06 Energy Impacts (July 1, 2005–June 30, 2006)

Estimated FY06 evaluation-verified gross and net energy impacts were determined by applying the final FY05 adjustment factors to the FY06 program-reported gross energy savings. The estimated FY06 impacts, the final FY05 impacts, and the impacts for the previous program years are provided in Table 5-3. During the first half of FY06, the evaluation team calculated FY05 adjustment factors based on projects completed during FY05. These adjustment factors were developed on a technology basis and are applied to the program-reported gross energy savings (by technology) for FY06 to determine estimated FY06 evaluation-verified gross and net energy impacts. The overall net adjustment factor for FY06 is different from FY05 because the mix of technologies differed.

For all completed years in the table, verified gross impacts were calculated by multiplying the overall program-reported gross savings by the overall program gross savings adjustment factor. Similarly, verified net savings is the product of the overall program-reported gross

savings and the overall realization rate. This was calculated for each of the three energy units (kWh, kW, and therms). In the case of estimated FY06 energy savings, the adjustment factors were applied at the technology level because the percentage of savings each technology accounts for changed from FY05 to FY06. Technology-level adjustment factors are not provided in this report to protect respondent confidentiality. We must note, however, that applying FY05 adjustment factors to FY06 projects resulted in very low net savings estimates. The change in the mix of technologies contributing to gross savings lowered the overall estimated net savings (by increasing the percent of estimated free-ridership). Further discussion of the calculation and application of the adjustment factors is provided in the next section.

Table 5-3. Renewable Energy Program
Reported Gross, Verified Gross, and Verified Net Impacts
FY02 through FY06

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	12,619,307	1,340,992	1,916	1,880	330	2,073,725	1,570,318	282,401
Total	**39,133,336**	**38,732,150**	**9,051,802**	**6,184**	**5,965**	**1,988**	**2,629,546**	**2,129,487**	**571,815**

Source: FY06 Program-reported gross, extracted from the Renewable Energy program tracking database, as synchronized on July 25, 2006.

Note: FY06 verified net savings were estimated by applying FY05 net adjustments at the technology level.

5.3.2 Final FY05 Energy Impacts

This section presents the results of the FY05 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*. The gross savings factors were based on verification of installation and an engineering review of the reported savings from installation for projects between July 1, 2005, and June 30, 2006.

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 reporting of the effect the Program had on their installation of the renewable energy measure. 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 measure installed
- Had no impact on a pre-existing intention to install the measure.

Data used in the net analysis came from several sources.

- Program-reported savings for each measure were obtained directly from the Renewable Energy Program tracking database.
- The evaluation team requested additional information from Program staff for each completed measure. This included detailed paperwork associated with the project application, and conversations clarifying the status of some projects. This information was used as a basis for the engineering verification.
- We conducted telephone interviews with participants completing 62 percent of the measures and representing 99.7 percent of kWh, 98.4 percent of kW, and 97.7 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.
- We verified the information provided in the Program documentation (measure, size, and other key variables) and then reviewed the engineering calculations for reasonableness and consistency.
- We contacted miscellaneous vendors to confirm information, get product specifications, or otherwise obtain information necessary for a thorough engineering review.

Table 5-4 below reports the final adjustment factors for FY05. These factors are based on a sample of projects completed in FY05 (July 1, 2004–June 30, 2005). The resulting gross savings adjustment factors combined with the attribution factor are used to determine the net program impacts. These numbers were calculated in aggregate for electric energy (kWh), electric demand (kW), and fossil fuels (therms). [12] The resulting net adjustment factors were then applied to all projects completed in FY05, resulting in the final net energy impacts of the Focus Renewable Program for FY05.

[12] For a more complete description of the data collection methodology and analysis algorithms refer to *Renewable Energy Program: Spring 2004 Impact and Linkage Evaluation* Bobbi Tannenbaum and Ryan Barry, KEMA Consulting and Adam Serchuk, Serchuk and Associates, PA Government Services Inc. July 19, 2004

Table 5-4. Final Net Adjustment Factors for FY05

Adjustment Factor	kWh				kW				Therms			
			Standard Error				Standard Error				Standard Error	
	n[a]	Estimate	Jul04 - Jun05	Extra-polated	n[a]	Estimate	Jul04 - Jun05	Extra-polated	n[a]	Estimate	Jul04 - Jun05	Extra-polated
Installation Rate	32	100%			32	100%			13	100%		
Engineering Verification Factor	32	99%	0.4%	2.0%	32	98%	0.6%	2.9%	13	77%	4.1%	19.3%
Gross Savings Adjustment Factor		99%				98%				77%		
Attribution Factor	31	19%	3.3%	15.5%	30	30%	3.9%	18.6%	12	26%	1.2%	5.4%
Realization Rate		19%				29%				20%		

aThe gross savings adjustment factor and the realization rate are not calculated directly but are products of other adjustment factors. Therefore, sample sizes are not provided for these two adjustment factors.

Similar to previous year, the final FY05 gross savings adjustment factors are high, 99 percent, 98 percent, and 77 percent for energy (kWh), demand (kW), and therms, respectively. Final FY05 net evaluated energy impacts are 19 percent of the energy (kWh), 29 percent of the demand (kW), and 20 percent of program-reported gross therm (i.e., raw tracking system) impacts. These low realization rates are a result of low attribution factors. For all energy types (except therms) the installation rate was 100% and the engineering verification factor was close to 100%. The free-ridership rates, however, for all energy types for the Renewable Energy Program are high. Free ridership is estimated at 81 percent for kWhs (energy), 70 percent for kW (demand), and 74 percent for therms. That is, the analysis indicates that 81 percent of the electric energy savings, 70 percent of the demand savings, and 74 percent of the therm savings would have been implemented without the program. This represents a very high free-ridership rate and a significant drop in program attribution from previous years.

We did notice a substantial difference in attribution rates by measure type. We cannot, however, report these differences without compromising respondent confidentiality. The evaluation team will explore other, market-based, approaches to assess these high free ridership rates and provide information to the program on how to address this issue. We will note, however, that the low program attribution is driven by projects that were expansions of existing renewable systems or had substantial economic benefits to the customer, or both.

5.4 MARKET EFFECTS

The evaluation team did not conduct any market effects research during this time period.

5.5 PROGRAM METRICS & GOALS

The *Summary Matrix for Operational Goals and Market Effects,* Appendix B, Amendment 12 of the Renewable Energy Program Administrator's Year 4 contract with the Wisconsin Department of Administration listed seven metrics, all related to the installation of photovoltaic (PV) systems. In the first half of FY06, the evaluation team conducted various tasks to determine how well the Renewable program did in achieving the goals identified in the metrics, and reported on the findings in December 2005.[13]

[13] FY05 Renewable Metrics Memo, Final-051209.doc

5.5.1 Summary of Metric Findings

Table 5-5 below summarizes the results of the evaluation to determine how well Wisconsin Renewable Energy Network (WREN) met the FY05 goals.

Table 5-5. Summary of Contract Metric Achievements

Metric #	Metric Goal	Metric Goal Achieved
1	Increase by 10 percent the number of participants who progress from receiving program information to paying for a site assessment, installing a PV system (whether Focus-funded or not), or taking a training course as a result of the program.	No
2	Achieve as high or a higher rate of response from targeted marketing than the response from previous PV program marketing efforts.	Insufficient Data Provided
3	Increase the number of installed PV systems that were influenced by Focus financial incentives. *(Increased program attribution, compared to FY04.)*	No
4	Increase by 10 percent the number of participants installing PV who report that the Focus site assessment was an important influence on their decision to install a PV system.	Yes
5	Increase by 10 percent the number of practicing electricians who participate in Focus training and are adding PV to their existing set of skills.	Yes
6	Increase by 10 percent the number of certified PV site assessors as a result of program-sponsored training.	Yes
7	Increase by 35 percent the number of certified PV installers as a result of program-sponsored training.	No

It is clear from our assessment of Metrics 5, 6, and 7 that there is an increase in the number of professionals trained and available to support a PV industry in Wisconsin. We can also infer that those who received training or certification see an opportunity to provide services in the PV industry. This is an indication that there was unmet demand for these services or that the industry is growing. Focus played a role in providing training and certification for these professionals, and the supporting infrastructure for PV systems has increased since the program's inception. We cannot, however, draw a definitive connection between Focus activities and the growth in the PV industry in Wisconsin.

Program staff report a program logic that lays out the steps Wisconsin consumers take to install a PV system. These steps, at the most basic level, involve obtaining information (possible through a variety of program activities), getting a site assessment, and subsequently installing a PV system. Metrics 1 and 4 are premised on this logic. The majority of participants who install a PV system do not follow these steps, and most install a PV system without engaging in other program activities. The number (and percent) of participants who get a site assessment prior to installation is very low (less than 15 percent) indicating, overall, that a site assessment is not an important factor in the decision to install a PV system.

Perhaps the most disappointing finding is that the program attribution decreased in FY05 from FY04. This indicates that the program is still attracting consumers who are highly motivated to install PV systems, even without program services and incentives.

Our assessment of these metrics calls into question the program logic itself. At this stage of the program, the logic does not seem to apply. Program attribution is low, the majority of participants are finding information on PV systems from other sources, and most are not obtaining site assessment prior to installation. Based on our surveys with the program

participants, we believe this is because many of the participants had been considering the installation of PV systems prior to the Focus program and did not need all the program services to install a system. A program with greater funding or a decrease in the cost of PV systems (which will effectively occur with the start of the federal solar tax credits) may result in less informed consumers considering PV and following the program steps toward installation.

5.5.2 Metric 1: Increase by 10 percent the number of participants who progress from receiving program information to paying for a site assessment, installing a PV system (whether Focus-funded or not), or taking a training course as a result of the program.

A. APPROACH

Using data provided by WECC, we identified three stages of program activity that participants could engage in:

1. Information—Received PV information from the program via the call center, through Focus facilitation services, or by attending a workshop.
2. Assessment—Received a cash-back reward for a PV site assessment.
3. Installation—Received a cash-back reward for the installation of a PV system.

We then identified the number of customers who had engaged in one or more of these activities to assess whether the number or percentage of participants progressing through these steps had increased in FY05 from FY04.

Table 5-6 below shows both the number and percentage of program participants who participated in one or more stages of program activity.

B. SUMMARY OF FINDINGS

Table 5-6 below shows the number and percent of participants engaged in the three activities (or steps) in FY04 and FY05. The shaded areas indicate participants who progressed through more than one step. The only substantial increase in progression is the number of participants obtaining information and subsequently obtaining a site assessment. There was not, however, a substantial increase in the percent of participants progressing from information to site assessments. We therefore conclude that, overall, this metric was not achieved.

Table 5-6. FY04 and FY05 Progression through Focus Program Services

	FY04		FY05	
	Number	Percent	Number	Percent
Information only (FY04 or FY05)	1,435	95.2%	2,090	95.1%
Site assessment only (FY04)	21	1.4	35	1.6
Installation only (program year)	19	1.3	28	1.3
Information (program year or before) and assessment (program year only)	14	0.9	24	1.1
Information (program year or before) and installation (program year only)	13	0.9	14	0.6

	FY04		FY05	
	Number	Percent	Number	Percent
Assessment (program year or before) and installation (program year only)	3	0.2	4	0.2
Information (program year or before), assessment (program year or before), and installation (program year only)	2	0.1	2	0.1
Total	**1,507**	**100.0%**	**2,197**	**100.0%**

5.5.3 Metric 2: Achieve as high or higher rate of response from targeted marketing than the response from previous PV program marketing efforts.

A. APPROACH

We used data provided by WECC to assess this metric. We could neither independently verify these data nor the metric.

B. SUMMARY OF FINDINGS

The information provided by WECC indicates a lower initial response in FY05 compared to FY04 for targeted marketing activities. This indicates that the program did not meet this metric.

Program staff did not provide the evaluation team with sufficient data to independently assess the initial response to targeted marketing nor did they provide any data to assess activity beyond initial response to the mailings (site assessments, education and training, and installations). It is possible that some of these initial responders obtained training, a site assessment, or installed a renewable energy system after the initial data request. Given the lag between requesting information and taking action, it is also possible that some of the initial responders will eventually install a renewable energy system.

The relationship between a reduction in initial response to targeted marketing and overall program impacts on renewable energy installation is unclear, since, we cannot determine whether respondents proceeded to take advantage of other program offerings. A lower response rate to initial targeted marketing does not necessarily mean a lower effect on the installation of renewable systems.

5.5.4 Metric 3: Increase the number of installed PV systems that were influenced by Focus financial incentives. *(Increased program attribution, compared to FY04.)*

A. APPROACH

In FY04, the evaluation team conducted telephone interviews with 49 percent of the PV participants to determine program attribution. We repeated the survey with 49 percent of FY05 participants and compared the attribution factor results to assess this metric. In both years, the samples were selected from all participants installing small PV systems. The questionnaire included sections on the system installed, the decision process, program impact, attribution, engineering, barriers to implementation, and demographics. The program

attribution survey questions and estimation techniques asked were identical in FY04 and FY05.

The questions asked in the attribution section are designed to measure the program's impact in terms of its influence on:

Installation—Would the participant have installed the system without the program?

Timing—Did the program have an effect on when the system was installed?

Size—Did the program have an effect on the size of the system?

For participants who would have installed a system without the program, but installed it sooner or installed a larger system, the program was assigned partial attribution.

B. SUMMARY OF FINDINGS

We found a decrease in program attribution from FY04 to FY05 for PV systems and concluded that this metric was not achieved. The program attribution rate for PVs decreased from 71 percent in FY04 to 47 percent in FY05. The difference in program attribution rates for PV is statistically significant at the 90 percent confidence level.

The decrease in program attribution for PVs is a result of two factors. In FY05 a greater percentage of participants reported that they would have installed or expanded their PV system without the program, and a lesser percentage of participants said that the program accelerated the timing for installation of a system.

5.5.5 Metric 4: Increase by 10 percent the number of participants installing PV who report that the Focus site assessment was an important influence on their decision to install a PV system.

A. APPROACH

We determined the number of PV installers who had a site assessment in FY04 and FY05 based on the data provided by WECC to assess Metric 1. To assess the influence of the site assessment on participants' decisions to install a PV system we used the same surveys discussed in Metric 3. Some of the questions asked in the program impact section were designed to gauge the effect of the assessment on the customer's decision to install the PV system.

B. SUMMARY OF FINDINGS

Using the data provided by WECC, we determined that few PV installers had a Focus site assessment (see Table 5-6 above). Five PV installers had a site assessment in FY04, compared to six in FY05. Based on the survey responses we determined that 50 and 66 percent (in FY04 and FY05, respectively) of the installers who had a site assessment said it was important in their decision to install a PV system. (Based on two respondents to these questions in FY04 and three in FY05.) Overall, the site assessment was important for 7 and 8 percent of the installations in FY04 and FY05, respectively.

The estimated change from 7 to 8 percent is a 10 percent increase in the number of participants installing PV who reporting that a Focus site assessment was an important influence on their decision to install a PV system. However, this change is so small as to be

within the margin of error for our estimates. We conclude that this metric was marginally achieved.

5.5.6 Metric 5: Increase by 10 percent the number of practicing electricians who participate in Focus training and are adding PV to their existing set of skills.

A. APPROACH

We used data provided by WECC that identified the courses offered each year, listed the attendees, and identified those attendees who were electricians.

B. SUMMARY OF FINDINGS

The number of electricians who obtained PV- related training from Focus on Energy-sponsored training increased substantially from FY04 to FY05. This metric was met.

Table 5-7 indicates that this increase is primarily due to the Interconnection course offered by Lakeshore Technical College in FY05. This course provides 18 continuing education units (CEUs) to electricians.

Table 5-7. Electricians Receiving Continuing Education Units for Focus Training

Course Title	Organization Offering Course	FY04	FY05
Basic PV/PV Site Auditor	MREA	3	3
Advanced Photovoltaics	MREA		2
Renewable Energy Interconnection	Lakeshore Technical College		8*
Totals		**3**	**13**

* An additional 6 people attended the training but were not identified as electricians.

5.5.7 Metric 6: Increase by 10 percent the number of certified PV site assessors as a result of program-sponsored training.

Metric 7: Increase by 35 percent the number of certified PV installers as a result of program-sponsored training.

A. APPROACH

We used data provided by WECC to assess Metrics 6 and 7. WECC maintains lists of *Certified Renewable Energy Site Assessors* and *Full Service Solar Electric System Installers Active in Wisconsin*. The lists of certified PV assessors and PV installers in FY04 were compared with these lists for FY05.

For Metric 6 we compared the list of people receiving Focus workshop scholarships to the list of newly certified site assessors to see if Focus played a role in the certification process.

For Metric 7, we compared the list of attendees to FY05 Focus-sponsored PV installation training and to the scholarship list. The purpose of this comparison was to determine if any of the newly certified PV installers had attended the training.

B. SUMMARY OF FINDINGS

The program achieved the Metric 6 goal. The number of certified PV site assessors (Metric 6) increased from 17 at the end of FY04 to 26 at the end of FY05. This represents a 53 percent increase in the number of certified PV site assessors. Of the nine site assessors added in 2005, four obtained a grant to attend site assessor training offered by the Midwest Renewable Energy Association. This represents a 30 percent increase in the number of certified PV site assessors as a result of program-sponsored training. The program achieved the Metric 6 goal.

The number of North American Board of Certified Energy Practitioners (NABCEP) Certified PV Installers increased from three in FY04 to seven in FY05. This represents a 133 percent increase in the number of certified PV installers for FY05. However, we did not find any of the newly certified installers listed as attendees of Focus-sponsored training or as recipients of grants to receive training. We find no evidence that the increase in certified installers is a result of program-sponsored training. The program did not achieve the Metric 7 goal.

5.6 DAIRY BIOGAS STUDY

Beginning in FY05, the Renewable Energy program launched its large dairy farm biogas systems program. The program identified a target market of approximately 100 dairy farms with 500 or more head of cows. The small target population and the extended time period it takes to facilitate the installation of a dairy biogas energy system creates a complicated and delicate situation for evaluation. To address the concerns associated with repeatedly surveying this limited population, we decided to establish a panel of dairy farmers that met the target criteria. The panel would be used to assess the effectiveness of program activities on participants' attitudes and behaviors over the long-term and to inform programming efforts.

We identified two purposes for this study:

- Assessing the effectiveness of the program's dairy biogas activities (marketing, education, assessments, and incentives)
- Providing the program with insights into decision-making processes at these large farms.

The full results of this study are reported in a memo to Oscar Bloch dated January 31, 2006, on the subject "Focus on Energy Public Benefits Evaluation Biogas Panel Baseline Study Results."

5.6.1 Dairy Biogas Study—Summary of Findings

Large dairy farmers in Wisconsin are aware of anaerobic digesters and the large majority of them can speak knowledgeably about the potential benefits of anaerobic digesters for dairy farms. The majority reports odor reduction and the ability to generate (and sell) electricity as benefits of a system. Many are aware of other benefits of digesters. High initial costs and digester maintenance issues (cost and difficulty) are the most often cited negative aspects of the systems. We found no substantial differences between farms within and outside the Focus service territory. There are indications that farms outside the Focus service territory are obtaining information from Focus sources, which may create a spillover effect outside the Focus territory.

The majority of respondents have explored installing a system on their farm and 30 percent say they are likely to install a system in the next two years. Other respondents indicated that they intended to install one, but not in the next two years. Those who do not intend to install one within two years most often cite financial barriers and technology concerns as reasons for not installing the system. Others say that it is not cost effective for their farm. Most of these responses appear to be based on significant thought and in many cases analysis of anaerobic digesters for their farms.

Farmers have learned about anaerobic digesters from a variety of sources. At almost one-half of the respondent farms, someone had attended an event at which anaerobic digesters for dairy farms were discussed or a tour of a facility was provided. Over three-quarters of respondents recall receiving written information on digesters and report getting this information from a wide variety of sources. Contractor/vendors were the most often cited source of this information. Only 11 percent recalled receiving written information on digesters from Focus on Energy. The respondents get information on manure management, in general, from wide variety of sources. It was clear from the interviews that farmers with facilities this large are tied into information networks and have access to information from a variety of sources. They read magazines targeted to dairy farmers and "network" with other farmers regularly. This target market is small and homogeneous enough that getting information to them on a specific topic is not difficult.

These findings indicate a market for anaerobic digesters that is maturing. The target market is aware and knowledgeable about the product, and most have explored purchasing it. The major obstacle to installation of systems appears to be initial and operational costs.

In FY05, the program provided incentives to three farms for anaerobic digesters. According to the Focus tracking database, two were expansions of existing systems that cost between $210,000 and $220,000 dollars and received grants of $40,000 and $45,000 respectively, representing approximately 20 percent of the system cost. The tracking database shows the third system costing $380,000 and receiving an incentive of $45,000, or approximately 12 percent of the system cost. (A listing of federal USDA grants provided by Focus lists the last farm as receiving a $300,000 grant for an anaerobic digester, which makes it unclear whether the tracking database is showing a net amount.) In FY06 the Focus grants were limited to a total of $80,000 (a maximum of $45,000 for electricity and $35,000 for thermal savings). For new digester systems incentives are likely to be less than 10 percent of the project cost, and unlikely to overcome financial barriers.

The findings from this baseline research suggest that Focus should examine its strategy for promoting anaerobic digesters in Wisconsin. While cost is often cited as a barrier to installation, it is unclear that Focus incentives are likely to have an impact on this market. The small size of Focus incentives, relative to digester costs, coupled with the availability of larger grants from the Department of Agriculture make them relatively ineffective in encouraging farmers who are not already installing a digester to install one. In other words, it is a situation likely to result in high free ridership and low net savings.

Focus efforts might be better spent continuing to provide information about anaerobic digesters and developing case studies to demonstrate the effectiveness of the technology. As more digesters become operational in Wisconsin, skeptical farmers will be seeking information regarding how they performed to determine if it is worth doing in their farm. If the economics of anaerobic digesters changes, making it cost effective for the smaller (but still large) dairy farms, farmers will need to learn of this. If the farmers who currently believe their

farm is too small for a digester are wrong, Focus can then provide materials to overcome that perception.

5.7 NON-ENERGY BENEFITS

The Initial Benefit-Cost Analysis for the Focus on Energy program did not include market effects or non-energy benefits (NEBs) for the renewables program. We will not include market effects in the upcoming B-C analysis, but in FY06 we explored NEBs through secondary research. The primary purpose of the secondary research was to determine how other state renewable energy programs treat NEBs.

Few public benefit funds contacted consider non-energy impacts rigorously in evaluating their renewable energy programs. None do so comprehensively. If Wisconsin chooses to pursue this topic, it will likely be breaking new analytic ground.

Several states consider at least some of the non-energy impacts identified by Wisconsin when scoring proposals for individual renewable energy projects, setting incentives, or other program design elements. Most program managers contacted endorse the logic of valuing projects more highly if they produce additional benefits. Here again, though, no manager contacted believed that their program had done a thorough, or a thoroughly defensible, job of identifying and setting weights for the various non-energy impacts that may come into play. Should Wisconsin choose to tackle this topic at a level of precision comparable to its energy efficiency benefit-cost analysis, significant pioneering would be required.

Program managers interviewed raised questions regarding the policy rationale behind conducting benefit-cost analysis. Most managers contacted noted that their programs aim to support precisely those immature technologies that would currently fail a benefit-cost test. They doubt that demonstrating that failure would prove analytically useful or politically productive.

We note, however, that if these programs are promoting technologies that for the most part do not currently make economic sense, then presumably the rationale for promoting them goes beyond immediate returns. The implied rationale seems to be that the programs will help make the technologies cost-effective by creating production improvements and economies and developing a supply-side infrastructure. Benefit-cost analysis of these programs should take this into consideration.

These research results are indicative, but not conclusive. Other states not included in these findings may have made useful progress on treatment of non-energy impacts, in particular California and New Jersey[14], which have active renewable energy programs.

5.7.1 Summary of Findings

- Of six state public benefit funds contacted, **none performs a benefit-cost analysis** to evaluate the performance of its renewable energy programs.
  - As a result, few see the need **to define rigorously or track** the non-energy impacts of interest to Focus.

[14] We made multiple attempts to identify and contact an appropriate respondent in these (and other) states, but were unsuccessful.

- Respondents explain their lack of attention to evaluation, benefit-cost analysis and non-energy benefits in various ways:
  - As **a temporary weakness** reflecting institutional immaturity, to be remedied as the programs ramp up operations.
  - As a result of an **oversight structure** that provides no incentive for third-party program evaluation, or which has intentionally chosen not to allocate resources for evaluation.
  - Most managers contacted argue that **benefit-cost analysis is inappropriate for renewable energy programs**, because those programs aim to support technologies that do not yet make economic sense.
    - Some respondents note that their programs are modeled on financial institutions, and should be judged on the fit between institutional goals and the investments selected, and on the investments' soundness.
- Several programs contacted consider some types of non-energy impacts in **evaluating individual project proposals,** particularly where those proposals respond to competitive solicitations.
  - These considerations are generally **qualitative**.
  - Some programs have developed ways to include those non-energy effects associated with the **grid impacts of distributed generation** in their program activities.
- Some state fund managers caution that benefit-cost analysis is a **sensitive topic** in the renewable energy community, and contend that representatives of the energy efficiency industry use the vocabulary of benefit-cost analysis to oppose renewable energy policies.

5.8 UPCOMING FY07 EVALUATION ACTIVITIES

In this section, we describe the upcoming FY07 evaluation activities. For a more detailed discussion of these activities, refer to *Focus on Energy Public Benefits Evaluation Contract Year 6 Detailed Evaluation Plan (FY07 DEP)*.

- **Finalize FY06 Energy Impacts.** In FY07 we will conduct engineering reviews and customer surveys to determine the net energy impacts for FY06. Impact evaluation will complete coverage of FY06 projects. Despite the lack of contractual energy goals, the program and evaluation team recognize the value of conducting net energy analysis as a method for better understanding program accomplishments and participant motivations for installing renewable energy systems.

  These efforts will focus on large projects and on thermal projects. We will include some PV projects, as budget allows. Larger projects (especially biogas) and projects producing thermal benefits are now dominating program savings.
- **Estimate FY07 Energy Impacts.** We will estimate the first half of FY07 energy impacts using the FY06 realization rates. We will complete the energy impact evaluation for FY07 projects in FY08.
- **Benefit-Cost Analysis.** A benefit-cost analysis of the Focus on Energy program is planned for fall 2006. The evaluation team will provide data and analysis to support

the development of the benefit-cost figures. The renewable energy component of the Initial Benefit-Cost Analysis did not include market effects or non-energy benefits (NEBs). We will not include market effects or NEBs in the upcoming B-C analysis. In FY06 we explored NEBs through secondary research. The primary purpose of the secondary research was to determine how other state renewable energy programs treat NEBs. In general none of the programs interviewed are quantifying NEBs. If Focus chose to do so it would be a groundbreaking effort. Quantifying NEBs for the B-C analysis would not be a good use of evaluation funds at this time.

- **FY06 Performance Metrics Review.** We will track the program's progress toward attaining its contractual goals and report the findings in the January semiannual reports. The FY05 performance metrics are exclusively related to biogas. Although the program will continue to promote PV and other technologies, the program has committed to dairy biogas energy systems as a long-term strategy. This is reflected in the FY06 performance metrics. Early in FY07, we will assess the program's performance on meeting the FY06 performance metrics. See the Detailed Evaluation Plan for more discussion of the performance metrics and approach to assessing them.
- **FY08 Planning**. We will prepare a Detailed Evaluation Plan for FY08 and work with the program to develop metrics for the FY08 program.

6. FOCUS ON ENERGY BIBLIOGRAPHY

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7. LOW-INCOME PROGRAMS

This section of the report highlights evaluation results for the Low-income Public Benefits Programs—the Wisconsin Home Energy Assistance Program (WHEAP) and the Weatherization Assistance Program (WAP). Low-income evaluation results are presented separately from the other Focus on Energy programs because the low-income programs' objectives significantly differ from other Focus programs.

The ultimate goal of the low-income programs is to deliver services in a manner that contributes to making households' energy self-sufficient within the constraints of state and federal limits for eligibility[xliii], whereas the goals of other Focus programs being evaluated revolve around market transformation and energy savings. Assessing the WHEAP and WAP programs only in terms of energy savings does not provide a complete picture of the societal and non-energy benefits of these types of programs.

This section summarizes the evaluation activities and results throughout the second half of FY06. Additionally, this section summarizes the activities defined for FY07, as addressed in the Detailed Evaluation Plan.[15] Detailed support is not provided in this section, as the intent of this report is to serve as a summary document. Please contact the evaluation team to receive supporting information for sections of interest. We have referenced the supporting documentation in all of the relevant places.

We present summary results for the Low-income Programs in the following categories:

1. Evaluation activities, findings, and issues.
2. Evaluated energy impacts.
3. Non-energy benefits.
4. Technical information to support evaluation results.

7.1 EVALUATION ACTIVITIES, FINDINGS, AND ISSUES

Evaluation activities that are presented in this section are:

1. Weatherization operator and staff training model review.
2. Weatherization Assistance Program distribution and measure review.
3. We Energies Low Income Program evaluation.
4. REACh Program evaluation.

7.1.1 Review Of The Training Model For Weatherization Operators And Staff

PA reviewed the current model for weatherization staff and operator training, and potential problems or shortcomings with the current training system, and identified potential resources that may be used to improve the current training model. Data collection activities included in-

[15] Fiscal year 2007 Detailed Evaluation Plan, June 2006.

depth interviews with the following groups, supplemented by program document reviews provided by each:

1. Staff involved in the design and delivery of Wisconsin WAP training (three staff).
2. WAP state program managers (six managers).
3. Training providers (nine providers).

The Weatherization Assistance Program Staff and Operator Training report provides detailed findings related to state-specific WAP training efforts and training provider offerings. This abbreviated summary provides a background of WAP training, WAP training best practices, and recommendations resulting from the study.

A. BACKGROUND OF WAP TRAINING

DOA's Division of Energy contracts with agencies throughout the state to deliver weatherization to low-income households. Agencies include community action agencies, housing authorities, tribes, local governments, and other nonprofit organizations.

Each year, DOA receives training and technical assistance (T&TA) funds from the Department of Energy (DOE) to support WAP T&TA efforts. DOA allocates a training fund to each agency as well as to one contractor to provide centralized facilitation of WAP training. The centralized training contract is put out to bid every three years. WECC was awarded the current training contract.

In addition to the standard training component, there is also a new WAP training component in the 2005–2006 program year, Rapid Response Training. Rapid Response Training needs are identified through DOA's monitoring and quality assurance (QA) process. DOA staff reported that while they are working on strengthening the link between QA and training, it has not been formalized yet and agencies are still recommended, not required, to attend trainings.

DOA program managers identified the following barriers to delivering effective WAP training: lack of qualified trainers; slow response time to identified agency training needs; and utilization of non-weatherization training resources. DOA staff identified several issues that WAP staff training will need to address in Wisconsin. These include health and safety issues, having enough resources to get the work done, the use of subcontractors, and program management.

B. WAP TRAINING BEST PRACTICES

This section highlights nine weatherization training best practices identified through state program managers and/or training providers interviews.

1. *Establish training requirements*. Program managers believe that weatherization training requirements can lead to consistently quality work across agencies.

2. *Address subcontractor quality of work*. Subcontractors make up a significant percent of the weatherization workforce. Program managers report that the use of subcontractors to weatherize homes is a practice that is here to stay.

3. *Deliver program management as well as technical training*. Program manager training was identified as a way to help empower staff by getting agency management on

board with practices covered in training and become supportive of staff implementing practices. In addition, interviewees report that there are complex demands in managing a weatherization program such as contract management, construction management, procurement, and crew and subcontractor management.

4. *Create a mechanism to make sure that training is responsive to agency needs and QA process.* Interviewees reported that agencies do not operate in a vacuum, therefore it is important to understand their needs and the demands under which they operate. It was further elaborated that it is important that the training sessions are responsive to the QA process by addressing issues identified in a timely manner.

5. *Provide hands-on application opportunities.* Interviewees were unanimous in their opinion that effective technical training needs to be reinforced through hands-on experience and application in the field.

6. *Identify expert trainers.* Interviewees expressed the need to identify expert trainers who can teach effectively and are readily available to deliver training sessions.

7. *Foster peer training.* Interviewees report that peer training promotes both networking between agencies and agency buy-in to training topics.

8. *Evaluate effectiveness of training sessions.* Interviewees report that effective training must respond to agency needs and actively promote staff understanding and implementation in the field. Evaluating the effectiveness of training sessions can help fine-tune trainings to better achieve these goals.

9. *Develop pipeline of new weatherization professionals.* Interviewees report a 'greying' of the weatherization workforce. A pipeline of new weatherization professionals can help replenish the pool of experienced weatherization professionals as experienced weatherization staff retire.

C. RECOMMENDATIONS FOR WAP TRAINING

Wisconsin is already incorporating many of the best-practice elements identified through this study in their WAP training. Wisconsin, like other interviewed states, sees the role of training increasing in importance as WAP faces new challenges. A major overhaul of Wisconsin's training model is most likely not needed, but opportunities do exist to increase the effectiveness of WAP training. Given this, we provided the following recommendations for DOA WAP staff to consider:

1. **Develop a state training policy.** Interviewees repeatedly brought up the issue of agency buy-in to training. An important first step is to show state buy-in to training through a state training policy. A state training policy could also improve consistency among agencies, which was raised as an issue by several interviewees.

2. **Evaluate the effectiveness of current training practices.** While this study has gathered qualitative information about weatherization training practices and models, key pieces of quantitative research about the effectiveness of current training practices are lacking that are necessary to inform DOA WAP staff in developing and refining a state training policy. We recommend that DOA expand this study to evaluate the effectiveness of current training practices with a survey of local agency staff to

measure how training sessions, including the new Rapid Response Training, have addressed their needs and affected their practices. Taking this study a step further can also help address the correct balance of internal/external training.

3. **Address subcontractor training.** The use of subcontractors in WAP is not going away as agencies look for ways to effectively meet production goals. There are numerous issues with subcontractor training. These include: deterring good and already busy contractors from the program; rural agencies having fewer contractors to chose from; and the source of payment for training. Wisconsin may want to consider a 'middle ground' approach for subcontractor training. If WAP staff feel that the quality of subcontractor work is better addressed through the procurement process (e.g., agencies only hire subcontractors who will perform quality work), then the issue of subcontractors could be addressed through management training with agencies that focus on how to effectively identify and manage subcontractors to ensure quality work.

4. **Integrate weatherization training with other training efforts.** WAP does not need to operate as an 'island.' While there are unique issues and regulations associated with WAP, the program uses building science principles that apply to other residential professionals and management practices that apply to other rehabilitation/small construction projects. The private weatherization training providers interviewed were able to make training centers financially feasible because they provide training to the private sector as well as WAP. If DOA is interested in a distance-learning course, collaboration may be possible with AEE, UW-EX, or similar organization.

5. **Investigate the feasibility of a dedicated training 'facility' in Wisconsin.** Interviewees were unanimous in the need for 'hands-on' practice for effective weatherization training. In addition, there were several reported advantages of a dedicated training facility for 'hands-on' practice as opposed to client homes. DOA must consider the costs of a training facility carefully as many of the state training centers take up the majority to all of the state's T&TA funds, leaving little left for other effective training systems. What DOA may want to consider is something similar to Vermont and investigate applying for a grant to equip a house and/or mobile home for training.

6. **Investigate Training the Trainer.** Some training providers reported that it was difficult to identify good weatherization trainers. The biggest challenge for them was to identify experts who could teach. State program managers and training providers offered several recommendations for addressing barriers. These could be used as a basis to develop a mini Train the Trainer Course or trainer guidelines for WAP. Alternatively, qualified experts could be sent to an already established Train the Trainer course.

7. **Develop a database of qualified trainers.** We recommend DOA's external training provider develop a database of qualified trainers for various subject areas. This would result in the ability to quickly and easily identify expert training providers and increase the responsiveness to training needs.

8. **Proactively address the 'greying' of the weatherization workforce by exploring tie-ins with local community and technical colleges.** State weatherization programs, including Wisconsin's program, are benefiting from long-term staff who have considerable weatherization expertise. However, experienced staff are beginning

to retire. Local community and technical colleges offer an opportunity to build a new 'pipeline' of talented young people entering the weatherization workforce.

7.1.2 Weatherization Assistance Program Distribution and Measure Review

Past evaluation efforts showed that WAP is serving a disproportionately lower number of renters, who tend to be less well off and live in poorer living conditions than homeowners. Additionally, the types and amounts of measures installed in rental units differ from measures installed in owned units.

For this task, we reviewed the measures funneled into the rental units by geographic area in comparison to other housing types. We reviewed and reported additional studies characterizing rental units, specifically multi-family units, in terms of their energy use and conservation behaviors. This activity will be completed in the last quarter of FY 2006. Last, we compared the percent of eligible units served by WHEAP and WAP by county and agency to identify any localities where WAP may be under serving multifamily units in general.

PA distributed a draft memorandum report to DOA in June 2006. The memorandum is currently being revised and will be resubmitted based on DOA comments. The final year-end report will reflect these findings.

7.1.3 We Energies Low-income Pilot Program Evaluation

We Energies designed a pilot program available to some Milwaukee residents who participate in Wisconsin's Home Energy Assistance Program (WHEAP): the Low-income Pilot (LIP). LIP is designed to relieve participating customers of disconnects, reduce their arrears, and establish payment habits using payment plan options provided by We Energies. The pilot will be administered in the Milwaukee area for three years (April 2005–April 2008).

We Energies enrolled the final Year 1 Low-income Pilot (LIP) participants at the end of September 2005. After enrollment was complete, the two administering agencies, the Social Development Commission (SDC) of Milwaukee and Community Advocates, began offering energy education and financial management workshops and case managers began to meet with participants on an individual basis in the fall of 2005.

This evaluation is ongoing. The first full program year will not be complete until September 2006, at which time a Year 1 report will be released. This section details evaluation activities that have taken place in FY06 and preliminary process findings reported in March 2006.

A. EVALUATION ACTIVITIES

To date, the major data collection activities in the first year include:

1. **Process interviews**: In October 2005 and March 2006, formal process interviews were conducted with program managers and case managers at SDC and Community Advocates and project managers at We Energies. Throughout the entire evaluation year, the evaluation team has kept abreast of issues through conversations with agencies and We Energies and has attended one of their bi-weekly update meetings.

2. **Telephone survey of first-year participants**: PA interviewers spoke with 709 of the 3,000 enrolled participants in November and December 2005. These interviews asked participants about their participation experience, bill payment practices before and

since participating in the program, financial management practices, energy conservation practices, and general household condition.

3. **Energy use and financial management questionnaires administered prior to energy education workshops:** The intent of these questionnaires was to understand what participants knew prior to the workshops, and to get a true baseline of awareness, knowledge, and behavior. The participant surveys in subsequent years will interview a subset of these participants to ascertain any changes in awareness, knowledge, and behavior since the workshops, and resulting from the program. Agencies administer the surveys and return them to PA to be data entered. PA received 942 energy education and 644 financial management surveys during the first evaluation year.

4. **Drop out surveys:** Households drop out of the program for various reasons. To capture a full picture of program performance, PA spoke with 18 participants that were removed from the program. This survey was meant to be qualitative and reviewed respondents' experiences with the program and reasons for their removal.

5. **We Energies LIP database review:** We Energies manages a progress database, which is updated each week. This data will be essential to identifying participant progress. It includes key performance indicators such as number of payments made, payment amounts, amount of arrears, number of times arrears have been forgiven, program status, and prior year's payment behaviors. PA worked with We Energies to thoroughly review the database and identify any inconsistencies or areas of confusion. This data source will feed into the program analysis for reporting.

B. PRELIMINARY PROCESS FINDINGS—YEAR 1

- **Enrollment:** The Program Year 1 enrollment period lasted slightly over five months. In total, approximately 3,200 households were accepted into the first year of the program. Enrollment rates rose after extensive mailing and outreach efforts by We Energies and the agencies (Community Advocates and Social Development Commission of Milwaukee). Households were also more eager to sign up after being presented with disconnection notices as discussed in more detail below.

  Program 2 enrollment began in January 2006. Program 2 enrollment supplemented the participant pool by 1,000 to account for those who dropped out, or would drop out, of the program. This enrollment was completed by June 2006.

- **Resources:** We Energies relies heavily on SDC and Community Advocates to enroll participants and administer the program. Program managers at the agencies expressed their commitment to the program. However, they also said they were over-worked with the existing staff they had. In the course of Year 1, We Energies saw the difficulty agencies were experiencing and provided funding for additional staff. We Energies also provides funds toward agency costs—$100 per participant—but the agencies view these funds as a stipend more than an income into the program.

- **Removal/drop out rate:** Approximately a third of program participants have been removed from the program due to nonpayment. Reasons why participants dropped out vary. The final report will qualitatively discuss why participants dropped out of the program.

- **Workshop delivery:** Community Advocates and SDC developed their energy conservation and financial management workshop materials separately from each other. As a result, the delivery of workshops differs considerably; Community Advocates promotes a group delivery style whereas SDC offers workshops in a more classroom setting. One system is not necessarily better than the other, they are simply different.

  These workshops serve as more than a way to educate customers—they also serve as a means to reinforce program requirements and benefits according to the agencies. Both SDC and Community Advocates were quick to remind participants of the benefits they receive through the program, and the implications of being removed from the program, financially and otherwise. Participants observed were incredibly responsive to the information presented to them and the program in general.

- **Participant characteristics:** Table 7-1 details program participant characteristics and telephone survey respondents as of March 2006. For the most part, the characteristics of the participant population are similar to survey respondents. This is important to note as it suggests that the individuals we spoke with in the survey are representative of the LIP program population as a whole.

Table 7-1. Characteristics of LIP Program Participants and Survey Respondents
(n varies depending on availability of data)

Characteristic	Survey Respondents		LIP Program Participants	
Household composition				
At least 1 child present in the household	35.4%	(n=644)	38.8%	(N=2,719)
At least 1 elderly member present in the household	8.4%	(n=644)	6.7%	(N=2,719)
At least 1 disabled member present in the household	31.4%	(n=644)	31.2%	(N=2,719)
Poverty level				
Poverty level less than or equal to 75% FPL*	44.4%	(n=644)	49.2%	(N=2,719)
Poverty level greater than 75% FPL*	55.6%	(n=644)	50.8%	(N=2,719)
Average poverty level*	80.5% of FPL	(n=644)	76.4% of FPL	(N=2,719)
Housing status				
Live in multi-family unit*	16.1%	(n=644)	21.0%	(N=2,719)
Live in single-family unit*	33.2%	(n=644)	28.7%	(N=2,719)
Live in duplex or two family	50.5%	(n=644)	50.1%	(N=2,719)
Live in mobile home or trailer	0.2%	(n=644)	0.2%	(N=2,719)
Utility information				
Average budget bill amount if weren't on program	$205.55	(n=704)	$198.70	(N=3,219)
Average monthly bill amount on program	$91.96	(n=704)	$89.79	(N=3,219)
Average arrears prior to program	$2,014	(n=704)	$2,109	(N=3,219)

* Difference statistically significant at 95% confidence interval

7.1.4 REACh Program Evaluation

SDC is completed its third program year administering REACh Milwaukee as of March 31, 2006. To formally complete the program cycle, SDC is required to have an independent evaluation to report their progress against the goals established in their proposal.

PA Consulting Group drafted and distributed an interim evaluation report in March 2005[16]. This report described the program, reported on program progress at that point in time, and identified process issues for further exploration.

In May 2006, PA conducted process interviews with SDC and DOA staff involved in managing and/or administering the program. In addition to the process interviews, PA reviewed the program database and participation data. Last, PA spoke with 24 REACh participants to develop a broader understanding of the program's impacts on their household. Given the small number of participants contacted, the results of these interviews should be viewed as qualitative.

The REACh report, submitted to DOA on June 30, 2006, is in draft format; therefore, the key findings are not presented in this report.

7.2 EVALUATION ACTIVITIES IDENTIFIED FOR FY07

Four evaluation activities are identified for the low-income program in FY07. These activities are summarized in Table 7-2. The reader is referred to the final evaluation plan for more details surrounding these activities[17].

1. Identification of WAP Training Evaluation Metrics.
2. Crisis Assistance Distribution Study.
3. WAP Prioritization Study.
4. We Energies LIP Program Evaluation—Year 2.

Table 7-2. Low-income Evaluation Summary for FY07

Study	Summary	Research activities
1. Identification of WAP Training Evaluation Metrics	Work with DOA to identify metrics necessary for effectively evaluating WAP's training activities and data that need to be tracked to feed into these metrics.	• Consultation with DOA
2. Crisis Assistance Study	Characterize large crisis recipients (households that receive $750 or more in crisis payments in a heating season), the process by which these payments are made, and use of the payments.	• Telephone surveys • Process interviews • Database analysis
3. WAP Prioritization Study	Determine if the revised prioritization scheme implemented in the city of Milwaukee is resulting in any energy savings, and identify administrative issues resulting from the change in prioritization.	• Pre-/post-billing analysis • Telephone surveys • Process interviews • Database analysis

[16] Laura Schauer and Pam Rathbun, "Residential Energy Assistance Challenge Evaluation—Interim Report" March 31, 2005.

[17] Low-income Public Benefits Evaluation: FY07 Detailed Evaluation Plan (Final June 19, 2006)

Study	Summary	Research activities
4. We Energies Low-income Pilot Evaluation—Year 2	A continuation of the We Energies Low-income Pilot evaluation, reviewing program performance against goals and metrics established by the program.	• Bill payment analysis • Telephone surveys (participant and nonparticipant) • Process interviews • Database analysis

7.3 EVALUATED ENERGY IMPACTS

Energy impacts are reported for homes weatherized through WAP and emergency furnace replacements implemented through WHEAP over the last five contract years (July 1, 2001–June 30, 2006).[xliv] In Federal Contract Year 2006 WAP weatherized 8,829 units and WHEAP handled 768 emergency heating system replacements[18].

Below are the annual verified gross energy and demand savings realized through participation in these programs. These savings are reported for the program to-date. Energy and demand savings are based on per unit average savings from the Year 3 billing analysis. Appendix D of the final report will have maps showing the geographic distribution of low-income program benefits.

Table 7-3. Low-income Programs:
Annual Verified Gross Energy And Dollars Saved

	Annual kWh Saved*	Annual Dollar Value of kWh Saved	Annual Therms Saved*	Annual Dollar Value of Therms Saved	Number of Participants
Year to Date (July 1, 2005–June 1, 2006)					
Total Saved	**7,354,557**	**$772,964**	**1,601,580**	**$1,856,231**	
WAP	7,354,557	$772,964	1,377,324	$1,596,319	8,829
WHEAP	NA	NA	224,256	$259,913	768
Program to Date (July 1, 2001–June 30, 2006)					
Total Saved	**36,776,420**	**$3,865,202**	**8,930,717**	**$10,350,701**	
WAP	36,776,420	$3,865,202	8,090,341	$9,376,705	36,454
WHEAP	NA	NA	840,376	$973,996	4,584

NA: Not applicable.

7.4 NON-ENERGY BENEFITS

7.4.1 Economic Impacts

Public benefits spending on these low-income programs results in a number of impacts on the economy: the creation of new jobs, increases in Wisconsin business sales, increases in Wisconsin's gross state product (GSP), and an increase in household income.

[18] Number of WAP units invoiced and closed through July 24, 2006, and number of WHEAP units served through June 28, 2006.

**Table 7-4. Low-income Programs:
Economic Benefits Of The Low-income Programs**

	First Year	Fifth Year	Tenth Year	Sum of 10 Years
Full-time equivalent job years	2,101	2,094	2,233	21,302
Sales generated *(in millions)*	$164.40	$157.50	$176.50	$1,630.00
Gross state product (value-added) *(in millions)*	$89.10	$96.20	$112.50	$989.00
Personal income generated *(in millions)*	$108.10	$129.60	$154.20	$1,317.50

Note: Based on program operations data for state fiscal year ending June 30, 2004, for WAP and federal fiscal year ending September 30, 2004, for WHEAP covering 10 years of program operations.

7.4.2 Environmental Impacts

The most significant environmental benefit of Low-income Public Benefits programs is the reduction of emissions from burning coal and natural gas at power plants and the reduction of emissions from the burning of natural gas by utility customers. Sulfur dioxides (SO_2), nitrogen oxides (NO_x), mercury (Hg), and carbon dioxide (CO_2) are the emissions of greatest concern due to their negative impact on health, natural resources, and capital investments.

Evaluators estimated emission factors or rates for the electric generating plants serving Wisconsin (Table 7-5a)[xlv] and used these data to estimate emissions reductions or savings associated with the Low-income Programs (Table 7-5b). The evaluation team estimated the generation emissions rates shown in Table 7-5a 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 7-5a) 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 7-5a. Low-income Programs:
Emissions Rates**

Emissions	Generation Lbs/MWh	On-site Therms Lbs/Therm
NO_x	5.7	
SO_2	12.2	
Mercury (Lbs/GWh)	0.0489	
CO_2	2,216	11.76

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

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

Table 7-5b shows the pounds of these emissions that will be avoided annually due to the energy efficiency improvements installed through the Low-income Public Benefits programs. Using the marginal cost emission rates and evaluation-verified net installed electricity savings estimates, the Low-income Programs together potentially avoided 290,529 pounds of NO_x; 449,158 pounds of SO_2; over 186 million pounds of CO_2; and nearly 1.8 pounds of mercury from inception to June 30, 2006 (Table 7-5b).

Table 7-5b. Low-income Programs:
Annual Reduction In Emissions From Power Plants And Utility Customers
(July 1, 2001–June 30, 2006)

	Emissions Reduction (pounds)			
	Nitrogen Oxides (NO_x)	Sulfur Dioxides (SO_2)	Carbon Dioxide (CO_2)	Mercury (Hg)
Total Reduction	**290,529**	**449,158**	**186,521,779**	**1.798**
WAP	290,529	449,158	176,638,957	1.798
WHEAP	NA	NA	9,882,822	N/A

Notes: 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.

NA: Not applicable

7.4.3 Other Non-energy Benefits

Types of other non-energy benefits include benefits for participants (e.g., increased health and comfort and improved ability to pay utility bills) and benefits for society (e.g., decreased utility service costs and improved safety). Following are the quantified non-energy benefits for households receiving benefits through WHEAP and WAP since the first program year of the evaluation began on July 1, 2002, as well as in the last program year. The dollar values assigned to these benefits were determined from prior research and from an analysis of the non-energy benefits accruing from energy efficiency improvements and bill payments conducted through the Low-income Programs.

Table 7-6. Low-income Programs:
Annual Value Of Non-Energy Benefits Program to Date (July 1, 2001–June 30, 2006)

Program Area	Approximate Value of Non-energy Benefits	
	FY06 July 1, 2005–June 30, 2006	Program to Date July 1, 2001–June 30, 2006
Low-income Programs	$7,017,490	$30,357,838
Example Benefits from Low-income Programs:		
• Reduced arrearage carrying costs		
• Lower bad-debt write-offs		
• Increase property value (avoided capital expense)		
• Indoor air quality (CO related)		
• Fewer utility disconnects and reconnects.		

7.5 BENEFIT-COST ANALYSIS

7.5.1 Low-income Programs Benefit-Cost Analysis

The first step in conducting a benefit-cost analysis is to list the costs and benefits that are involved. Table 7-7 shows each element of the benefit-cost analysis and whether the element is added to or subtracted from the benefit or cost side.

The **benefits** of the Low-income Programs include the four major impacts discussed earlier—energy, economic, environmental, and other non-energy benefits. The economic impact counted in the analysis is the net change in real disposable income, after subtracting the opportunity cost of other ways the public funds could have been spent. This net economic impact could be positive or negative, but for these programs is positive. An additional component counted in the benefits is the direct bill payment by WHEAP. This payment is counted also in the program costs. The **costs** of the programs are the total program spending, including project costs, bill payments, and administration.

Table 7-7. Low-income Programs:
Elements Included In A Benefit-Cost Analysis For Low-income Programs

Element	"Benefit"	"Cost"
Bill Payments	+	+
Economic Impacts	+/-	
Environmental Benefits	+	
Net Energy Impacts	+	
Other Non-energy Benefits	+	
Program Spending		+

The second step in conducting a benefit-cost analysis is to select a valuation method. Regardless of which benefit-cost valuation method the researcher uses, if the value of the benefits do not outweigh the costs of achieving those benefits, continued spending will be questioned. A benefit-cost ratio greater than 1 indicates that benefits exceed the costs of the program.

Table 7-8 shows that the overall benefits of the Low-income Programs to Wisconsin outweigh the costs by about 30 percent. This means that the programs are creating greater value for the state of Wisconsin than they cost to run.

The benefit cost analysis presented in this section, conducted in February and March of 2003, projected program impacts for the first ten years of operation assuming stable funding levels over that time period. However, the State biennial budget for 2003–2005 reduced funding for the Focus on Energy program by approximately 40 percent for 2003–2005. At this reduced level of funding, program impacts will not reach the levels projected, and thus assumptions about the elements in the benefit/cost ratios discussed in this section are also affected. The benefit-cost and economic impact analysis originally planned for evaluation year 3 to update these numbers was also cut as a result of budget reductions.

Table 7-8. Low-income Programs:
Benefit-Cost Ratios For Low-income Overall And By Program Area

Program	Benefit/Cost Ratio
Low-income Programs Combined	1.3
Weatherization Assistance Program (WAP)	1.9
Wisconsin Home Energy Assistance Program (WHEAP)	1.0

Note: Based on program operations data through October 2002 using verified net savings data.

The Weatherization Assistance Program has a benefit-cost ratio of 1.9. Thus, the program benefits to the state are nearly twice the program cost. About 60 percent of the total benefit goes to participants in the form of reduced energy costs and associated non-energy benefits. The remainder is a benefit to the state as a whole. Most of this societal benefit is from the additional economic development effects of the measure implementation. A small portion comes from lower energy costs to ratepayers, resulting from reduced utility costs associated with arrearages. The remainder is the avoided externality cost of the saved energy.

The Wisconsin Home Energy Assistance Program has a benefit-cost ratio of 1.0. This result makes sense because the bulk of the program spending and the program benefit is the bill payment to participants. There are some additional costs for emergency furnace replacements and program administration. These are roughly balanced by the additional benefits in the form of participant non-energy benefits, avoided externalities related to the furnace replacements, ratepayer benefits via reduced utility costs, and additional economic development effects.

7.6 REFERENCES

7.6.1 Technical Information to Support Evaluation Results

"Low-income Public Benefits Evaluation: A Study of Weatherization Assistance Program Staff and Operator Training." Lark Lee, PA Government Services, Inc., May 4, 2006

"Evaluation Activities and Early Baseline Results – Year 1 We Energies LIP Program Evaluation." Memo from Laura Schauer, and Pam Rathbun. PA Government Services Inc., March 9, 2006.

"Low-income Public Benefits Evaluation: FY07 Detailed Evaluation Plan." PA Government Services Inc., June 19, 2006.

Year 3 Low-income Program Evaluation—Volume I. Report (Second draft submission: August 31, 2004). Lark Lee, Pam Rathbun, and Laura Schauer; PA Government Services Inc. Department of Administration, Division of Energy.

APPENDIX A: GEOGRAPHIC DISTRIBUTION OF DIRECT ENERGY IMPACTS

This appendix presents the geographic distribution of direct energy impacts.

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. The data reported here is the evaluated verified gross numbers, so it does represent evaluation work done to establish evaluated verified gross for specific programs and/or program areas.

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 Dunn & 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 annual energy savings achieved through participation in Focus on Energy Business Programs. These impacts are broken out for the Commercial and Industrial sectors.

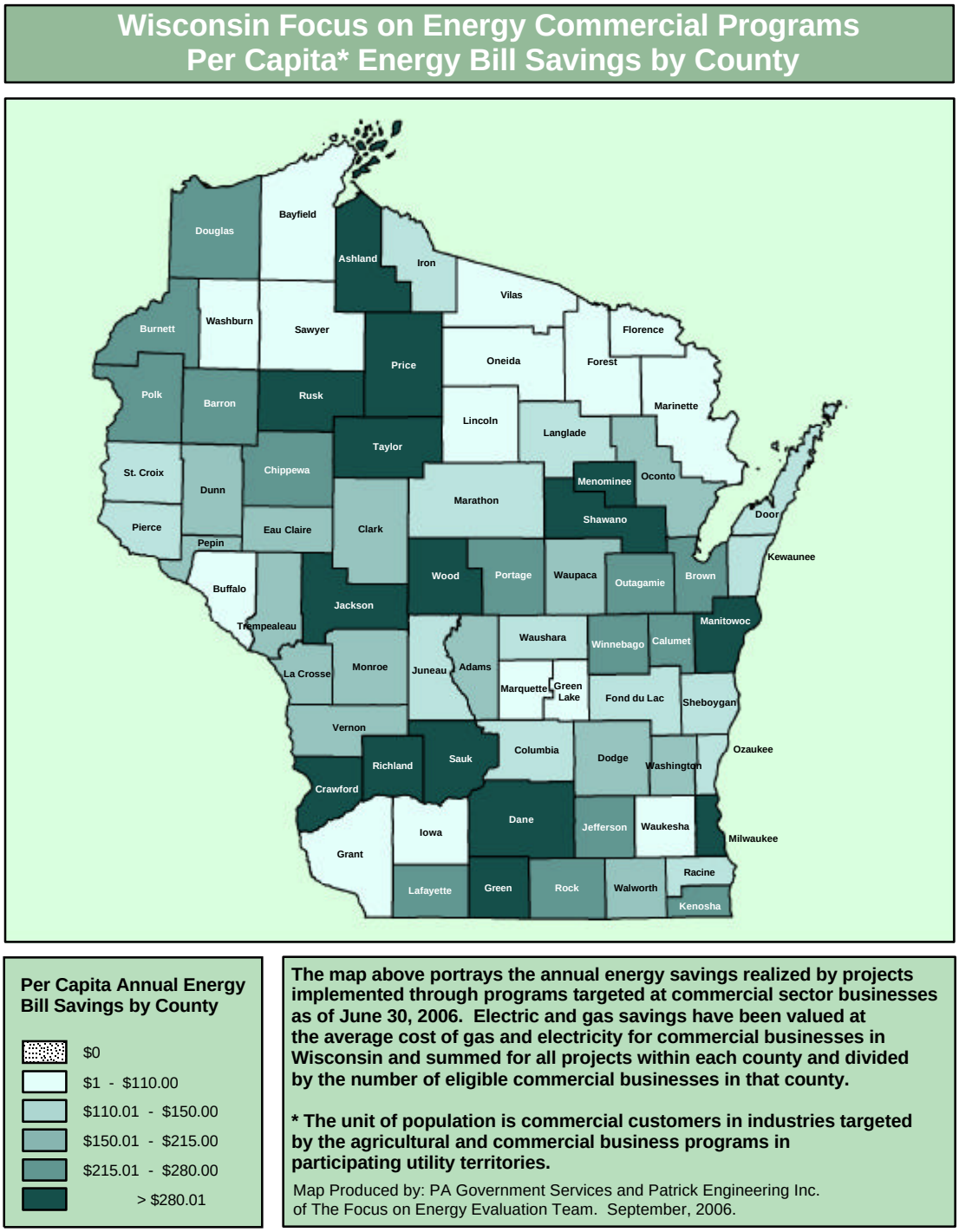
The *"Number of Customers"* presented for each of the counties in Table A-1 and Table A-5 are based on the number of customers in industries targeted by the program administrator in the respective programs who are in participating utility territories in that county. The number businesses in participating 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 Dunn 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 8 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% of Wisconsin businesses, while the 28 codes identified as being targeted by the commercial programs account for about 79% of Wisconsin businesses.

The *"Number of Customers"* presented for each of the participating utilities in Table A-4 and Table A-8 are based on the number of customers reported by the utilities in 2003.

A.2.1 Commercial Programs

Figure A-1.
Wisconsin Focus on Energy Commercial Programs
Per Capita Energy Bill Savings by County



The map above portrays the annual energy savings realized by projects implemented through programs targeted at commercial sector businesses as of June 30, 2006. Electric and gas savings have been valued at the average cost of gas and electricity for commercial businesses in Wisconsin and summed for all projects within each county and divided by the number of eligible commercial businesses in that county.

*** The unit of population is commercial customers in industries targeted by the agricultural and commercial business programs in participating utility territories.**

Map Produced by: PA Government Services and Patrick Engineering Inc.
of The Focus on Energy Evaluation Team. September, 2006.

Table A-1. Commercial Program Energy Impacts (By County)

County	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Eligible Commercial Businesses
Adams	$156.94	$46,769.51	473,482	6,700	298
Ashland	$366.67	$277,566.50	1,424,394	155,803	757
Barron	$231.27	$286,544.49	1,770,489	135,717	1,239
Bayfield	$108.83	$71,611.95	639,366	17,429	658
Brown	$274.84	$2,400,728.41	14,796,047	1,140,201	8,735
Buffalo	$62.16	$40,276.82	261,101	18,051	648
Burnett	$217.50	$110,271.39	588,027	60,043	507
Calumet	$222.10	$233,426.96	1,724,425	86,931	1,051
Chippewa	$226.84	$445,735.66	2,719,045	214,050	1,965
Clark	$208.91	$274,090.30	1,811,802	119,914	1,312
Columbia	$137.09	$284,183.94	1,793,888	131,418	2,073
Crawford	$426.35	$354,298.56	4,129,600	5,300	831
Dane	$280.15	$4,244,870.12	28,241,020	1,841,927	15,152
Dodge	$207.95	$609,087.20	4,325,307	241,426	2,929
Door	$144.42	$156,982.29	1,117,261	62,016	1,087
Douglas	$276.06	$451,086.49	2,708,078	220,271	1,634
Dunn	$188.77	$254,834.28	1,706,998	109,607	1,350
Eau Claire	$180.62	$662,335.80	6,303,765	128,511	3,667
Florence	$89.20	$3,121.92	24,694	1,026	35
Fond du Lac	$137.65	$501,051.62	4,120,212	151,530	3,640
Forest	$33.50	$14,607.29	148,410	2,048	436
Grant	$76.74	$137,279.39	1,050,581	48,073	1,789
Green	$317.80	$286,023.27	2,949,812	36,436	900
Green Lake	$41.59	$76,603.54	719,093	15,699	1,842
Iowa	$92.80	$125,367.61	1,266,790	18,160	1,351
Iron	$121.05	$43,458.55	349,698	13,785	359
Jackson	$819.75	$74,597.27	480,765	33,670	91
Jefferson	$223.12	$500,001.54	3,516,083	201,083	2,241
Juneau	$142.98	$53,759.81	545,393	7,606	376
Kenosha	$221.02	$806,073.93	5,439,897	343,313	3,647
Kewaunee	$148.92	$151,151.25	1,285,485	42,148	1,015
La Crosse	$153.64	$638,986.53	5,481,706	174,214	4,159
Lafayette	$254.38	$151,612.20	719,652	89,992	596
Langlade	$137.89	$143,684.24	1,002,270	58,466	1,042
Lincoln	$87.54	$114,850.20	760,365	50,148	1,312
Manitowoc	$359.47	$422,020.73	3,045,412	163,215	1,174
Marathon	$129.58	$650,338.26	4,656,870	254,542	5,019
Marinette	$92.17	$172,548.18	1,488,332	46,367	1,872
Marquette	$64.62	$37,094.68	370,739	5,716	574
Menominee	$463.54	$31,057.12	310,016	4,817	67
Milwaukee	$283.84	$6,925,415.96	43,993,231	3,179,374	24,399
Monroe	$158.61	$263,761.40	1,815,893	109,334	1,663
Oconto	$161.40	$141,386.90	1,500,733	14,445	876

County	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Eligible Commercial Businesses
Oneida	$108.05	$245,599.08	1,777,830	94,522	2,273
Outagamie	$231.77	$1,324,111.18	11,394,093	358,088	5,713
Ozaukee	$136.50	$370,326.65	2,594,348	149,756	2,713
Pepin	$209.95	$92,377.17	803,494	24,264	440
Pierce	$118.58	$111,225.67	979,428	28,210	938
Polk	$237.20	$361,253.45	2,490,718	149,443	1,523
Portage	$276.71	$683,472.13	5,465,343	219,674	2,470
Price	$709.10	$378,660.08	621,288	323,252	534
Racine	$116.17	$661,350.89	5,336,106	208,573	5,693
Richland	$390.57	$54,289.49	539,065	8,661	139
Rock	$266.81	$1,397,259.72	9,699,003	572,541	5,237
Rusk	$708.67	$345,121.31	2,713,353	114,810	487
Sauk	$328.32	$695,388.54	5,984,326	188,021	2,118
Sawyer	$59.46	$55,472.38	514,617	11,880	933
Shawano	$317.82	$265,376.57	2,145,246	83,353	835
Sheboygan	$129.23	$415,470.43	2,921,032	167,139	3,215
St. Croix	$113.06	$190,388.73	1,296,659	80,100	1,684
Taylor	$2,246.88	$157,281.36	761,982	92,065	70
Trempealeau	$153.79	$64,744.36	447,885	26,658	421
Vernon	$154.46	$140,253.78	758,895	75,448	908
Vilas	$62.26	$66,493.13	711,064	6,351	1,068
Walworth	$205.84	$747,806.85	6,035,661	235,672	3,633
Washburn	$94.73	$64,228.98	585,615	14,613	678
Washington	$161.38	$554,012.36	4,460,031	175,560	3,433
Waukesha	$102.24	$1,430,881.82	11,379,526	465,126	13,996
Waupaca	$155.47	$300,830.74	3,259,273	25,195	1,935
Waushara	$130.64	$109,473.40	1,075,856	18,398	838
Winnebago	$225.80	$1,164,471.96	7,019,456	566,232	5,157
Wood	$283.19	$227,964.11	1,896,978	67,066	805
Not Mapped*		$151,656.48	1,179,445	51,530	
		$36,497,796.86	**260,423,839**	**14,362,718**	**176,255**

* *Unknown County*: The impacts for these participants is 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.
Wisconsin Focus on Energy Commercial Programs
Implemented Energy Bill Savings by Senate District

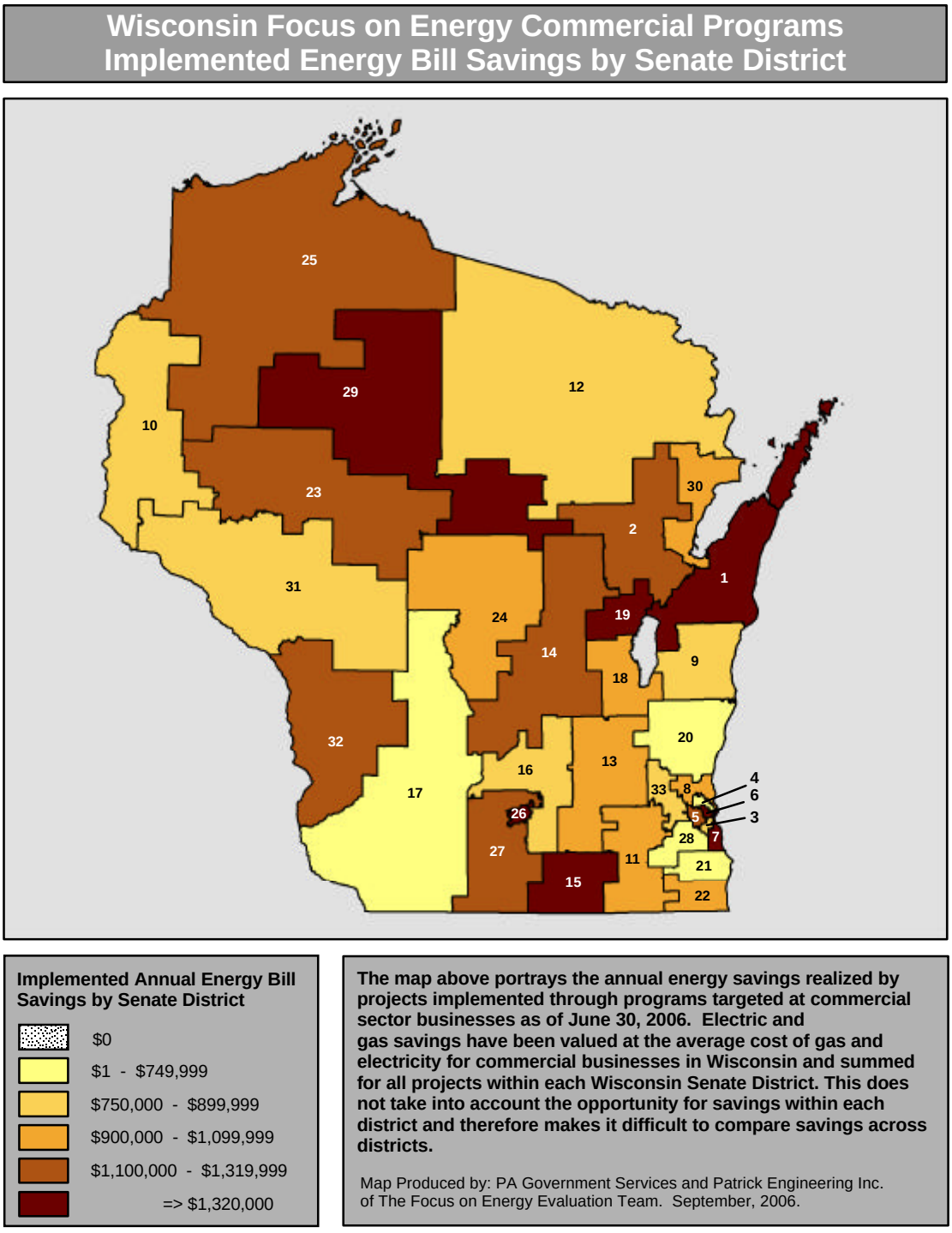


Table A-2. Commercial Program Energy Impacts (By Senate District)

Senate District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
1	$1,404,674.90	7,107,142	796,949
2	$1,271,247.80	9,567,925	458,630
3	$864,945.39	3,070,911	600,053
4	$434,787.64	3,280,355	156,192
5	$1,316,618.60	7,841,503	648,178
6	$2,069,486.01	14,372,545	847,380
7	$1,323,643.94	8,860,219	569,827
8	$916,826.35	5,992,348	406,812
9	$783,562.69	5,377,889	326,195
10	$888,797.81	5,781,730	396,672
11	$962,290.54	7,323,719	340,373
12	$759,424.27	6,107,960	241,131
13	$1,052,356.25	7,737,726	394,964
14	$1,201,940.44	10,366,369	323,075
15	$1,521,499.08	10,736,214	608,810
16	$891,327.78	7,041,867	293,647
17	$694,225.44	5,557,468	222,616
18	$956,658.98	7,043,493	358,259
19	$1,613,959.65	12,190,017	578,695
20	$736,776.57	5,544,796	265,849
21	$530,036.90	4,625,612	137,931
22	$922,540.85	6,002,652	411,612
23	$1,311,794.12	9,853,903	474,865
24	$977,183.65	8,009,716	297,683
25	$1,245,280.58	7,929,658	570,094
26	$2,553,316.98	14,543,148	1,312,607
27	$1,219,664.36	10,465,110	332,371
28	$672,074.71	6,468,687	124,352
29	$1,355,815.38	7,411,039	723,075
30	$1,055,057.96	9,301,579	266,674
31	$857,513.06	6,719,220	287,155
32	$1,182,095.20	10,908,456	258,009
33	$798,126.49	6,096,435	280,454
Not mapped*	$152,246.51	1,186,429	51,530
	$36,497,796.86	**260,423,841**	**14,362,718**

* *Unknown District*: The impacts for these participants is 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.
Wisconsin Focus on Energy Commercial Programs
Implemented Energy Bill Savings by Assembly District

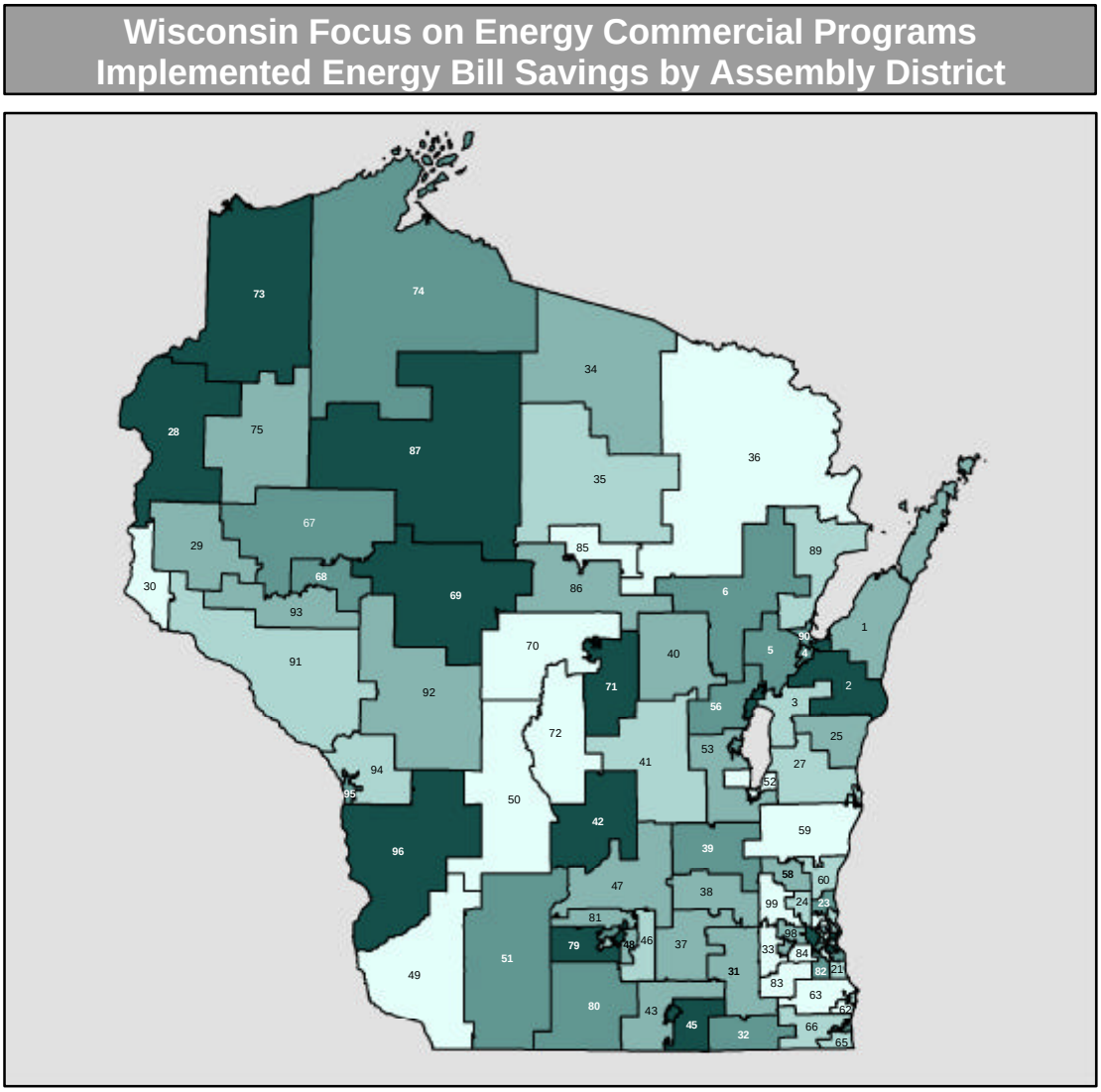


Table A-3. Commercial Program Energy Impacts (by Assembly District)

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
1	$323,792	2,591,816	103,849
2	$813,913	2,149,712	626,622
3	$266,970	2,365,614	66,478
4	$458,169	2,829,721	217,104
5	$447,743	3,560,586	145,563
6	$365,336	3,177,618	95,964
7	$157,347	742,112	93,794
8	$230,542	962,756	147,859
9	$477,056	1,366,043	358,400
10	$202,835	1,281,491	93,705
11	$79,393	838,127	8,495
12	$152,560	1,160,737	53,992
13	$263,923	1,568,861	130,182
14	$678,930	5,135,980	242,755
15	$373,765	1,136,662	275,240
16	$1,524,187	11,171,111	575,052
17	$356,368	2,548,993	139,721
18	$188,931	652,440	132,606
19	$606,458	3,797,614	283,012
20	$436,546	2,856,520	193,429
21	$280,640	2,206,085	93,385
22	$251,729	1,020,575	164,014
23	$433,997	3,240,534	158,743
24	$231,100	1,731,239	84,054
25	$328,835	2,073,850	152,224
26	$234,553	1,625,055	96,368
27	$220,176	1,678,984	77,603
28	$491,773	3,158,212	222,898
29	$285,689	1,695,638	141,137
30	$111,336	927,880	32,636
31	$311,040	2,089,850	133,248
32	$455,675	3,931,156	122,391
33	$195,576	1,302,713	84,734
34	$305,888	2,424,838	100,088
35	$278,930	2,067,351	103,309
36	$174,606	1,615,771	37,734
37	$310,593	2,727,727	79,386
38	$307,611	1,441,527	184,145
39	$434,152	3,568,472	131,433
40	$286,930	3,107,121	24,161
41	$268,841	2,087,942	91,586
42	$646,169	5,171,306	207,328
43	$319,680	3,129,481	54,746
44	$460,453	3,087,874	197,748
45	$741,366	4,518,858	356,316

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
46	$206,907	1,381,881	89,335
47	$327,826	2,680,784	100,397
48	$356,594	2,979,202	103,916
49	$167,299	1,393,792	49,082
50	$139,979	1,242,656	34,663
51	$386,947	2,921,021	138,871
52	$196,031	1,713,541	50,779
53	$315,014	2,735,817	83,089
54	$445,615	2,594,134	224,391
55	$514,146	2,491,112	300,939
56	$457,869	4,968,025	37,731
57	$641,945	4,730,880	240,025
58	$343,625	2,575,799	124,846
59	$177,666	1,595,094	42,498
60	$215,486	1,373,903	98,505
61	$272,564	2,637,157	49,281
62	$155,726	1,094,680	62,661
63	$101,747	893,775	25,989
64	$453,490	2,470,415	242,557
65	$242,092	2,067,705	66,770
66	$226,959	1,464,531	102,286
67	$360,206	2,311,657	163,400
68	$407,199	4,121,655	58,394
69	$544,389	3,420,592	253,071
70	$134,249	1,405,774	15,323
71	$664,970	5,179,357	225,286
72	$177,965	1,424,585	57,074
73	$495,073	3,118,505	229,494
74	$444,556	2,886,023	198,897
75	$305,651	1,925,130	141,702
76	$253,621	1,008,216	166,924
77	$374,959	2,643,994	150,190
78	$1,924,737	10,890,938	995,493
79	$490,440	4,028,712	148,676
80	$383,252	3,934,247	50,355
81	$345,972	2,502,150	133,340
82	$397,993	3,897,424	68,049
83	$132,223	1,245,098	26,771
84	$141,858	1,326,165	29,532
85	$144,780	1,332,082	31,932
86	$313,585	1,788,856	160,977
87	$897,450	4,290,102	530,165
88	$489,290	4,361,214	119,690
89	$200,355	1,849,896	43,646
90	$365,414	3,090,470	103,339
91	$219,911	1,788,009	68,210
92	$315,024	1,933,808	150,265
93	$322,578	2,997,403	68,679
94	$249,872	2,431,876	43,982

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
95	$405,885	3,273,815	128,095
96	$526,339	5,202,765	85,932
97	$334,522	2,145,128	151,891
98	$285,161	2,412,285	80,597
99	$178,444	1,539,022	47,965
Not mapped*	$152,247	1,186,429	51,530
	$36,497,797	**260,423,841**	**14,362,718**

* *Unknown District:* The impacts for these participants is 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.
Wisconsin Focus on Energy Commercial Programs
Per Capita Energy Bill Savings by Utility Territory

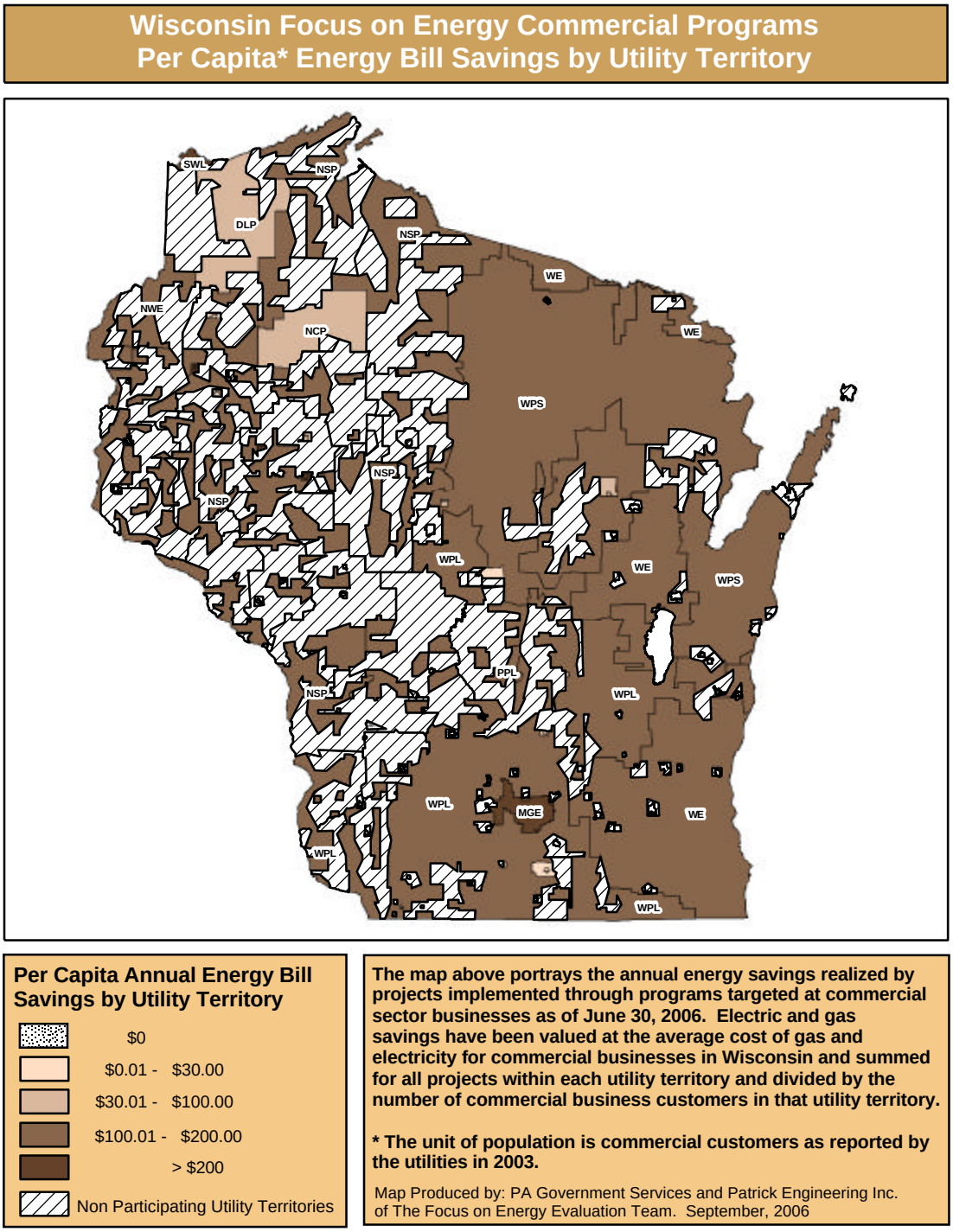


Table A-4. Commercial Program Energy Impacts
(By Participating Utility)

Utility	Map Code	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Number of Customers
Alliant Energy	WPL	$111	$5,802,762	49,190,764	1,631,459	52,285
Bloomer Electric & Water Co		$391	$114,080	383,526	80,944	292
City of Argyle		$15	$1,453	17,009	16	97
City of Barron		$27	$9,813	12,515	8,677	362
City of Cornell		$74	$9,924	89,325	2,355	135
City of Evansville		$27	$20,075	221,045	1,384	757
City of Princeton		$12	$1,954	23,128	0	158
City of Shullsburg		$25	$3,417	40,434	0	135
Consolidated Water Power Co		$26	$5,064	59,934	0	196
Cumberland City of		$215	$46,702	436,672	9,716	217
Dahlberg Light & Power Co	DLP	$45	$47,276	452,046	8,998	1,053
La Farge Municipal Electric Co						112
Madison Gas & Electric Co	MGE	$203	$3,565,507	22,629,080	1,638,603	17,592
North Central Power Co Inc	NCP	$54	$23,244	291,212	-1,351	430
Northwestern Wisconsin Elec Co	NEW	$106	$150,154	978,313	66,884	1,416
Pioneer Power & Light Co	PPL	$114	$12,402	146,766	0	109
Spooner City of		$13	$4,650	31,867	1,940	346
Superior Water, Light & Power Co	SWL	$215	$398,560	2,192,509	211,391	1,857
Village of Benton						73
Village of Cadott		$4,196	$33,565	94,415	25,359	8
Village of Cashton		$38	$4,306	45,719	439	113
Village of Centuria						70
Village of Gresham		$72	$11,083	16,475	9,604	154
Village of Pardeeville		$22	$2,558	18,121	1,018	115
Village of Stratford		$72	$10,638	89,761	3,026	147
Village of Viola						90
We Energies	WE	$133	$13,629,583	95,583,507	5,503,247	102,255
Westfield Electric Co						128
Wisconsin Public Service Corp	WPS	$127	$5,593,200	38,687,315	2,303,391	44,075
Wonewoc Electric & Water Util		$76	$6,305	6,161	5,733	83
Xcel Energy	NSP	$124	$4,030,575	27,500,719	1,691,540	32,530
Not mapped*			-$9,767,861	-74,730,589	-3,422,326	
			$33,538,850	**239,238,339**	**13,204,371**	**257,390**

* *Unknown Utility:* The impacts for these participants is 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-5.
Wisconsin Focus on Energy Industrial Programs
Per Capita Energy Bill Savings by County

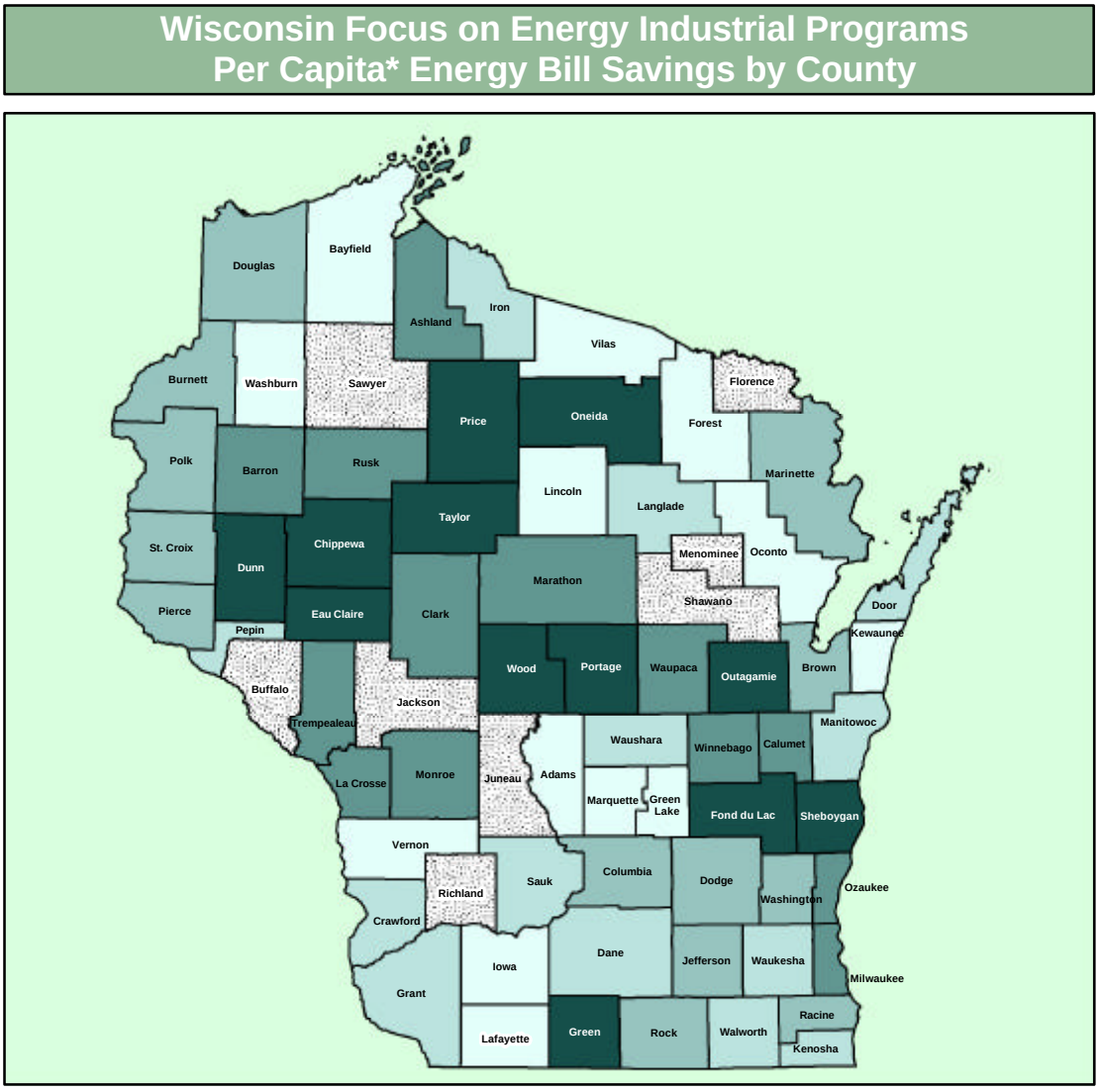


Table A-5. Industrial Program Energy Impacts (By County)

County	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Eligible Commercial Businesses
Adams	$34.20	$4,378	76,133	0	128
Ashland	$380.14	$114,043	1,671,303	18,235	300
Barron	$423.33	$217,170	1,213,548	149,788	513
Bayfield	$57.37	$17,212	107,125	11,232	300
Brown	$309.79	$1,409,529	14,475,550	586,570	4,550
Burnett	$296.66	$74,759	1,300,149	0	252
Calumet	$462.07	$178,358	2,012,084	63,682	386
Chippewa	$1,083.23	$940,241	6,392,056	582,010	868
Clark	$380.14	$195,390	547,857	166,553	514
Columbia	$163.78	$139,703	2,345,767	4,899	853
Crawford	$131.56	$35,258	578,162	2,046	268
Dane	$110.95	$822,004	9,841,261	260,296	7,409
Dodge	$223.93	$269,617	3,215,033	86,131	1,204
Door	$95.58	$48,268	594,985	14,285	505
Douglas	$195.61	$147,292	608,806	114,111	753
Dunn	$959.71	$489,452	2,314,855	362,142	510
Eau Claire	$756.54	$1,262,663	5,072,395	986,789	1,669
Fond du Lac	$763.33	$1,168,661	16,126,324	245,323	1,531
Forest	$42.73	$10,639	185,029	0	249
Grant	$148.54	$94,771	365,622	74,947	638
Green	$598.15	$223,109	3,813,147	3,916	373
Green Lake	$8.03	$5,767	100,299	0	718
Iowa	$18.04	$8,840	153,742	0	490
Iron	$112.51	$19,578	340,479	0	174
Jefferson	$235.97	$257,445	4,404,500	4,254	1,091
Kenosha	$108.79	$194,301	2,222,254	67,603	1,786
Kewaunee	$58.50	$22,466	183,205	12,125	384
La Crosse	$401.00	$774,333	8,505,468	289,907	1,931
Lafayette	$23.71	$5,216	90,710	0	220
Langlade	$100.21	$46,195	201,729	35,158	461
Lincoln	$20.19	$12,480	217,039	0	618
Manitowoc	$83.04	$38,946	596,351	4,731	469
Marathon	$522.61	$1,207,228	10,541,167	610,885	2,310
Marinette	$188.72	$167,016	1,497,478	82,227	885
Marquette	$46.50	$8,929	155,284	0	192
Milwaukee	$421.33	$5,039,914	25,975,638	3,603,769	11,962
Monroe	$437.46	$300,097	503,269	275,568	686
Oconto	$43.37	$16,004	256,817	1,257	369
Oneida	$1,929.17	$2,102,795	1,222,750	2,065,535	1,090
Outagamie	$1,003.65	$2,826,265	30,873,946	710,811	2,816
Ozaukee	$514.41	$782,939	7,682,105	346,766	1,522
Pepin	$86.84	$12,419	83,920	7,717	143
Pierce	$305.89	$104,919	798,293	59,977	343

County	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Eligible Commercial Businesses
Polk	$215.77	$149,743	2,424,130	10,524	694
Portage	$2,505.09	$2,713,008	4,543,286	2,487,736	1,083
Price	$6,768.72	$1,631,260	8,666,027	1,151,386	241
Racine	$171.90	$523,781	4,823,879	250,414	3,047
Rock	$220.58	$513,502	5,134,022	221,846	2,328
Rusk	$523.45	$117,776	1,808,553	14,009	225
Sauk	$140.04	$114,971	1,987,535	699	821
Shawano	$0.00	$0	0	0	333
Sheboygan	$2,306.16	$3,403,886	17,591,712	2,431,262	1,476
St. Croix	$215.35	$198,340	1,854,586	93,192	921
Taylor	$1,951.84	$85,881	156,176	78,151	44
Trempealeau	$455.79	$94,804	505,871	66,785	208
Vernon	$32.11	$10,404	180,938	0	324
Vilas	$36.78	$17,507	304,463	0	476
Walworth	$150.57	$261,236	3,422,103	65,514	1,735
Washburn	$12.88	$4,417	65,960	634	343
Washington	$230.81	$430,238	3,615,334	225,972	1,864
Waukesha	$145.94	$1,242,226	12,055,013	557,991	8,512
Waupaca	$528.93	$449,590	862,580	406,496	850
Waushara	$155.58	$53,830	191,788	43,498	346
Winnebago	$345.23	$829,929	12,046,397	139,493	2,404
Wood	$7,669.76	$3,159,941	9,271,123	2,627,236	412
Not Mapped*		$1,272,361	13,273,036	498,439	
		39,095,238	**274,248,143**	**23,282,524**	

* *Unknown County:* The impacts for these participants is 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-6.
Wisconsin Focus on Energy Industrial Programs
Implemented Energy Bill Savings by Senate District

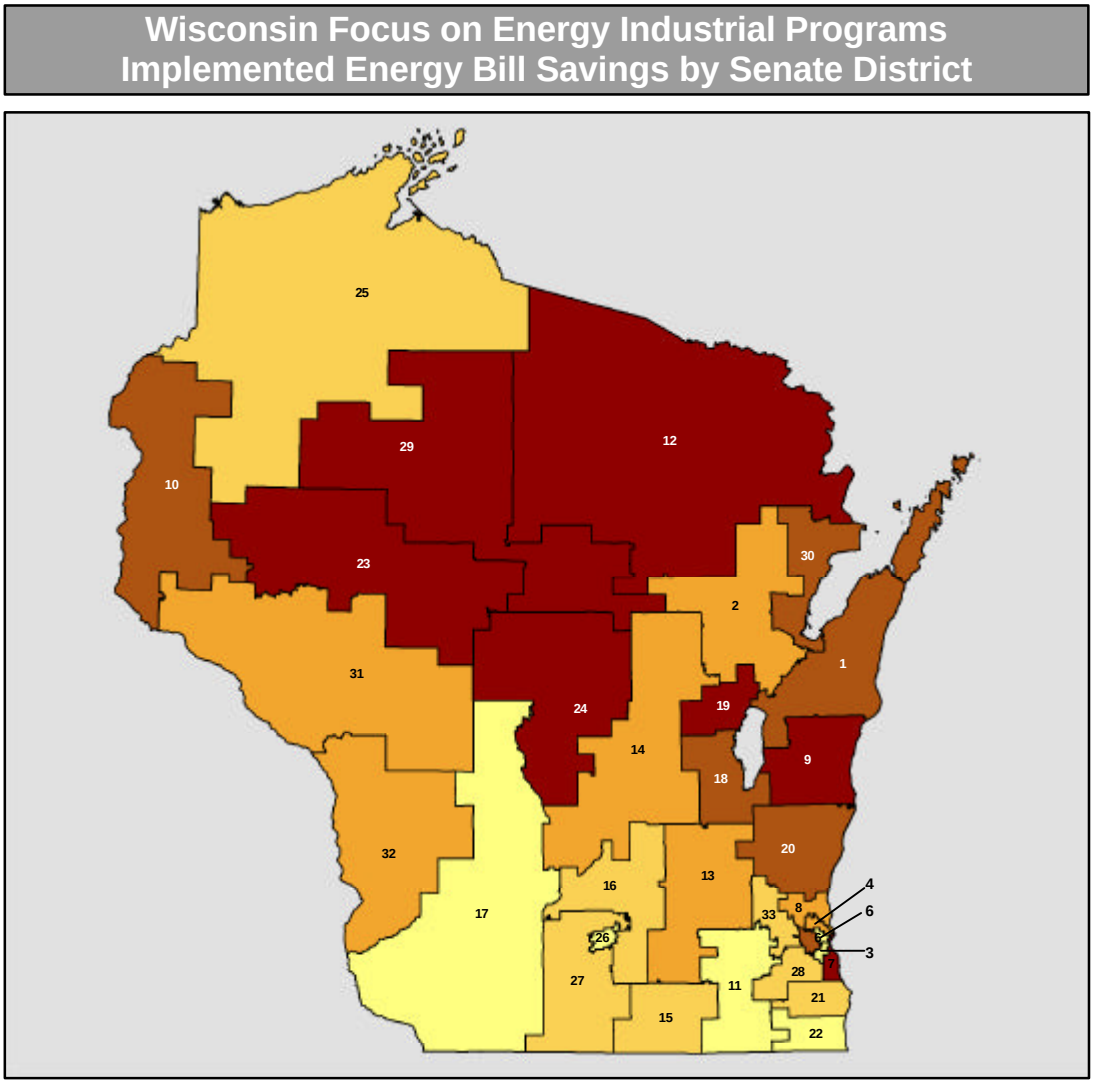
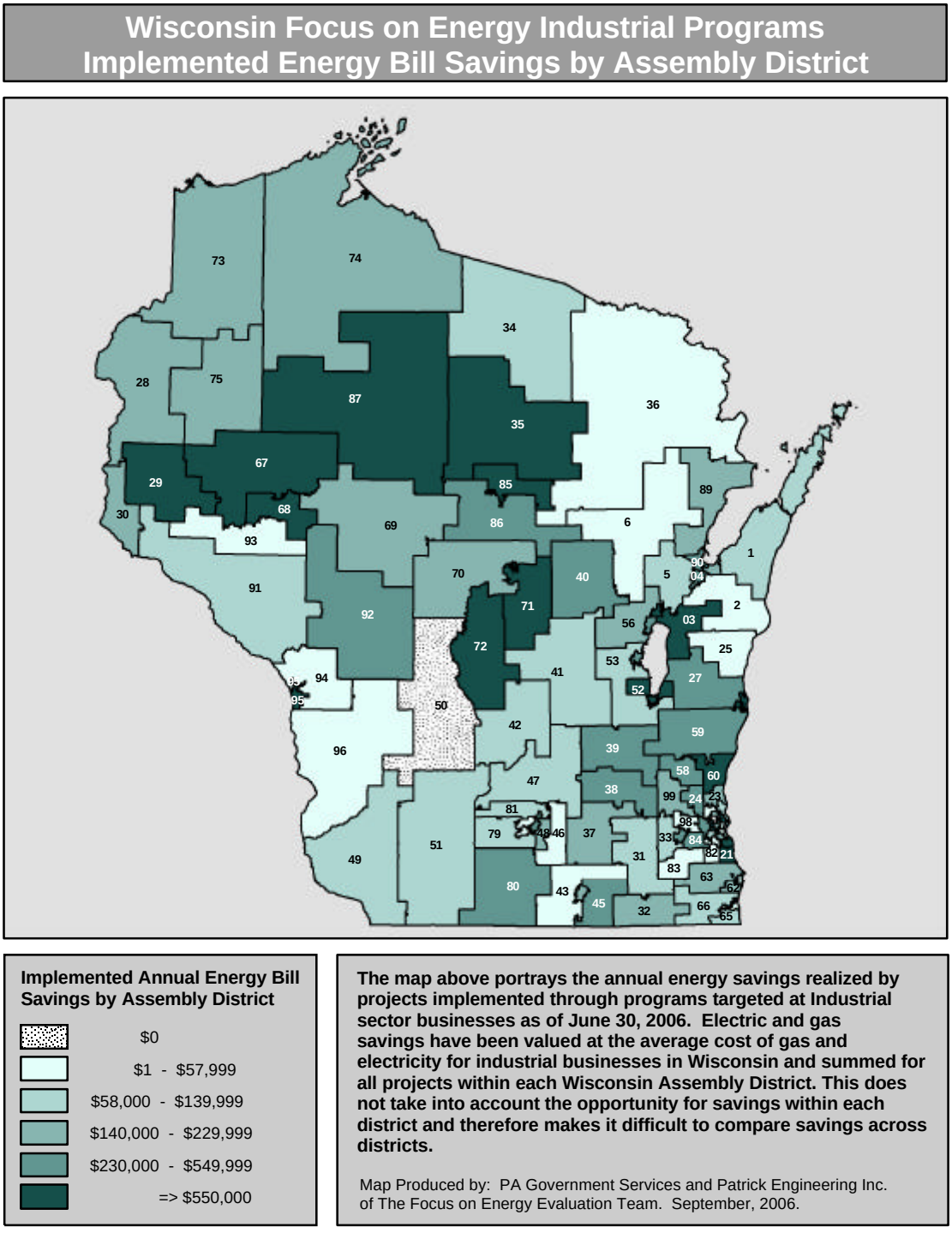


Table A-6. Industrial Program Energy Impacts (By Senate District)

Senate District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
1	$1,448,188	13,453,549	652,757
2	$647,388	7,951,563	193,265
3	$279,567	2,888,935	115,298
4	$830,943	4,242,279	596,557
5	$1,571,945	8,527,466	1,098,993
6	$157,657	1,201,190	90,029
7	$1,915,677	4,193,230	1,701,795
8	$616,958	9,985,839	43,468
9	$3,269,786	17,124,762	2,322,269
10	$1,011,765	8,660,435	522,144
11	$322,883	4,421,421	69,768
12	$2,231,795	2,147,416	2,142,600
13	$706,218	7,420,737	284,071
14	$694,319	3,652,338	492,184
15	$513,010	5,125,450	221,846
16	$343,572	4,653,474	77,233
17	$220,978	2,560,528	74,947
18	$1,603,280	23,808,113	238,123
19	$1,951,664	24,179,975	245,972
20	$1,216,762	10,842,599	602,960
21	$455,040	4,785,261	182,813
22	$260,212	2,211,656	135,205
23	$2,247,780	11,555,216	1,609,100
24	$5,881,297	13,959,583	5,114,972
25	$523,387	4,007,982	297,691
26	$324,007	3,250,619	139,325
27	$402,658	6,187,229	47,655
28	$440,328	3,277,374	255,975
29	$3,018,775	21,062,575	1,837,070
30	$890,186	7,902,224	442,894
31	$582,977	1,690,316	493,682
32	$819,995	9,264,568	291,954
33	$421,882	4,779,206	149,469
Not mapped*	$1,272,361	13,273,036	498,439
	$39,095,238	**274,248,143**	**23,282,524**

* *Unknown District:* The impacts for these participants is 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.
Wisconsin Focus on Energy Industrial Programs
Implemented Energy Bill Savings by Assembly District



Implemented Annual Energy Bill Savings by Assembly District

	$0
	$1 - $57,999
	$58,000 - $139,999
	$140,000 - $229,999
	$230,000 - $549,999
	=> $550,000

The map above portrays the annual energy savings realized by projects implemented through programs targeted at Industrial sector businesses as of June 30, 2006. 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 Wisconsin Assembly District. This does not take into account the opportunity for savings within each district and therefore makes it difficult to compare savings across districts.

Map Produced by: PA Government Services and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. September, 2006.

Table A-7. Industrial Program Energy Impacts (By Assembly District)

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
1	71,492	778,190	27,181
2	47,322	515,577	17,964
3	1,329,373	12,159,782	607,612
4	525,943	7,071,207	121,289
5	113,819	747,721	71,976
6	7,627	132,636	0
7	300	5,211	0
8	49,821	866,454	0
9	229,447	2,017,270	115,298
10	608,148	2,295,343	483,908
11	199,206	1,536,693	112,648
12	23,589	410,243	0
13	1,026,339	2,097,822	920,442
14	424,574	4,530,864	166,717
15	121,031	1,898,779	11,835
16	9,087	150,950	414
18	148,570	1,050,240	89,615
19	79,265	765,637	35,814
20	1,068,823	1,801,578	980,927
21	767,590	1,626,015	685,055
22	105,924	1,803,459	2,262
23	207,063	3,341,457	15,172
24	303,971	4,840,923	26,035
25	37,375	579,924	4,095
26	2,986,419	16,068,078	2,096,041
27	245,992	476,759	222,133
28	223,042	3,762,053	6,833
29	617,507	3,351,334	431,713
30	171,216	1,547,048	83,598
31	108,633	751,284	66,498
32	151,597	2,580,518	3,270
33	62,653	1,089,619	0
34	60,037	796,896	14,447
35	2,118,938	1,149,085	2,086,246
36	52,819	201,435	41,907
37	155,086	2,697,145	0
38	291,455	1,514,872	207,672
39	259,678	3,208,720	76,399
40	454,150	941,894	406,496
41	120,922	648,559	84,990
42	119,246	2,061,885	699
43	41,690	444,888	16,371
44	209,362	1,993,518	96,275
45	261,958	2,687,044	109,200
46	26,963	268,356	11,720

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
47	132,202	2,299,170	0
48	184,407	2,085,948	65,513
49	94,771	365,622	74,947
51	126,207	2,194,905	0
52	1,071,555	15,147,553	203,832
53	114,847	1,979,572	1,039
54	416,878	6,680,988	33,253
55	542,736	5,989,649	201,556
56	226,879	3,347,227	34,973
57	1,182,050	14,843,099	9,443
58	302,316	2,549,064	158,277
59	343,099	1,498,105	261,136
60	571,347	6,795,430	183,547
61	58,305	467,067	31,960
62	175,226	1,983,624	62,162
63	221,509	2,334,569	88,691
64	39,285	645,608	2,198
65	134,230	1,215,147	65,406
66	86,697	350,902	67,602
67	804,963	5,386,664	503,282
68	1,218,550	5,415,580	921,905
69	224,267	752,972	183,913
70	184,893	795,795	141,397
71	2,564,289	4,376,600	2,346,339
72	3,132,115	8,787,188	2,627,236
73	147,292	608,806	114,111
74	150,833	2,118,907	29,467
75	225,262	1,280,269	154,113
76	50,608	880,131	0
77	451	7,851	0
78	272,948	2,362,638	139,325
79	70,440	845,258	22,193
80	274,176	4,332,544	25,462
81	58,042	1,009,427	0
82	42,067	731,593	0
83	56,274	978,672	0
84	341,988	1,567,110	255,975
85	884,653	7,457,301	463,270
86	298,984	2,970,674	130,254
87	1,835,138	10,634,600	1,243,546
88	212,002	3,428,405	15,111
89	141,199	1,651,454	46,993
90	536,984	2,822,365	380,791
91	107,223	589,790	74,502
92	450,544	662,103	419,180
93	25,209	438,423	0
94	26,605	455,960	394
95	747,728	8,049,508	289,514

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
96	45,662	759,100	2,046
97	252,391	4,261,997	7,445
98	6,652	115,681	0
99	162,839	401,528	142,024
Not mapped*	1,272,361	13,273,036	498,439
	39,095,238	**274,248,143**	**23,282,524**

* *Unknown District:* The impacts for these participants is 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.
Wisconsin Focus on Energy Industrial Programs
Per Capita Energy Bill Savings by Utility Territory

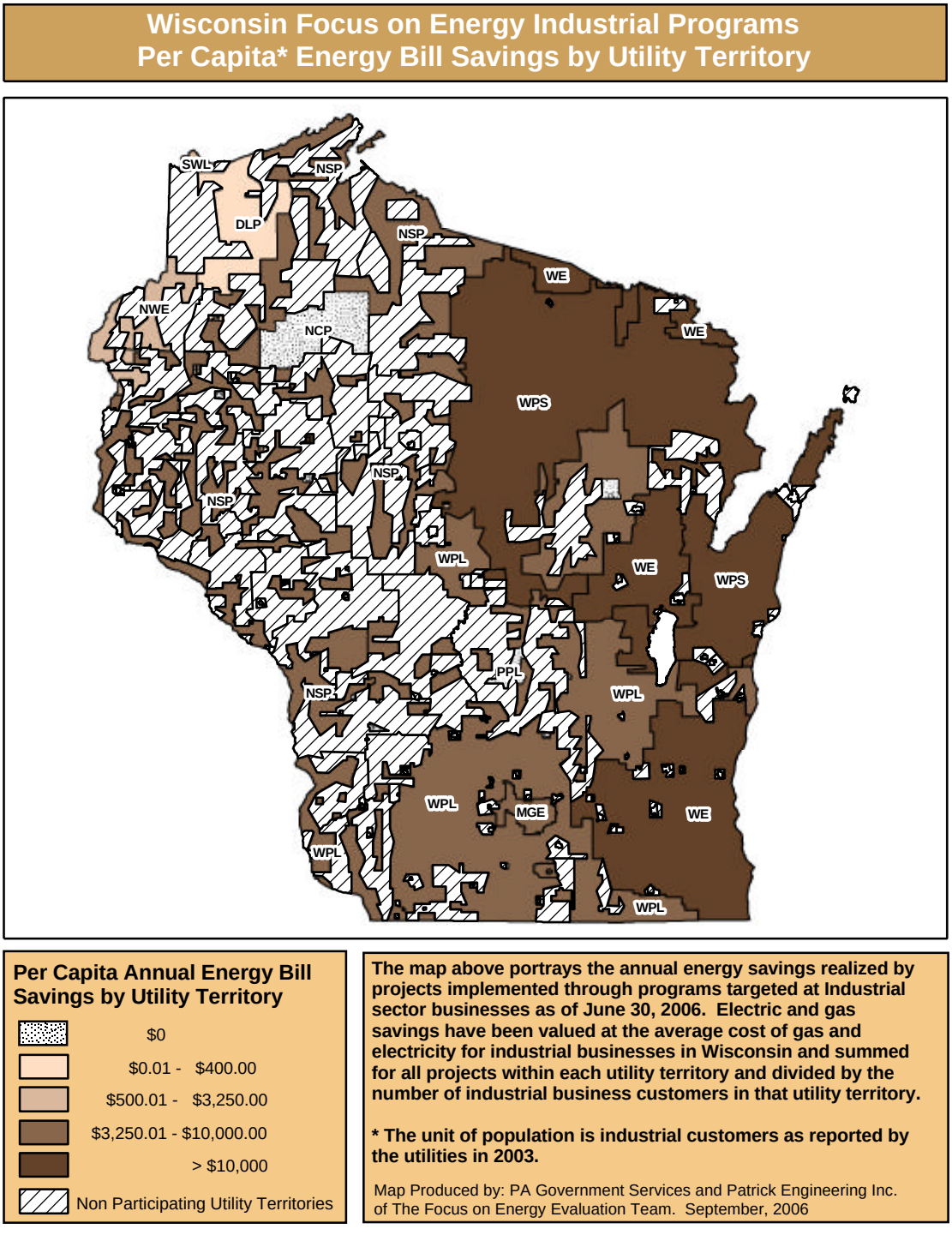


Table A-8. Industrial Program Energy Impacts (By Participating Utility)

Utility	Map Code	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Number of Customers
Alliant Energy	WPL	$7,386.15	$7,164,564	57,618,698	3,914,115	970
Bloomer Electric & Water Co		$294.53	$14,726	256,111	0	50
City of Argyle						
City of Barron						
City of Cornell		$21,232.25	$254,787	195,744	247,492	12
City of Evansville		$3,344.29	$6,689	116,323	0	2
City of Princeton						
City of Shullsburg						
Consolidated Water Power Co		$72,998.89	$72,999	359,924	42,205	1
Cumberland City of		$362.82	$8,708	104,845	2,723	24
Dahlberg Light & Power Co	DLP	$48.15	$1,926	33,493	0	40
La Farge Municipal Electric Co						
Madison Gas & Electric Co	MGE	$8,886.67	$568,747	6,321,713	208,586	64
North Central Power Co Inc	NCP					
Northwestern Wisconsin Elec Co	NEW	$2,947.42	$82,528	1,392,457	2,502	28
Pioneer Power & Light Co	PPL					
Spooner City of		$339.75	$4,417	65,960	634	13
Superior Water, Light & Power Co	SWL	$1,135.67	$145,366	575,313	114,111	128
Village of Benton						
Village of Cadott						
Village of Cashton						
Village of Centuria						
Village of Gresham						
Village of Pardeeville						
Village of Stratford		$1,079.63	$2,159	37,552	0	2
Village of Viola						
We Energies	WE	$15,465.63	$10,671,284	89,285,773	5,302,710	690
Westfield Electric Co						
Wisconsin Public Service Corp	WPS	$36,639.45	$8,390,435	44,463,846	5,924,722	229
Wonewoc Electric & Water Util						
Xcel Energy	NSP	$3,810.86	$6,101,181	39,001,863	3,921,315	1,601
Not mapped*			$5,604,724	34,418,527	3,601,409	
			$39,095,238	**274,248,143**	**23,282,524**	**3,854**

* *Unknown Utility:* The impacts for these participants is 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 evaluated energy impacts across the Residential Programs through the second quarter of FY05 that ended on December 31, 2004. The tables and maps below provide *verified gross energy savings* that are based on the evaluators' review of participants, measures installed, and per-unit savings used by WECC program administrators.

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-9 are based on the number of customers reported by the utilities in 2003.

Figure A-9.
Wisconsin Focus on Energy Residential Programs
Per Capita Energy Bill Savings by County

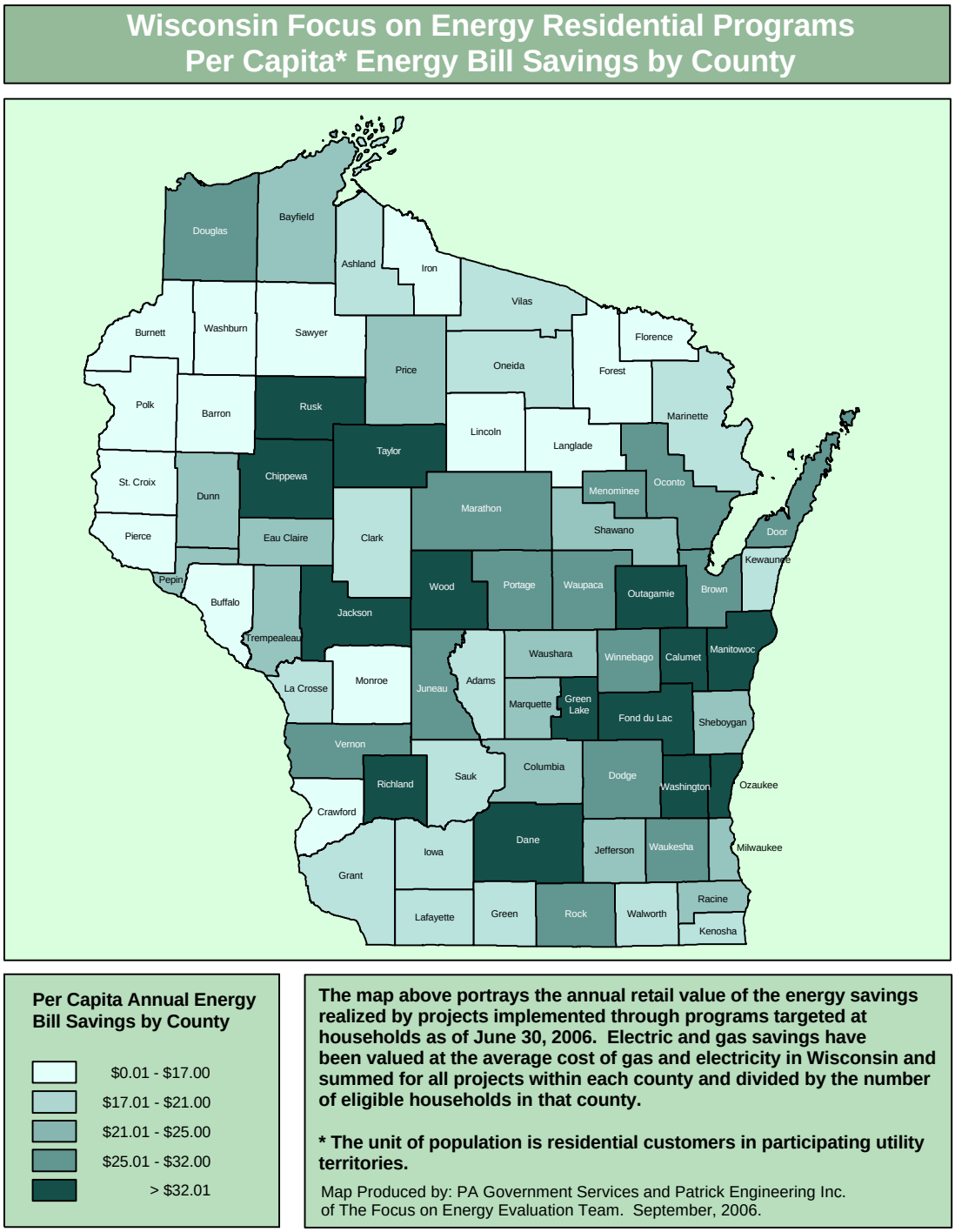


Table A-9. Residential Programs Energy Impacts (by Participating County)

County	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
Adams	$18.66	$47,017	420,267	2,456
Ashland	$20.74	$102,680	771,395	18,643
Barron	$16.01	$145,961	1,253,890	12,232
Bayfield	$23.04	$88,384	585,210	23,191
Brown	$27.85	$2,431,424	17,646,675	497,634
Buffalo	$13.72	$32,577	250,015	5,436
Burnett	$7.47	$26,043	226,314	1,948
Calumet	$35.25	$459,264	3,632,615	66,848
Chippewa	$38.69	$524,855	4,213,723	70,744
Clark	$18.81	$146,702	1,258,922	12,416
Columbia	$21.78	$346,042	2,858,024	39,399
Crawford	$14.49	$61,012	539,617	3,709
Dane	$39.59	$6,124,899	40,532,151	1,609,120
Dodge	$25.55	$709,428	5,858,647	80,832
Door	$31.91	$197,125	1,768,993	9,667
Douglas	$25.97	$386,643	2,940,656	66,937
Dunn	$24.99	$222,483	1,914,241	18,374
Eau Claire	$24.85	$768,918	6,061,047	113,807
Florence	$4.13	$7,260	68,597	44
Fond du Lac	$32.09	$1,172,619	8,839,737	210,149
Forest	$14.96	$60,474	550,292	2,276
Grant	$17.01	$179,664	1,509,763	18,109
Green	$20.58	$241,140	2,044,642	22,647
Green Lake	$32.11	$219,768	1,824,294	24,189
Iowa	$19.29	$168,864	1,422,014	16,747
Iron	$9.32	$22,230	188,946	2,047
Jackson	$53.73	$52,724	476,814	2,253
Jefferson	$22.45	$508,862	4,285,895	50,400
Juneau	$26.99	$75,958	588,626	12,160
Kenosha	$18.56	$1,040,507	8,229,267	151,520
Kewaunee	$19.55	$140,027	1,236,439	8,695
La Crosse	$19.48	$723,592	5,550,649	120,982
Lafayette	$20.67	$73,662	618,216	7,495
Langlade	$16.56	$139,988	1,251,105	7,331
Lincoln	$15.55	$179,704	1,431,530	25,238
Manitowoc	$32.01	$423,358	3,597,477	39,053
Marathon	$25.60	$1,137,088	8,963,998	168,224
Marinette	$17.31	$291,396	2,523,836	22,555
Marquette	$24.21	$61,371	528,908	4,990
Menominee	$29.77	$38,377	207,623	14,285
Milwaukee	$21.88	$8,265,127	61,086,965	1,591,792
Monroe	$10.90	$122,166	1,037,848	11,293
Oconto	$25.43	$205,056	1,784,383	15,115
Oneida	$17.44	$265,331	2,236,249	26,145
Outagamie	$37.35	$1,745,185	14,590,301	182,695
Ozaukee	$32.73	$826,329	6,678,838	107,319

County	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
Pepin	$23.99	$45,972	380,272	5,182
Pierce	$13.28	$52,805	478,953	2,129
Polk	$13.10	$106,637	760,756	23,022
Portage	$31.34	$725,728	5,497,551	127,641
Price	$21.69	$60,783	542,014	3,294
Racine	$21.04	$1,490,016	12,961,588	110,227
Richland	$40.99	$86,077	751,065	6,161
Rock	$30.89	$1,674,265	13,112,134	255,547
Rusk	$38.77	$130,628	1,115,103	11,588
Sauk	$20.94	$336,453	2,928,489	24,735
Sawyer	$12.40	$58,053	488,034	5,833
Shawano	$24.95	$233,931	1,932,371	26,608
Sheboygan	$21.61	$752,923	5,967,517	108,488
St. Croix	$13.34	$185,515	1,648,613	10,566
Taylor	$95.64	$70,180	633,631	3,094
Trempealeau	$22.10	$61,549	534,800	4,609
Vernon	$29.71	$129,557	1,120,714	10,156
Vilas	$19.21	$168,918	1,387,437	19,929
Walworth	$20.43	$648,155	5,505,503	59,989
Washburn	$16.78	$61,810	548,466	3,595
Washington	$34.57	$1,342,445	10,156,435	237,277
Waukesha	$26.30	$3,384,456	28,548,541	331,324
Waupaca	$27.75	$400,627	3,364,183	40,597
Waushara	$24.50	$150,759	1,260,087	15,810
Winnebago	$29.39	$1,631,924	12,252,720	296,948
Wood	$37.30	$349,849	2,921,872	36,894
Not Mapped*		$1,500,114	$5,372,097	$807,167
		$47,049,417	**358,256,596**	**8,107,548**

* *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-10.
Wisconsin Focus on Energy Residential Programs
Implemented Energy Bill Savings by Senate District

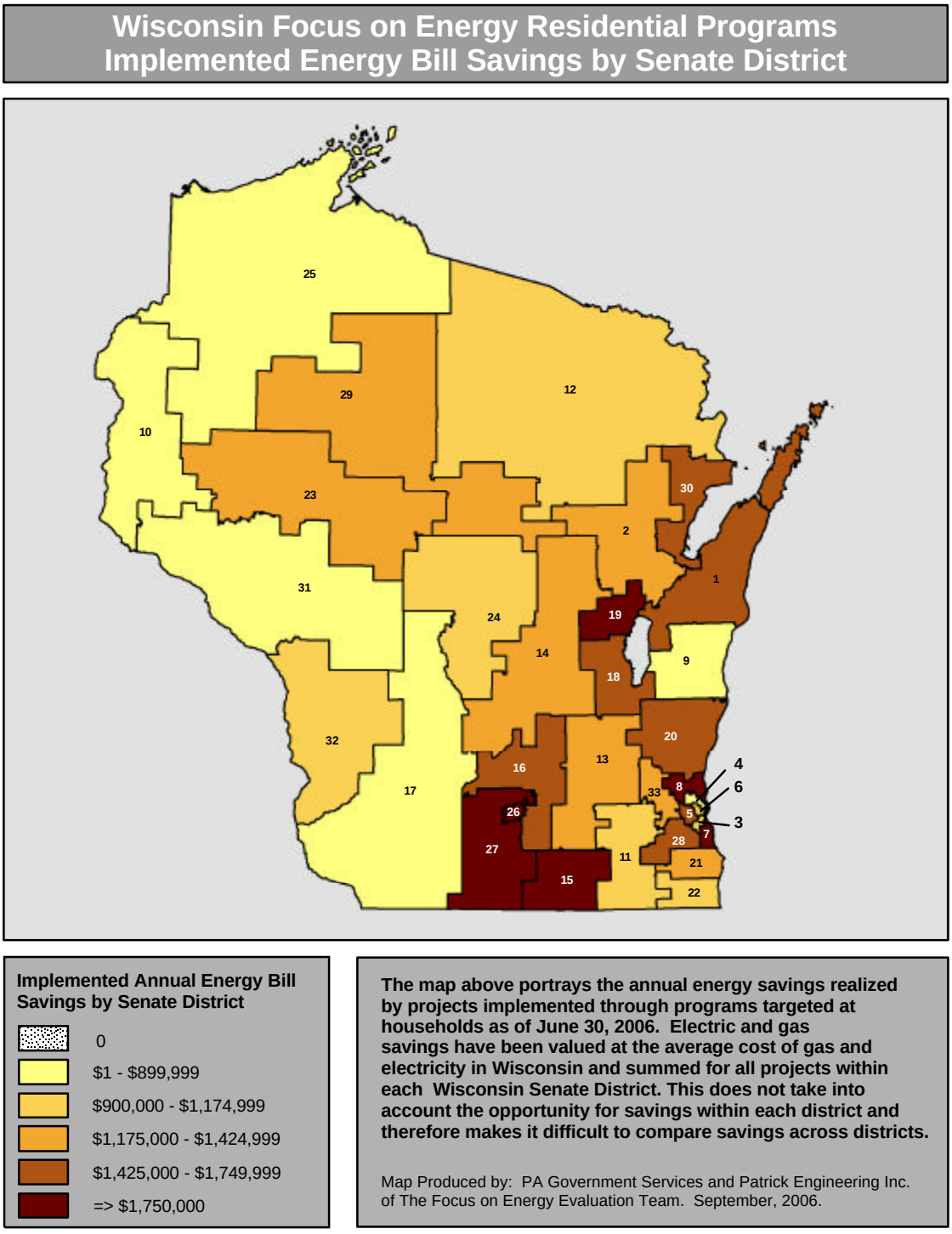


Table A-10. Residential Programs Energy Impacts (By Senate District)

Senate District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
1	$1,436,970	12,010,186	150,733
2	$1,316,710	10,055,211	224,251
3	$1,101,527	8,396,942	188,964
4	$873,713	6,149,047	196,245
5	$1,700,306	13,673,966	227,068
6	$1,140,019	6,561,607	388,606
7	$2,020,420	14,911,963	391,003
8	$1,768,311	13,721,626	281,422
9	$879,862	7,068,574	118,167
10	$459,155	3,835,249	48,378
11	$1,165,583	9,785,232	118,339
12	$1,071,430	9,169,638	92,925
13	$1,225,950	10,140,774	138,183
14	$1,190,711	10,034,580	117,409
15	$1,777,908	14,254,435	241,386
16	$1,702,375	11,982,050	382,279
17	$749,576	6,355,077	70,455
18	$1,676,357	12,157,041	343,962
19	$2,009,176	16,641,776	224,439
20	$1,673,073	13,058,940	259,343
21	$1,257,643	11,094,276	79,063
22	$1,134,759	8,935,470	168,802
23	$1,211,847	9,838,038	153,468
24	$1,116,946	8,831,339	162,875
25	$860,319	6,743,485	130,784
26	$2,762,441	17,367,136	808,590
27	$1,973,412	14,015,599	431,728
28	$1,694,831	14,694,570	129,794
29	$1,268,671	10,170,906	172,312
30	$1,461,333	10,580,705	301,381
31	$721,086	5,976,457	80,208
32	$924,241	7,317,528	133,881
33	$1,423,191	11,814,528	156,587
Not mapped*	$2,299,564	$10,912,647	$994,516
	$47,049,417	**358,256,596**	**8,107,548**

* *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-11.
Wisconsin Focus on Energy Residential Programs
Implemented Energy Bill Savings by Assembly District

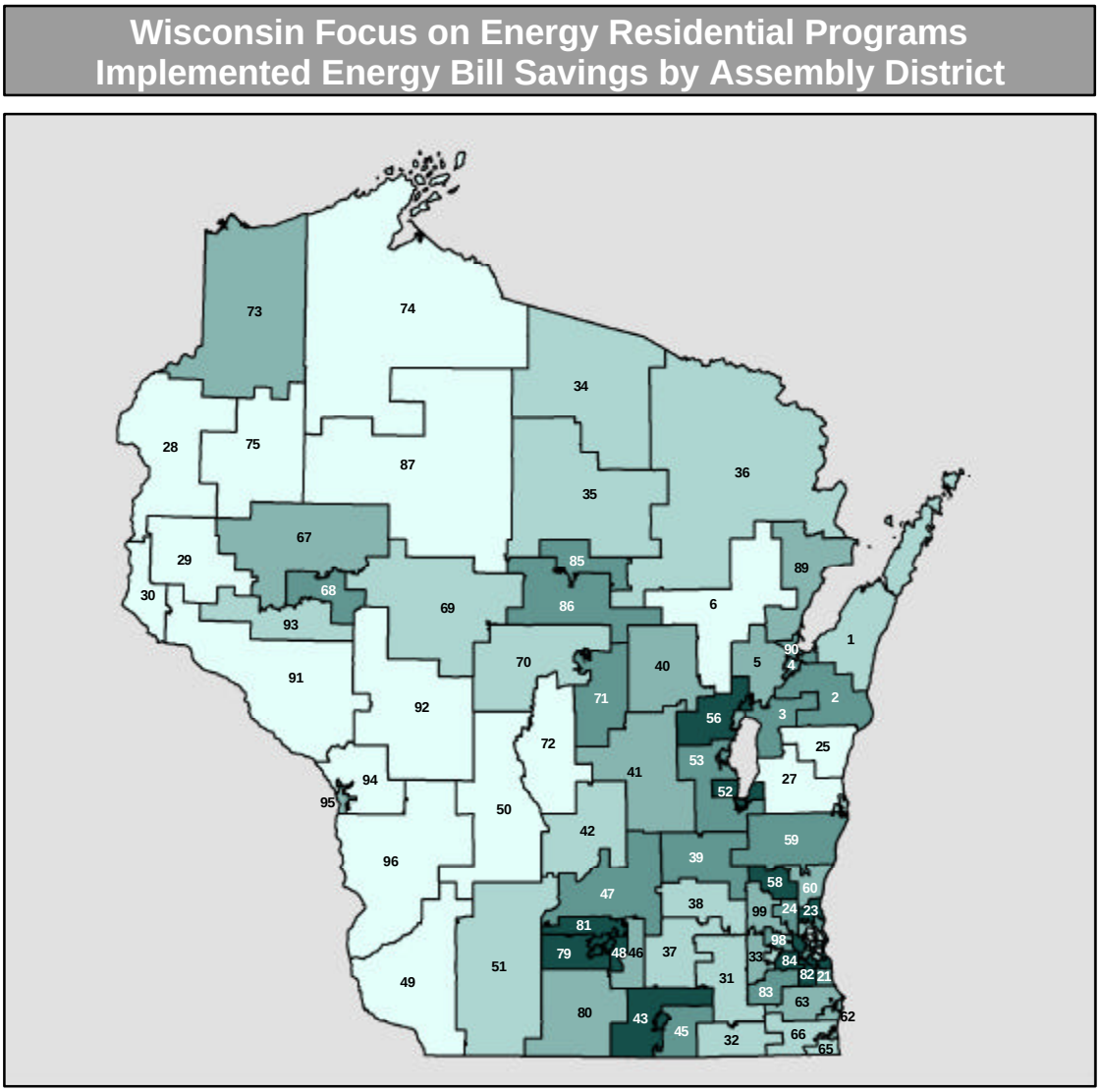


Table A-11. Residential Programs Energy Impacts (By Assembly District)

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
1	$381,725	3,394,338	21,553
2	$505,202	4,171,710	57,597
3	$550,089	4,444,574	71,583
4	$560,282	4,371,836	86,974
5	$460,536	3,207,348	106,508
6	$295,846	2,475,592	30,769
7	$602,847	4,458,240	115,864
8	$185,603	1,393,344	33,790
9	$313,069	2,545,278	39,310
10	$249,294	1,838,404	48,384
11	$218,888	1,492,788	53,491
12	$405,580	2,818,324	94,369
13	$441,584	3,602,603	54,314
14	$710,213	5,794,716	87,306
15	$548,484	4,276,409	85,448
16	$459,401	1,900,770	224,012
17	$302,993	2,418,138	42,146
18	$377,625	2,242,699	122,448
19	$868,079	5,480,768	251,984
20	$638,205	5,045,682	93,101
21	$514,136	4,385,513	45,918
22	$575,899	4,354,995	101,975
23	$659,119	5,080,634	107,976
24	$533,268	4,285,766	71,471
25	$202,018	1,702,618	19,908
26	$375,638	2,909,596	60,259
27	$302,236	2,456,652	38,000
28	$121,344	895,101	23,528
29	$217,639	1,869,375	18,264
30	$120,171	1,070,773	6,586
31	$373,198	3,152,396	36,135
32	$332,053	2,736,382	38,360
33	$460,320	3,896,334	43,844
34	$389,861	3,263,065	40,477
35	$346,091	2,913,109	34,446
36	$335,478	2,993,464	18,002
37	$368,099	3,104,602	36,070
38	$352,839	2,748,645	55,182
39	$505,096	4,288,326	46,931
40	$414,645	3,503,549	40,053
41	$460,735	3,882,318	45,473
42	$315,331	2,648,713	31,882
43	$630,011	5,507,854	44,120
44	$649,556	4,791,055	125,985
45	$498,341	3,955,526	71,281
46	$425,072	2,855,731	107,795

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
47	$480,394	3,961,614	55,245
48	$796,719	5,162,895	219,239
49	$192,023	1,619,692	18,804
50	$190,039	1,603,992	18,516
51	$367,514	3,131,393	33,136
52	$654,571	4,789,603	130,443
53	$541,461	4,114,811	94,042
54	$480,325	3,252,626	119,477
55	$474,844	3,901,443	55,912
56	$890,216	7,298,454	106,254
57	$644,116	5,441,879	62,273
58	$662,889	4,938,045	124,159
59	$532,676	4,067,639	90,740
60	$477,467	4,052,860	44,445
61	$422,205	4,094,095	-6,976
62	$397,186	3,239,503	48,934
63	$438,252	3,760,678	37,105
64	$395,822	2,778,835	89,531
65	$374,477	3,141,385	38,238
66	$364,460	3,015,251	41,033
67	$411,530	3,559,722	32,272
68	$494,125	3,941,789	68,890
69	$306,192	2,336,528	52,306
70	$334,708	2,773,256	37,307
71	$577,270	4,358,761	102,816
72	$204,969	1,699,323	22,752
73	$423,030	3,263,111	69,091
74	$264,550	1,979,791	48,726
75	$172,740	1,500,582	12,967
76	$1,001,147	6,020,976	317,810
77	$721,117	5,096,522	160,028
78	$1,040,225	6,250,077	330,752
79	$852,190	5,576,744	229,572
80	$458,019	3,801,127	50,492
81	$663,264	4,638,301	151,664
82	$622,253	5,313,602	55,042
83	$485,067	4,165,404	40,796
84	$587,519	5,215,643	33,956
85	$504,230	3,737,439	96,139
86	$492,287	4,039,864	58,410
87	$272,155	2,393,603	17,763
88	$489,789	3,471,773	107,771
89	$396,458	3,215,659	50,468
90	$575,085	3,893,273	143,142
91	$152,139	1,279,457	15,245
92	$177,533	1,650,364	3,520
93	$391,414	3,046,636	61,443
94	$282,645	2,439,564	22,646
95	$432,611	3,056,556	96,089

Assembly District	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved
96	$208,984	1,821,408	15,146
97	$393,962	3,176,489	51,866
98	$565,873	4,692,740	62,698
99	$463,380	3,945,522	42,024
Not mapped*	$2,299,564	10,912,647	994,516
	$47,049,417	**358,256,596**	**8,107,548**

* *Unknown District*: The impacts for these participants is 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-12.
Wisconsin Focus on Energy Residential Programs
Per Capita Energy Bill Savings by Utility Territory

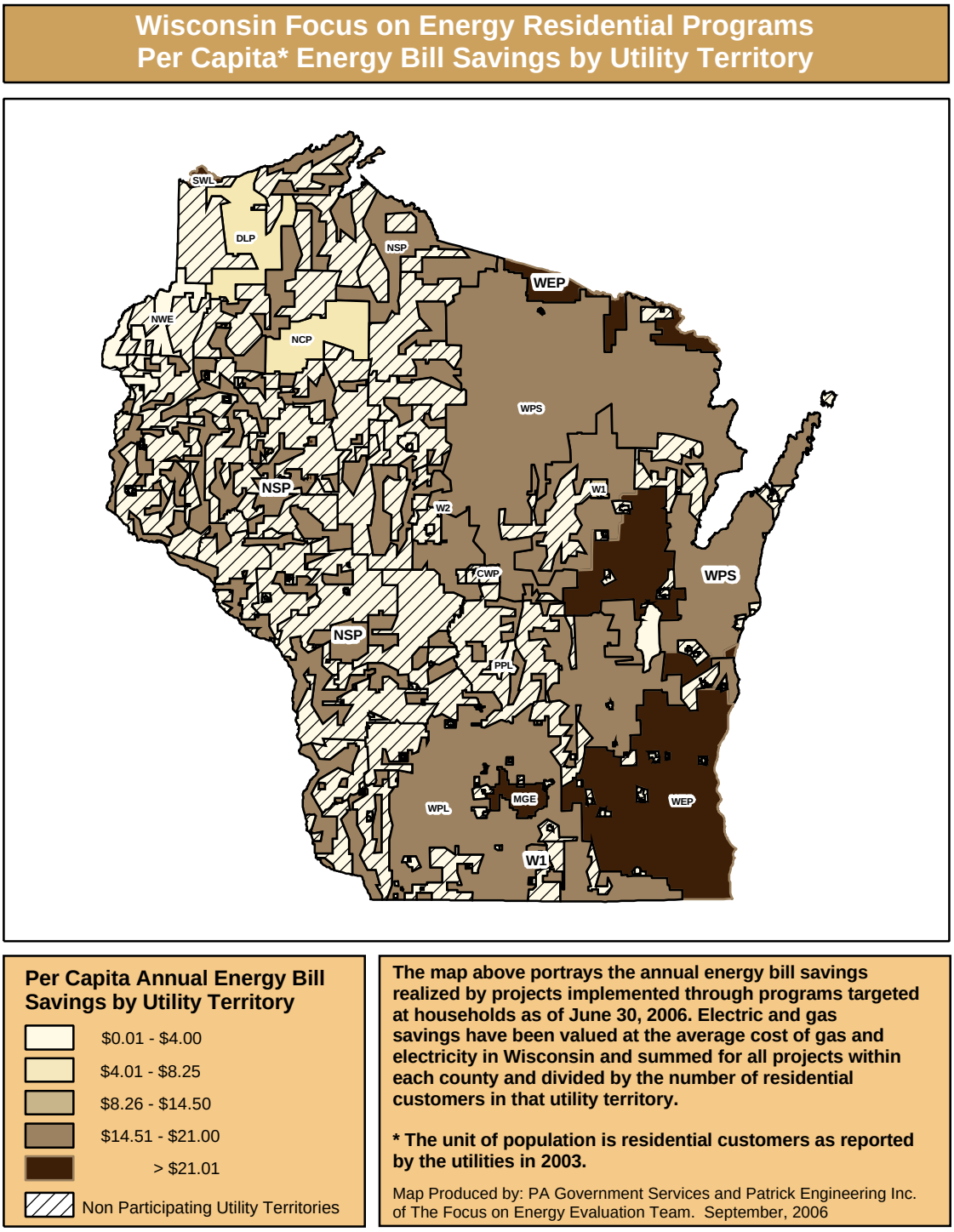


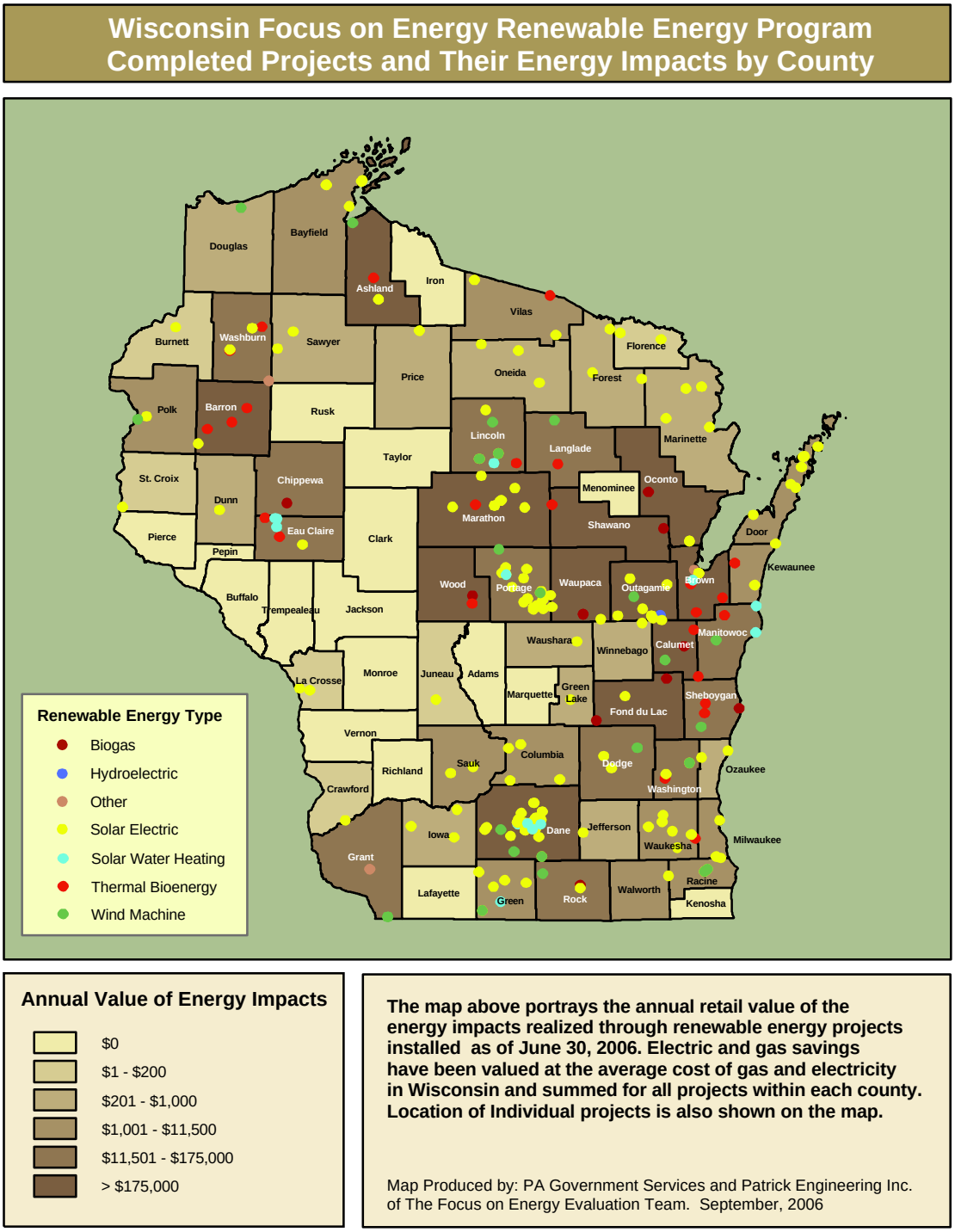
Table A-12. Residential Programs Energy Impacts (By Participating Utility)

Utility	Map Code	Annual Dollars Saved Per Capita	Annual Dollars Saved	Annual kWh Saved	Annual Therms Saved	Number of Customers
Alliant Energy	WPL	$20.43	$7,582,773	59,547,549	1,142,645	371,183
Bloomer Electric & Water Co		$10.92	$17,389	151,295	1,284	1,593
City of Argyle		$9.12	$3,540	30,912	251	388
City of Cornell		$53.43	$36,866	242,878	9,784	690
City of Evansville	W1	$15.88	$53,785	397,124	10,395	3,388
City of Princeton		$7.29	$5,854	52,101	326	803
City of Shullsburg		$6.56	$4,017	35,358	260	612
Consolidated Water Power Co	CWP	$19.66	$19,478	154,015	2,840	991
Cumberland City of		$12.00	$13,623	113,214	1,488	1,135
Dahlberg Light & Power Co	DLP	$8.18	$76,270	628,852	8,781	9,322
La Farge Municipal Electric Co		$2.77	$1,193	10,101	113	431
Madison Gas & Electric Co	MGE	$38.25	$4,383,167	27,725,790	1,267,633	114,590
North Central Power Co Inc	NCP	$5.05	$19,970	166,399	2,141	3,957
Northwestern Wisconsin Elec Co	NEW	$3.94	$42,775	285,851	10,986	10,846
Pioneer Power & Light Co	PPL	$3.95	$7,402	64,631	526	1,876
Spooner City of		$10.17	$12,620	95,959	2,187	1,241
Superior Water, Light & Power Co	SWL	$24.48	$304,709	2,195,822	63,786	12,447
Village of Benton		$2.02	$859	6,608	142	426
Village of Cadott		$29.58	$17,865	132,400	3,408	604
Village of Cashton		$15.33	$6,835	54,376	967	446
Village of Centuria		$5.13	$1,927	5,909	1,127	376
Village of Gresham	w1	$8.35	$7,607	68,358	365	911
Village of Pardeeville		$13.76	$14,210	126,944	749	1,033
Village of Stratford	W2	$31.66	$21,021	179,949	1,819	664
Village of Viola		$2.88	$974	6,322	267	338
We Energies	WEP	$22.01	$20,492,925	160,471,504	3,129,741	930,873
Wisconsin Public Service Corp	WPS	$19.51	$6,973,701	53,532,040	1,162,626	357,397
Wonewoc Electric & Water Util		$5.52	$2,653	21,617	329	481
Xcel Energy	NSP	$15.72	$2,996,189	23,662,213	439,422	190,632
Not mapped*			$3,927,220	28,090,508	841,162	
			$47,049,417	**358,256,596**	**8,107,548**	**2,019,674**

* *Unknown Utility:* The impacts for these participants is 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

Figure A-13.
Wisconsin Focus on Energy Renewable Energy Program
Completed Projects and Their Energy Impacts by County



Annual Value of Energy Impacts

- $0
- $1 - $200
- $201 - $1,000
- $1,001 - $11,500
- $11,501 - $175,000
- > $175,000

The map above portrays the annual retail value of the energy impacts realized through renewable energy projects installed as of June 30, 2006. 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 Government Services and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. September, 2006

Table A-13. Renewable Programs Energy Impacts
(By County)

County	Total Dollars
Ashland	318,695
Barron	183,912
Bayfield	1,040
Brown	494,763
Burnett	44
Calumet	202,097
Chippewa	22,317
Columbia	2,505
Crawford	135
Dane	1,432,264
Dodge	17,846
Door	2,311
Douglas	227
Dunn	216
Eau Claire	53,982
Florence	144
Fond du Lac	578,446
Forest	407
Grant	27,512
Green	8,849
Green Lake	671
Iowa	590
Jefferson	254
Juneau	50
Kewaunee	2,040
La Crosse	138
Langlade	18,426
Lincoln	18,497
Manitowoc	12,994

County	Total Dollars
Marathon	321,949
Marinette	879
Milwaukee	1,672
Oconto	212,064
Oneida	458
Outagamie	685,603
Ozaukee	783
Polk	4,618
Portage	12,335
Price	262
Racine	4,384
Rock	30,706
Sauk	1,447
Sawyer	242
Shawano	557,906
Sheboygan	82,869
St. Croix	84
Vilas	7,475
Walworth	1,555
Washburn	40,127
Washington	11,564
Waukesha	7,903
Waupaca	178,611
Waushara	391
Winnebago	376
Wood	1,293,212
TOTAL	**5,319,635**

APPENDIX B: GEOGRAPHIC DISTRIBUTION OF LOW-INCOME BENEFITS

The following appendix provides four maps showing geographic distribution of Low-income Program benefits. The maps include:

- Figure B-1. Wisconsin Weatherization Assistance Program, Monetary Value of Energy Savings for Households Weatherized.
- Figure B-2. Wisconsin Weatherization Assistance Program, Total Cost of Weatherization Services.
- Figure B-3. Wisconsin Home Energy Assistance Program, Total Heating and Crisis Assistance Benefits Paid to Households Federal Fiscal Year 2005 to June 30, 2006.
- Figure B-4. Wisconsin Home Energy Assistance Program, Percentage of Eligible Households Participating by County in Federal Fiscal Year 2005 to June 30, 2006.

Figure B-1.
Wisconsin Weatherization Assistance Program
Monetary Value of Energy Savings
for Households Weatherized

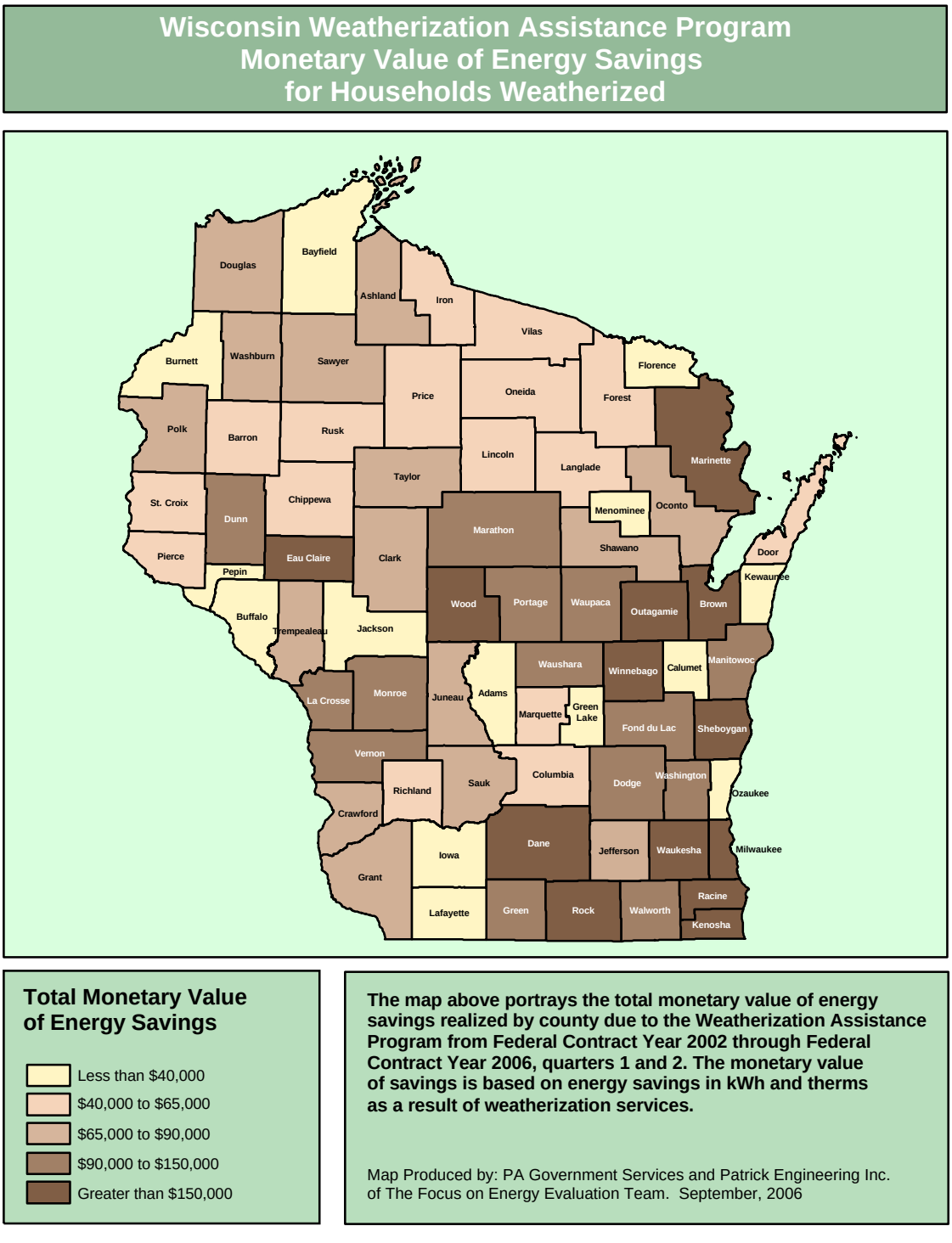


Table B-1. Wisconsin Weatherization Assistance Program
Total Monetary Value* of Energy Savings for Households Weatherized

County	Savings in dollars
Adams	30,870
Ashland	72,450
Barron	61,957
Bayfield	26,969
Brown	173,838
Buffalo	21,884
Burnett	25,379
Calumet	30,811
Chippewa	63,100
Clark	68,556
Columbia	46,917
Crawford	68,036
Dane	431,205
Dodge	91,167
Door	56,499
Douglas	83,975
Dunn	91,984
Eau Claire	151,950
Florence	19,535
Fond du Lac	91,151
Forest	59,264
Grant	68,105
Green	110,202
Green Lake	31,231
Iowa	35,212
Iron	44,171
Jackson	32,948
Jefferson	78,916
Juneau	76,082
Kenosha	166,077
Kewaunee	35,972
La Crosse	132,351
Lafayette	34,198
Langlade	51,884
Lincoln	59,445
Manitowoc	110,443
Marathon	103,789

County	Savings in dollars
Marinette	191,010
Marquette	40,683
Menominee	32,794
Milwaukee	1,378,086
Monroe	92,285
Oconto	88,555
Oneida	60,932
Outagamie	152,280
Ozaukee	34,207
Pepin	30,056
Pierce	44,508
Polk	83,210
Portage	97,070
Price	42,036
Racine	281,675
Richland	63,672
Rock	299,951
Rusk	59,083
Sauk	82,398
Sawyer	69,313
Shawano	86,453
Sheboygan	185,415
St. Croix	57,522
Taylor	67,108
Trempealeau	77,098
Vernon	100,388
Vilas	56,004
Walworth	116,507
Washburn	72,331
Washington	125,671
Waukesha	236,627
Waupaca	148,524
Waushara	113,769
Winnebago	331,802
Wood	471,103

* Program-to-date Savings: Federal Fiscal Year 2002 through June 30, 2006).

Figure B-2.
Wisconsin Weatherization Assistance Program
Total Cost of Weatherization Services

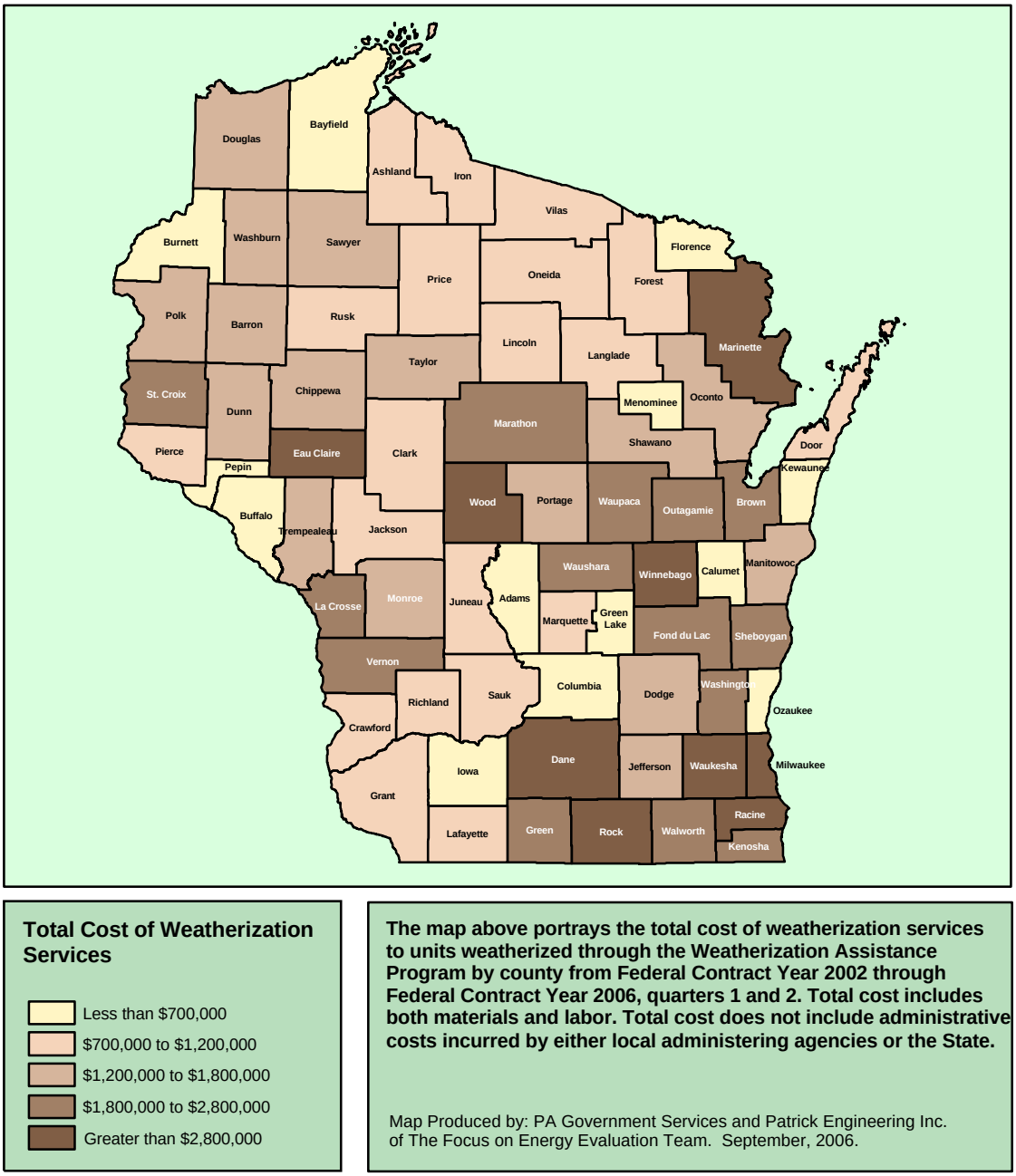


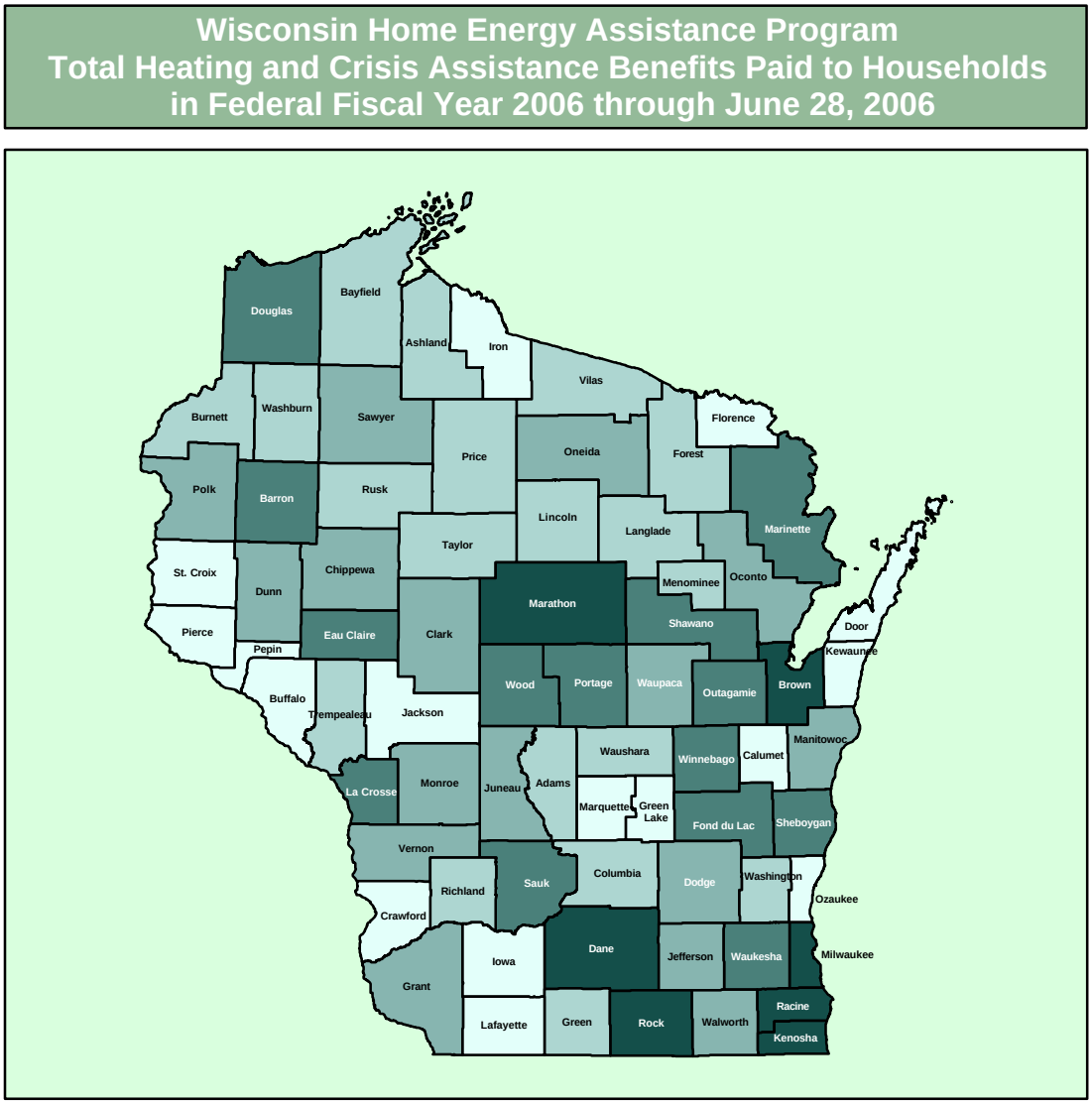
Table B-2. Wisconsin Weatherization Assistance Program
Total Cost* of Weatherization Services

County	Cost in dollars
Adams	522,914
Ashland	1,037,376
Barron	1,222,934
Bayfield	410,218
Brown	2,798,951
Buffalo	414,997
Burnett	450,727
Calumet	595,760
Chippewa	1,370,634
Clark	1,179,164
Columbia	678,858
Crawford	1,150,981
Dane	6,876,870
Dodge	1,502,530
Door	919,965
Douglas	1,547,877
Dunn	1,782,393
Eau Claire	2,935,334
Florence	363,027
Fond du Lac	1,951,258
Forest	1,144,387
Grant	1,148,897
Green	2,154,352
Green Lake	569,608
Iowa	623,322
Iron	707,743
Jackson	787,017
Jefferson	1,497,443
Juneau	1,099,591
Kenosha	2,480,987
Kewaunee	680,687
La Crosse	2,248,129
Lafayette	742,112
Langlade	982,022
Lincoln	1,162,673
Manitowoc	1,766,579
Marathon	1,987,096

County	Cost in dollars
Marinette	3,558,969
Marquette	718,213
Menominee	643,028
Milwaukee	22,538,790
Monroe	1,553,943
Oconto	1,618,269
Oneida	1,066,053
Outagamie	2,728,593
Ozaukee	622,022
Pepin	666,140
Pierce	1,045,746
Polk	1,613,106
Portage	1,792,942
Price	884,482
Racine	4,339,816
Richland	1,194,166
Rock	4,439,177
Rusk	1,186,325
Sauk	1,164,571
Sawyer	1,449,665
Shawano	1,327,656
Sheboygan	2,661,933
St. Croix	1,969,479
Taylor	1,683,239
Trempealeau	1,726,757
Vernon	1,822,510
Vilas	1,194,730
Walworth	2,098,433
Washburn	1,531,097
Washington	2,443,717
Waukesha	4,633,162
Waupaca	2,509,320
Waushara	2,218,171
Winnebago	5,550,100
Wood	12,085,849

* Program-to-date Cost, by County: Federal Fiscal Year 2002 through December 31, 2006

Figure B-3.
Wisconsin Home Energy Assistance Program
Total Heating and Crisis Assistance Benefits Paid to Households
Federal Fiscal Year 2006 to June 30, 2006



The map above portrays the total amount of benefits paid to households through the Wisconsin Home Energy Assistance Program in Federal Fiscal Year 2006 through 6/28/06. Total benefits includes funds distributed for both heating assistance and crisis assistance (including furnace repairs and replacements) components of WHEAP. Total benefit does not include administrative costs incurred by either local administering agencies or the State. Data obtained through the Department of Administration.

Map Produced by: PA Government Services and Patrick Engineering Inc. of The Focus on Energy Evaluation Team. September, 2006.

Table B-3. Wisconsin Home Energy Assistance Program
Total Heating and Crisis Assistance Benefits Paid to Households
in Federal Fiscal Year 2006 (June 30, 2006)

County	Total benefits
Adams	$561,762
Ashland	$574,173
Barron	$950,349
Bayfield	$390,103
Brown	$2,493,098
Buffalo	$281,735
Burnett	$455,159
Calumet	$288,998
Chippewa	$890,054
Clark	$715,426
Columbia	$598,002
Crawford	$349,724
Dane	$2,783,050
Dodge	$838,481
Door	$312,960
Douglas	$1,139,169
Dunn	$828,487
Eau Claire	$1,241,569
Florence	$179,301
Fond du Lac	$939,051
Forest	$489,806
Grant	$628,473
Green	$453,702
Green Lake	$323,391
Iowa	$317,377
Iron	$221,110
Jackson	$315,553
Jefferson	$623,567
Juneau	$745,484
Kenosha	$2,572,031
Kewaunee	$326,551
La Crosse	$1,420,559
Lafayette	$270,915
Langlade	$560,415
Lincoln	$479,310
Manitowoc	$658,732
Marathon	$2,586,611

County	Total benefits
Marinette	$1,449,761
Marquette	$335,608
Menominee	$445,520
Milwaukee	$33,109,914
Monroe	$772,264
Oconto	$792,712
Oneida	$685,767
Outagamie	$1,326,565
Ozaukee	$287,360
Pepin	$135,340
Pierce	$267,926
Polk	$747,061
Portage	$986,025
Price	$465,664
Racine	$3,143,395
Richland	$368,567
Rock	$2,573,892
Rusk	$535,642
Sauk	$1,039,982
Sawyer	$873,849
Shawano	$967,016
Sheboygan	$1,138,240
St. Croix	$329,678
Taylor	$352,857
Trempealeau	$355,655
Vernon	$602,807
Vilas	$566,987
Walworth	$889,216
Washburn	$421,477
Washington	$596,033
Waukesha	$1,627,731
Waupaca	$868,777
Waushara	$599,756
Winnebago	$1,755,780
Wood	$1,136,711

Figure B-4.
Wisconsin Home Energy Assistance Program
Percent of Eligible Households Participating by County
in Federal Fiscal Year 2006 to June 30, 2006

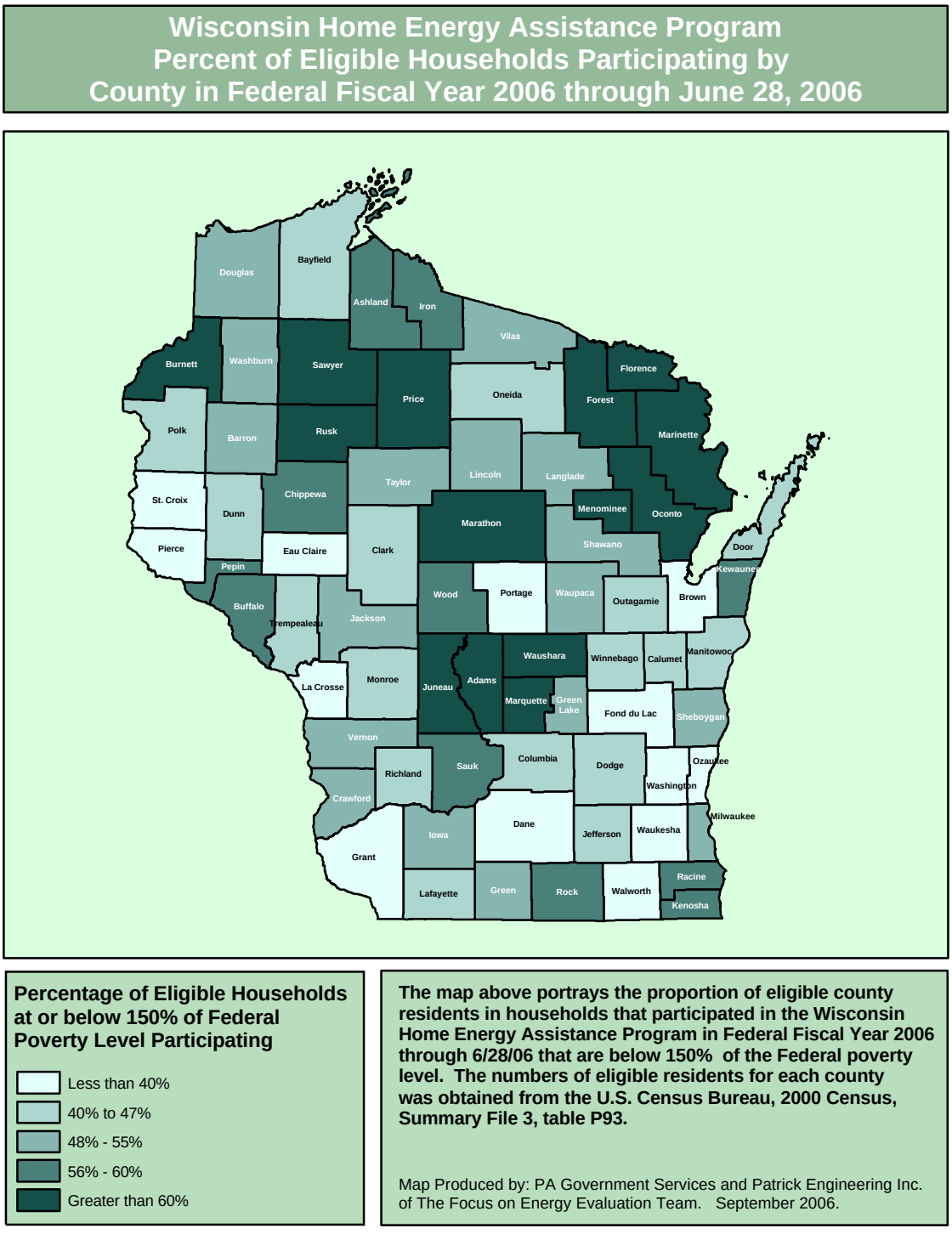


Table B-4. Wisconsin Home Energy Assistance Program
Percentage of Eligible Households Participating by County
in Federal Fiscal Year 2006 to June 30, 2006

County	Percent of Eligible Households Served
Adams	67%
Ashland	59%
Barron	52%
Bayfield	46%
Brown	38%
Buffalo	60%
Burnett	61%
Calumet	46%
Chippewa	56%
Clark	45%
Columbia	42%
Crawford	53%
Dane	24%
Dodge	44%
Door	40%
Douglas	52%
Dunn	46%
Eau Claire	39%
Florence	61%
Fond du Lac	38%
Forest	68%
Grant	32%
Green	54%
Green Lake	49%
Iowa	49%
Iron	59%
Jackson	51%
Jefferson	41%
Juneau	68%
Kenosha	56%
Kewaunee	57%
La Crosse	39%
Lafayette	44%
Langlade	53%
Lincoln	48%
Manitowoc	46%
Marathon	61%

County	Percent of Eligible Households Served
Marinette	69%
Marquette	62%
Menominee	98%
Milwaukee	54%
Monroe	46%
Oconto	62%
Oneida	47%
Outagamie	43%
Ozaukee	35%
Pepin	57%
Pierce	32%
Polk	45%
Portage	39%
Price	63%
Racine	56%
Richland	42%
Rock	57%
Rusk	60%
Sauk	57%
Sawyer	75%
Shawano	54%
Sheboygan	50%
St. Croix	30%
Taylor	49%
Trempealeau	45%
Vernon	51%
Vilas	54%
Walworth	28%
Washburn	53%
Washington	36%
Waukesha	36%
Waupaca	54%
Waushara	66%
Winnebago	41%
Wood	56%

APPENDIX C: RESIDENTIAL DEFAULT SAVINGS VALUES USED FOR FY06

The following table lists default/deemed energy savings by measure (used for FY06) for the Residential Programs, as of June 30, 2006.

Table C-1. Residential Programs: Default/Deemed Energy Savings By Measure (as of June 30, 2006)

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
ACES	CSG In Unit Exchange	Candelabra Base	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG In Unit Exchange	Compact Fluorescent Lightbulb	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG In Unit Exchange	Screw Base Compact Fluorescents	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG In Unit Exchange	Water	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	13W TCP Bug Light	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	4ft 1 lamp strip fixture with lamps	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	9W TCP Bug Light	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Candelabra Base	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Ceiling Surface	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Common Area T-8	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Common Area T-8 Cloud Fixture	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Common Area T-8 with Occupancy Sensor	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Common Area T-8 Wrap Fixture	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Common Area U-Tube	FY06	1	1	1	1	1	1	1	1	1	2

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
ACES	CSG Lighting	Compact Fluorescent Reflector Bulb	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Exit Light Retrofit Kit	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Flood Light 20w dimmable R30	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Floor Lamp	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Garage Lights	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	High Pressure Sodium	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Kitchen T5 Fixture	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	LED Exit Fixture	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	LED Exit Light Fixture	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	LED Exit Light Fixture w Battery Backup	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	LED Exit Light Fixture with Battery Backup Only	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	LED GREEN Exit Light Fixture with Batter Back up O	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	LED GREEN Exit Light Fixture with Emergency Lights	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Motion Sensor-Ivory	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Outdoor	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Outdoor Post Lantern	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Outdoor Reflector Bulb	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Outdoor Wall Lantern	FY06	1	1	1	1	1	1	1	1	1	2

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
ACES	CSG Lighting	Sconce with Olde Iron Finish	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Sconces	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Screw Base Compact Fluorescents	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Table Lamp	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	TCP 14W Candelabra Base	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	TCP Floodlights	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Timer	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	Torchiere	FY06	349	0.01	0	349	0.01	0	349	0.01	0	1
ACES	CSG Lighting	Vanity Fixture	FY06	1	1	1	1	1	1	1	1	1	2
ACES	CSG Lighting	White Traditional Dome	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Air Conditioning	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Appliances	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Bonus	FY06	1	1	1	0	0	0	0	0	0	2
ACES	New Construction	Building Shell	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	DHW - Central	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	DHW - Individual	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Heating	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Heating & Cooling	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Heating & DHW	FY06	1	1	1	1	1	1	1	1	1	2
ACES	New Construction	Lighting	FY06	1	1	1	1	1	1	1	1	1	2

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
ACES	New Construction	Ventilation	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Air Conditioning	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Appliances	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Building Shell	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Heating	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Heating & DHW	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Lighting	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Ventilation	FY06	1	1	1	1	1	1	1	1	1	2
ACES	Whole Building Existing	Water Heating-Central	FY06	1	1	1	1	1	1	1	1	1	2
EHCI	EHCI	>=90% modulating hot water	FY06	0	0	98	0	0	98	0	0	98	1
EHCI	EHCI	>=90% non-modulating hot water	FY06	0	0	98	0	0	98	0	0	98	1
EHCI	EHCI	90% AFUE or greater Boiler-New Construction	FY06	0	0	98	0	0	98	0	0	98	1
EHCI	EHCI	90% AFUE or greater Hot Water Boiler	FY06	0	0	98	0	0	98	0	0	98	1
EHCI	EHCI	90+ AFUE with ECM	FY06	773	0.1	20	773	0.1	20	618	0.08	16	1
EHCI	EHCI	90+ AFUE with ECM New Construction	FY06	1126	0.1	20	1126	0.1	20	1126	0.1	20	1
EHCI	EHCI	A/C Value Added Installation	FY06	1	1	1	0	0	0	0	0	0	2

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
EHCI	EHCI	Adjustment	FY06	1	1	1	0	0	0	0	0	0	2
EHCI	EHCI	SEER 12	FY06 (Jan-Jun)	0	0	0	0	0	0	0	0	0	1
EHCI	EHCI	SEER 12	FY06 (Jul-Dec)	250	0.6	0	250	0.6	0	0	0	0	1
EHCI	EHCI	SEER 12-New Construction	FY06 (Jan-Jun)	0	0	0	0	0	0	0	0	0	1
EHCI	EHCI	SEER 12-New Construction	FY06 (Jul-Dec)	250	0.6	0	250	0.6	0	250	0.6	0	1
EHCI	EHCI	SEER 13	FY06 (Jan-Jun)	0	0	0	0	0	0	0	0	0	1
EHCI	EHCI	SEER 13	FY06 (Jul-Dec)	346	0.83	0	346	0.83	0	443	1.06	0	1
EHCI	EHCI	SEER 13 <65 MBh	FY06 (Jul-Dec)	346	0.83	0	346	0.83	0	443	1.06	0	1
EHCI	EHCI	SEER 13-New Construction	FY06 (Jan-Jun)	0	0	0	0	0	0	0	0	0	1
EHCI	EHCI	SEER 13-New Construction	FY06 (Jul-Dec)	346	0.83	0	346	0.83	0	346	0.83	0	1
EHCI	EHCI	SEER 14 or greater	FY06 (Jan-Jun)	82	0.2	0	82	0.2	0	82	0.2	0	1
EHCI	EHCI	SEER 14 or greater	FY06 (Jul-Dec)	429	1.03	0	429	1.03	0	549	1.32	0	1
EHCI	EHCI	SEER 14 or greater <65 MBh	FY06 (Jul-Dec)	429	1.03	0	429	1.03	0	549	1.32	0	1
EHCI	EHCI	SEER 14 or greater-New Construction	FY06 (Jan-Jun)	82	0.2	0	82	0.2	0	82	0.2	0	1
EHCI	EHCI	SEER 14 or greater-New Construction	FY06 (Jul-Dec)	429	1.03	0	429	1.03	0	429	1.03	0	1
EHCI	EHCI	SEER 15	FY06 (Jan-Jun)	154	0.37	0	154	0.37	0	154	0.37	0	1
EHCI	EHCI	SEER 15	FY06 (Jul-Dec)	500	1.2	0	500	1.2	0	640	1.54	0	1

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
EHCI	EHCI	SEER 15-New Construction	FY06 (Jan-Jun)	154	0.37	0	154	0.37	0	154	0.37	0	1
EHCI	EHCI	SEER 15-New Construction	FY06 (Jul-Dec)	500	1.2	0	500	1.2	0	500	1.2	0	1
EHCI	EHCI	SEER 16	FY06 (Jan-Jun)	216	0.52	0	216	0.52	0	216	0.52	0	1
EHCI	EHCI	SEER 16	FY06 (Jul-Dec)	563	1.35	0	563	1.35	0	721	1.73	0	1
EHCI	EHCI	SEER 16-New Construction	FY06 (Jan-Jun)	216	0.52	0	216	0.52	0	216	0.52	0	1
EHCI	EHCI	SEER 16-New Construction	FY06 (Jul-Dec)	563	1.35	0	563	1.35	0	563	1.35	0	1
EHCI	EHCI	SEER 17	FY06 (Jan-Jun)	271	0.65	0	271	0.65	0	271	0.65	0	1
EHCI	EHCI	SEER 17	FY06 (Jul-Dec)	618	1.48	0	618	1.48	0	791	1.89	0	1
EHCI	EHCI	SEER 18	FY06 (Jan-Jun)	321	0.77	0	321	0.77	0	321	0.77	0	1
EHCI	EHCI	SEER 18	FY06 (Jul-Dec)	667	1.6	0	667	1.6	0	854	2.05	0	1
EHCI	EHCI	SEER 18-New Construction	FY06 (Jul-Dec)	667	1.6	0	667	1.6	0	667	1.6	0	1
EHCI	EHCI	SEER 19	FY06 (Jan-Jun)	364	0.87	0	364	0.87	0	364	0.87	0	1
EHCI	EHCI	SEER 19	FY06 (Jul-Dec)	711	1.71	0	711	1.71	0	910	2.19	0	1
EHCI	EHCI	SEER 19-New Construction	FY06 (Jul-Dec)	711	1.71	0	711	1.71	0	711	1.71	0	1
EHCI	EHCI	SEER 20	FY06 (Jan-Jun)	404	0.97	0	404	0.97	0	404	0.97	0	1
EHCI	EHCI	SEER 20	FY06 (Jul-Dec)	750	1.8	0	750	1.8	0	960	2.3	0	1
EHCI	EHCI	Tested to 13 Seer	FY06	96	0.23	0	96	0.23	0	96	0.23	0	1
ENERGY STAR Products	Reward	Ceiling Fan	FY06	175	0	0	175	0	0	175	0	0	1

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
ENERGY STAR Products	Reward	CFL	FY06-Inst	51.1	0.004	0	38.4	0.0027	0	38.4	0.0027	0	1
ENERGY STAR Products	Reward	CFL	FY06-Mail	51.1	0.004	0	43.5	0.0031	0	43.5	0.0031	0	1
ENERGY STAR Products	Reward	CFL-MF	FY06	173	0.005	0	131	0.004	0	131	0.004	0	1
ENERGY STAR Products	Reward	Clothes Washers	FY06	266	0	22	242	0	8	182	0	6	1
ENERGY STAR Products	Reward	Dehumidifier	FY06	50	0.05	0	50	0.05	0	50	0.05	0	1
ENERGY STAR Products	Reward	Dishwashers	FY06	90	0	5	90	0	5	90	0	5	1
ENERGY STAR Products	Reward	Freezers	FY06	42	0	0	42	0	0	42	0	0	1
ENERGY STAR Products	Reward	Lighting Fixtures	FY06	104	0.004	0	104	0.004	0	104	0.004	0	1
ENERGY STAR Products	Reward	Lighting Fixtures - LED	FY06	40.1	0	0	40.1	0	0	40.1	0	0	1
ENERGY STAR Products	Reward	Lighting Fixtures - Torchiere	FY06	349	0.01	0	349	0.01	0	349	0.01	0	1
ENERGY STAR Products	Reward	Refrigerators	FY06	66	0.01	0	66	0.01	0	66	0.01	0	1
ENERGY STAR Products	Reward	RoomAC	FY06	33	0.11	0	33	0.11	0	33	0.11	0	1

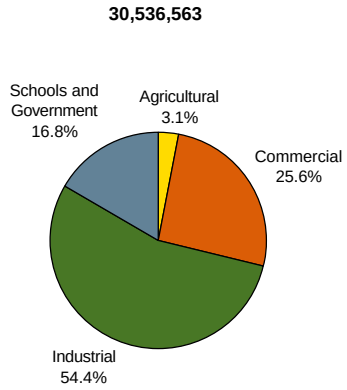
Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
ENERGY STAR Products	Spiffs	CFL	FY06	66	0.002	0	66	0.002	0	66	0.002	0	1
ENERGY STAR Products	Spiffs	Clothes Washer	FY06	266	0	22	242	0	8	182	0	6	1
ENERGY STAR Products	Spiffs	Dehumidifier	FY06	50	0.05	0	50	0.05	0	50	0.05	0	1
ENERGY STAR Products	Spiffs	Dishwasher	FY06	90	0	5	90	0	5	90	0	5	1
ENERGY STAR Products	Spiffs	Refrigerator	FY06	66	0.01	0	66	0.01	0	66	0.01	0	1
Home Performance	EHCI	90 AFUE or more	FY06	0	0	98	0	0	98	0	0	98	1
Home Performance	EHCI	Water Heater - Fuel Switch	FY06	3680	0.3	-195	3680	0.3	-195	3680	0.3	-195	1
Home Performance	Renewable Energy	SDHW System	FY06	0	0	312	0	0	312	0	0	312	1
Home Performance	Renewable Energy	Solar Water Heating	FY06	1	1	1	1	1	1	1	1	1	2
Home Performance	Whole House	Air Sealing - per 100 CFM	FY06	0	0	1	0	0	1	0	0	1	1
Home Performance	Whole House	Attic Insulation	FY06	328	0.15	121	160	0.118	100	136	0.1	85	1
Home Performance	Whole House	Chimney Liner	FY06	0	0	81	0	0	81	0	0	81	1
Home Performance	Whole House	Exterior Foundation Insulation	FY06	204	0	89	59	0	49	51	0	41	1
Home Performance	Whole House	Floor Insulation	FY06	259	0.118	96	126	0.093	79	107	0.079	67	1
Home Performance	Whole House	Foam Sidewall (AGW) Insulation 1"	FY06	207	0.094	76	60	0.049	41	51	0.042	35	1

Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
Home Performance	Whole House	Foam Sidewall (AGW) Insulation 1/2"	FY06	122	0.056	45	36	0.029	25	30	0.025	21	1
Home Performance	Whole House	High Pressure Sodium Lighting	FY06	173	0	0	173	0	0	173	0	0	1
Home Performance	Whole House	Interior Foundation Insulation	FY06	590	0	257	172	0	140	146	0	119	1
Home Performance	Whole House	Sidewall Insulation	FY06	1113	0.507	411	326	0.264	225	277	0.224	191	1
Home Performance	Whole House	Sill Box Insulation	FY06	110	0	48	53	0	39	45	0	33	1
Home Performance	Whole House	Water Heater - Poor Draft	FY06	0	0	114	0	0	114	0	0	114	1
Targeted Home Performance	Existing Homes	Heating Equipment	FY06	1	1	1	0	0	0	0	0	0	2
Targeted Home Performance	Existing Homes	House	FY06	1192	0.19	295	1192	0.19	295	1192	0.19	295	1
Targeted Home Performance	Existing Homes	Thermostat	FY06	1	1	1	0	0	0	0	0	0	2
Targeted Home Performance	Existing Homes	Water Heater	FY06	1	1	1	0	0	0	0	0	0	2
WESH	EHCI	>=90% modulating hot water	FY06	0	0	98	0	0	98	0	0	98	1
WESH	EHCI	14 SEER	FY06 (Jan-Jun)	82	0.2	0	82	0.2	0	82	0.2	0	1
WESH	EHCI	14 SEER	FY06 (Jul-Dec)	429	1.03	0	429	1.03	0	429	1.03	0	1
WESH	EHCI	15 SEER	FY06 (Jan-Jun)	154	0.37	0	154	0.37	0	154	0.37	0	1
WESH	EHCI	16 SEER	FY06 (Jan-Jun)	216	0.52	0	216	0.52	0	216	0.52	0	1
WESH	EHCI	17 SEER	FY06 (Jan-Jun)	271	0.65	0	271	0.65	0	271	0.65	0	1

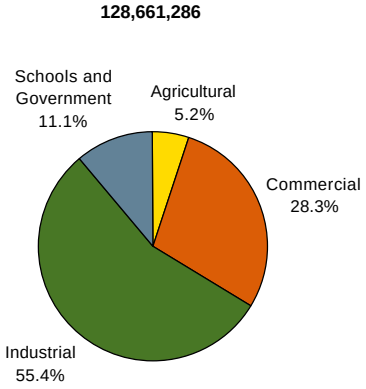
Program	Sub Program	Measure Type	Period	Gross			Verified			Net			Evaluation Type
				kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	
WESH	EHCI	90+ AFUE with ECM	FY06	773	0.1	20	773	0.1	20	773	0.1	20	1
WESH	New Construction	12 SEER	FY06 (Jan-Jun)	0	0	0	0	0	0	0	0	0	1
WESH	New Construction	12 SEER	FY06 (Jul-Dec)	250	0.6	0	250	0.6	0	250	0.6	0	1
WESH	New Construction	13 SEER	FY06 (Jan-Jun)	0	0	0	0	0	0	0	0	0	1
WESH	New Construction	90+ AFUE with ECM	FY06	773	0.1	20	773	0.1	20	773	0.1	20	1
WESH	New Construction	Ceiling Fan	FY06	175	0	0	175	0	0	175	0	0	1
WESH	New Construction	Clothes Washer	FY06	76	0	29	230	0	9	173	0	7	1
WESH	New Construction	Compact Fluorescent Bulbs	FY06	66	0.002	0	66	0.002	0	66	0.002	0	1
WESH	New Construction	Dishwasher	FY06	42	0	7	42	0	7	42	0	7	1
WESH	New Construction	Gas Stub-Clothes Dryer	FY06	900	0	-31	900	0	-31	900	0	-31	1
WESH	New Construction	Light Fixtures (INDOOR ENERGY STAR)	FY06	104	0.004	0	104	0.004	0	104	0.004	0	1
WESH	New Construction	Refrigerator	FY06	66	0.01	0	66	0.01	0	66	0.01	0	1
WESH	New Construction	WESH Home Status	FY06	0	0	100	0	0	100	0	0	100	1
WESH	Renewable Energy	Solar Water Heating	FY06	1	1	1	1	1	1	1	1	1	2

* Evaluation Type 1 = Deemed Savings. Evaluation Type 2 = Calculated Savings.

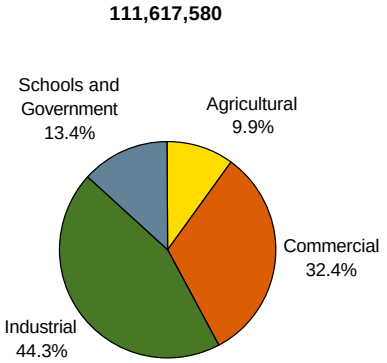
Figure D-1. Business Programs: Tracked Energy Savings (kWh) Annual and Program-to-date, by Sector (Verified Gross Savings)



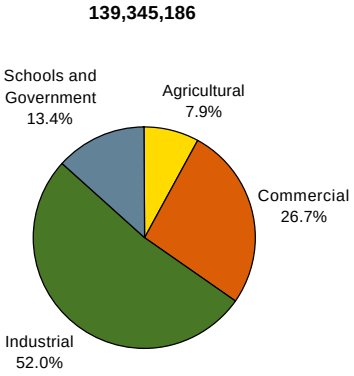
FY02 (CY1)



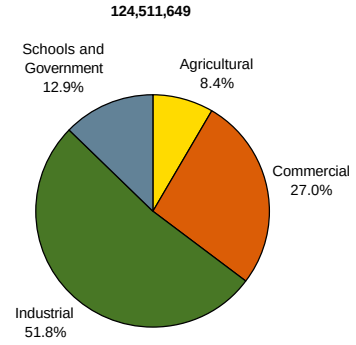
FY03 (CY2)



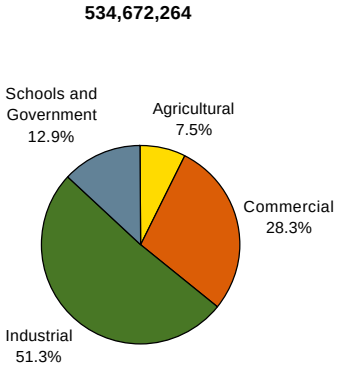
FY06 To date



FY04 (CY3)



FY05 (CY4)



Cumulative Program-to-date

Figure D-2. Business Programs: Tracked Energy Savings (kW) Annual and Program-to-date, by Sector (Verified Gross Savings)

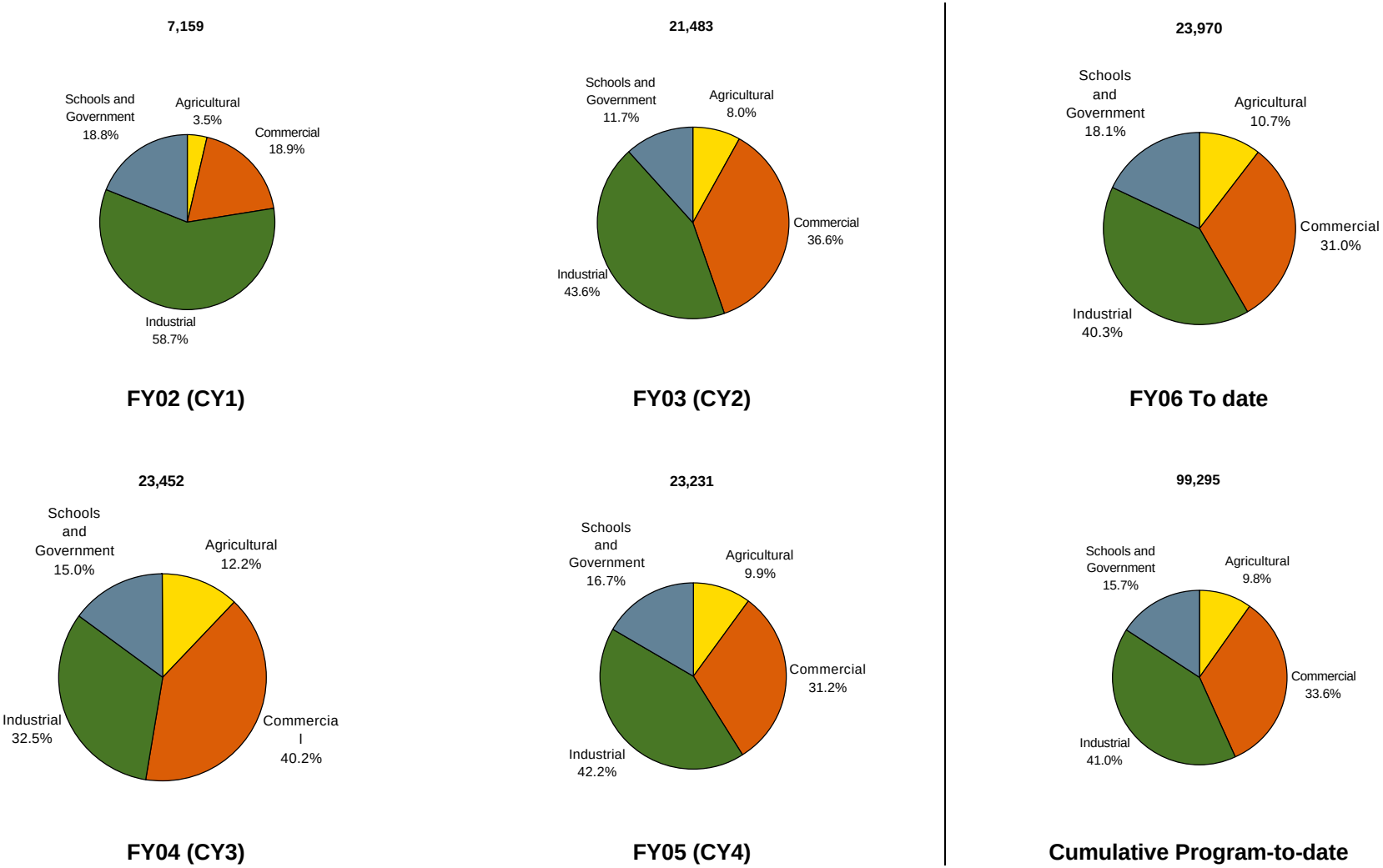
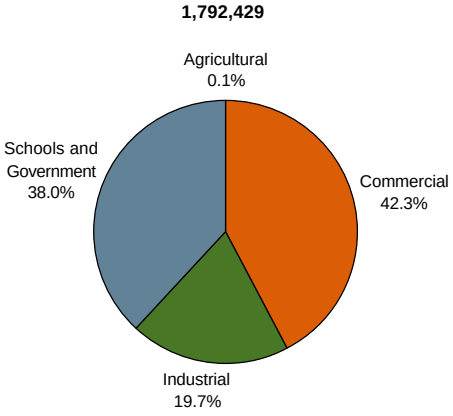
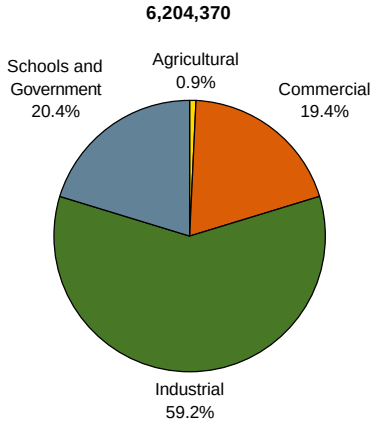


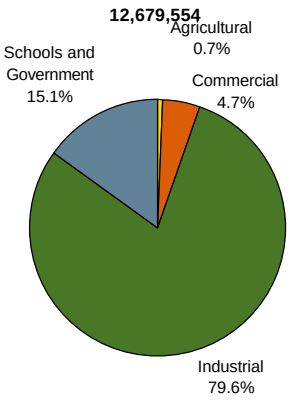
Figure D-3. Business Programs: Tracked Energy Savings (therms) Annual and Program-to-date, by Sector (Verified Gross Savings)



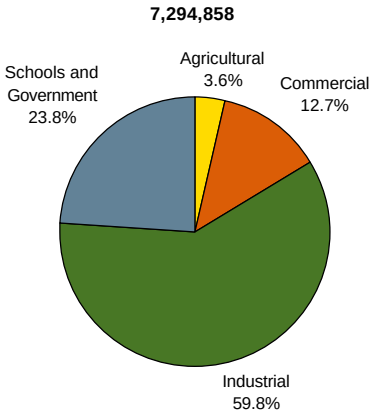
FY02 (CY1)



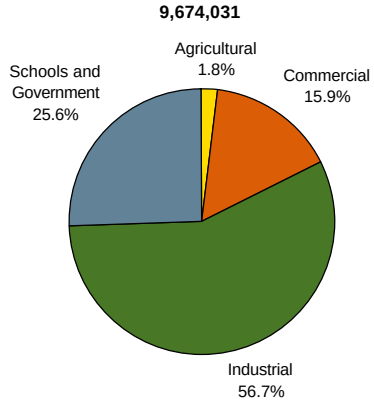
FY03 (CY2)



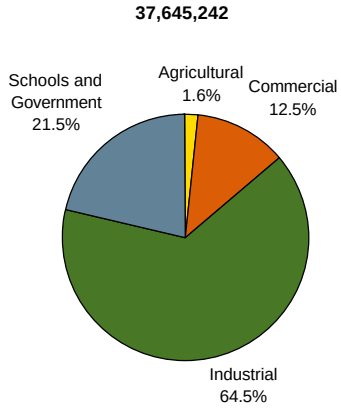
FY04 (CY3)



FY05 (CY4)



FY06 To date



Cumulative Program-to-date

APPENDIX E: ENDNOTES

Endnotes include sources and references supporting this report.

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[i] Economic Development Benefits: Interim Economic Impacts Report. Focus evaluation team. Final: March 31, 2003.

[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] Please note that this is a gross simplification of what is involved in a benefit-cost analysis. A more complete explanation is included in the report that serves as the source for this information (see *Initial Benefit-Cost Analysis*. PA Government Services Inc. Final Report: March 31, 2003).

[v] State of Wisconsin, Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY06 Detailed Evaluation Plans. June 22, 2005 (Revised).

[vi] Amendment 11 to the Cooperative Agreement between the State of Wisconsin, Department of Administration–Division of Energy, and Wisconsin Energy Conservation Corporation (Contract 81310, Amendment 11).

[vii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Residential Programs: ENERGY STAR® Products Program—
Key Findings from CFL Distribution System Interviews. Final Report: July 17, 2006. Issued by Tom Talerico and Rick Winch, Glacier Consulting Group.

[viii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Residential Programs: ENERGY STAR® Products Program Compact Fluorescent Lighting Installation Rate Study. Final Report: November 29, 2005. Issued by Rick Winch and Tom Talerico, Glacier Consulting Group.

[ix] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Residential Programs: Review of Delta Watts Values for CFLs Rewarded through the ENERGY STAR® Products Program during FY05. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. April 12, 2006.

[x] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY04/05 Net-to-Gross Savings Adjustments for CFLs Rewarded through the ENERGY STAR® Products Program. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. January 11, 2006.

[xi] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Residential Programs: ENERGY STAR® Qualified Clothes Washer Verified Gross Savings Adjustments for FY05. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. April 12, 2006.

[xii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Net-to-Gross Savings Adjustments for ENERGY STAR® Qualified Clothes

Washers. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. January 11, 2006.

[xiii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Residential Programs: ENERGY STAR® Products Program—CFL Database Analysis. Final Report: April 12, 2006. Issued by Tom Talerico and Rick Winch, Glacier Consulting Group.

[xiv] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Metrics Performance—Residential Programs. Memorandum issued by Rick Winch and Tom Talerico, Glacier Consulting Group. November 11, 2005.

[xv] We are aware, however, from WECC and other sources that a number of major retailers will only participate in buy-down programs.

[xvi] At program inception, customers were allowed to purchase as many CFLs as they wanted. At the beginning of FY04, customers were limited to a maximum of 24 CFLs per store visit. In FY05, customers were further limited to a maximum of 12 CFLs per store visit.

[xvii] In the 2003 study, instant reward installation rates were 76% among those purchasing 10 or fewer CFLs, 64% for those purchasing 11 to 24, and 59% for those purchasing 25 or more. Similar results were found for mail-in rewards (78% installation rate for those purchasing 10 or less, 73% for 11-24, 69% for 25 or more).

[xviii] This does not imply that ESP has no free-ridership among its participants (i.e., participants who received a rebate for a CFL who would have purchased a CFL in the absence of a rebate). It means that the reduction in impacts due to free-ridership is offset by the effects of spillover (i.e., qualifying CFLs sold by nonparticipating retailers) and breakage (i.e., qualifying CFLs sold by participating retailers for which a rebate was not claimed).

[xix] Wisconsin market share increase by about 5 percentage points from FY04 to FY05 (41.7% to 46.4%). Average market share across the three baseline groups, however, increased by about 10 percentage points from FY04 to FY05 (29.7% to 39.3%).

[xx] The Northwest Energy Efficiency Alliances has developed a set of market progress indicators which are annually tracked for its CFL program. Please see the following for details: (1) "ENERGY STAR® Consumer Products Market Progress Evaluation Report," Executive Summary, prepared by KEMA, #E05-151, November 15, 2005; and (2) "Residential Lighting in the Northwest: Market Transformation in Program," AESP Brown Bag Presentation by Karen Horkitz, October 21, 2004.

[xxi] The original contract metric originally was specified as "Increase statewide (ENERGY STAR) clothes washer market share by 4 percentage points from the market share reported in the 3rd calendar quarter of 2004 using data triangulated from 3 sources: WECC retailer sales data, D&R International, and AHAM." We modified the comparison period from the 3rd to the 2nd quarter because the 3rd quarter would include progress that occurred in FY06, whereas the 2nd quarter would encompass only FY05.

[xxii] In 2002, market share information pertaining to ENERGY STAR qualified clothes washers was purchased from AHAM by D&R International. For various reasons, ranging from cost considerations to concerns with the reliability of the information provided, neither D&R International nor regional entities interested in energy efficiency have purchased the information since 2002.

[xxiii] The ENERGY STAR criteria for residential clothes washers increased on January 1, 2004 from a minimum Modified Energy Factor (MEF) of 1.26 to a minimum MEF of 1.42.

[xxiv] It is important to note that the metrics measurement process is not assessing attribution. It simply involves measuring the total change in ENERGY STAR clothes washer market share. Separating the change in ENERGY STAR clothes washer market share into its component pieces (i.e., program-induced versus naturally occurring) is addressed through the net-to-gross analysis (State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY04 Net-to-Gross Savings Adjustments for ENERGY STAR® Qualified Clothes Washers. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. June 30, 2005).

[xxv] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Metrics Performance—Residential Programs. Memorandum issued by Rick Winch and Tom Talerico, Glacier Consulting Group. November 11, 2005.

[xxvi] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Wisconsin ENERGY STAR® Homes Infiltration Analysis. Memorandum issued by Tom Talerico, Glacier Consulting Group. April 5, 2004.

[xxvii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: Guidelines for Measuring Future WESH Infiltration-Based Metrics. Memorandum issued by Tom Talerico, Glacier Consulting Group. November 4, 2005 (Draft).

[xxviii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: CY3 Metrics Performance—Residential Programs. Memorandum issued by Rick Winch and Tom Talerico, Glacier Consulting Group. January 11, 2005.

[xxix] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Savings Adjustments for Home Performance with ENERGY STAR® Insulation Measures. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. July 14, 2006.

[xxx] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Net-to-Gross Savings Adjustments for 12/13+ SEER Central Air Conditioners and ECM Furnaces. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. June 27, 2006.

[xxxi] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Metrics Performance—Residential Programs. Memorandum issued by Rick Winch and Tom Talerico, Glacier Consulting Group. November 11, 2005.

[xxxii] The net-to-gross ratio of 128 percent for 13+ SEER CACs does not imply no free-ridership among participants who received a reward for 13+ SEER CACs (i.e., participants who received a rebate for a 13+ SEER CAC who would have purchased a 13+ SEER CAC in the absence of a rebate). It means that the reduction in impacts due to free-ridership is offset by the effects of spillover (i.e., 13+ SEER CACs purchased by Wisconsin residential customers but not rewarded through EHCI).

[xxxiii] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY05 Metrics Performance—Residential Programs. Memorandum issued by Rick Winch and Tom Talerico, Glacier Consulting Group. November 11, 2005.

[xxxiv] State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: CY2 Metrics Performance—Residential Programs. Memorandum issued by Rick Winch and Tom Talerico, Glacier Consulting Group. October 24, 2003.

[xxxv] The contract metric originally was specified as "Increase the number of remodeling/home improvement companies with whom consultants and qualified contractors have developed relationships from 6 and 34 in FY03 and FY04, respectively, to 44 in FY05." The estimates of 6 in FY03 and 34 in FY04 specified by the program manager in the metric, however, are lower than the actual numbers, which were 32 in FY03 and 72 in FY04. Therefore, we adjusted the numbers specified in the metric accordingly to reflect the actual numbers. This resulted in a goal of 93, not 44, for FY05 {(44 ÷ 34) x 72}.

[xxxvi] The contract metric originally was specified as "Increase the number of referrals received by consultants and qualified contractors from remodeling/home improvement companies from 68 and 148 in FY03 and FY04, respectively, to 200 in FY05." The estimates of 68 in FY03 and 148 in FY04 specified by the program manager in the metric, however, are higher than the actual numbers, which were 33 in FY03 and 87 in FY04. Therefore, we adjusted the numbers specified in the metric accordingly to reflect the actual numbers. This resulted in a goal of 118, not 200, for FY05 {(200 ÷ 148) x 87}.

[xxxvii] The contract metric originally was specified as "Increase the number of ratings and assessments performed by consultants and qualified contractors from 422 and 759 in FY03 and FY04, respectively, to 800 in FY05." The estimates of 422 in FY03 and 759 in FY04 specified by the program manager in the metric, however, are lower than the actual numbers, which were 691 in FY03 and 1,078 in FY04. Therefore, we adjusted the numbers specified in the metric accordingly to reflect the actual numbers. This resulted in a goal of 1,136, not 800, for FY05 {(800 ÷ 759) x 1,078}.

[xxxviii] Major building performance-related measures are defined as those rebated and tracked through the HPWES program. These include air sealing, attic insulation, sidewall insulation, foundation insulation, floor insulation, sillbox insulation, and exhaust fans.

[xxxix] Please see the *Evaluated Energy Impacts* section of *Existing Homes* for a discussion of the issues related to use of FACTS.

[xl] It is important to note that the metrics measurement process is <u>not</u> assessing attribution. It simply involves measuring the total change in 13+ SEER CAC market share. Separating the change in 13+ SEER CAC market share into its component pieces (i.e., program-induced versus naturally occurring) is addressed through the net-to-gross analysis (State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY04 Net-to-Gross Savings Adjustments for 12/13+ SEER Central Air Conditioners and ECM Furnaces. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. November 11, 2005).

[xli] Please see the *Evaluated Energy Impacts* section of *Existing Homes* for a discussion of the issues related to use of FACTS.

[xlii] It is important to note that the metrics measurement process is <u>not</u> 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 (State of Wisconsin Department of Administration, Division of Energy. Focus on Energy Public Benefits Evaluation: FY04 Net-to-Gross Savings Adjustments for 12/13+ SEER Central Air Conditioners and ECM Furnaces. Memorandum issued by Tom Talerico and Rick Winch, Glacier Consulting Group. November 11, 2005).

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

[xliv] WHEAP does not conform to the contract year, with its FY running October 1–September 30.

[xlv] *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.