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Southwestern Public Service Company

Energy Efficiency and Load Management Annual Report

2011

Prepared in Compliance with the Efficient Use of Energy Act and 17.7.2 NMAC (Energy Efficiency Rule)

Case No. 09-00352-UT
August 1, 2012

Southwestern Public Service Company

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Glossary of Acronyms and Definition

Acronym/Defined Term	Definition
2011 Plan	SPS's 2011 Energy Efficiency and Load Management Plan
2011 Report	SPS's 2011 Energy Efficiency and Load Management Annual Report
Annual Energy Savings	Equates to Customer savings as approved March 2011
ASHP	Air-Source Heat Pump
CFL	Compact Fluorescent Light Bulb
BSC	Business Solutions Center
CIL	Contract Interruptible Load
EUEA	New Mexico Efficient Use of Energy Act, as amended by Senate Bill 418 (2007) and House Bill 305 (2008) §§62-17-1 through 62-17-11 NMSA 1978
Evaluator	Independent Program Evaluator, the third-party contractor that will conduct all measurement & verification of the programs
Generator kW; Generator kWh	Demand and energy savings, respectively, measured at the generator, corrected for transmission line losses and free-rider/drivership
HES	Home Energy Services
HID	High Intensity Discharge
HVAC	Heating, Ventilation and Air Conditioning
LIHEAP	Low-Income Home Energy Assistance Program
ICO	Interruptible Credit Option
MFA	Mortgage Finance Authority, a low-income community agency
M&V	Measurement and Verification
NEB	Non-Energy Benefits refers to benefits of the energy efficiency and load management programs that are unrelated to the generation, transmission, distribution, or cost of energy
NMPRC	New Mexico Public Regulation Commission
O&M	Operations and Maintenance
Rule	Energy Efficiency Rule 17.7.2 NMAC
SPS	Southwestern Public Service Company, a New Mexico Corporation
Acronym/Defined Term	**Definition**
TRC	Total Resource Cost, a test of cost-effectiveness as defined in the Efficient Use

	of Energy Act
VFD/ASD	Variable Frequency/Adjustable Speed Drives
Xcel Energy	Xcel Energy Inc.

Document Layout
This 2011 Annual Report includes the following sections:

- Section I provides the Executive Summary consisting of an Introduction, Background, and Summary of Results.
- Section II provides the reporting requirements as stated in 17.7.2.12 NMAC.
- Section III provides the program descriptions including an explanation of deviations from goal and changes during 2011, organized into the Residential, Business, and Planning & Research Segments.
- Appendix A provides the Measurement and Verification ("M&V") Report of SPS's 2011 program year prepared by ADM Associates Inc.

Section I. Executive Summary

Introduction
In accordance with the Efficient Use of Energy Act ("EUEA"), as amended by Senate Bill and the New Mexico Public Regulation Commission's ("Commission" or "NMPRC") Energy Efficiency Rule ("17.7.2 NMAC", "Rule"), Southwestern Public Service Company, a New Mexico Corporation ("SPS") respectfully submits for Commission review SPS's 2011 Energy Efficiency and Load Management Annual Report ("2011 Annual Report"). The EUEA and its associated Rule require public utilities to offer cost-effective energy efficiency and load management programs and authorizes them to receive cost recovery for qualified expenditures. Further, 17.7.2.13.B NMAC requires SPS to file with the Commission on August 1 of each year, a report on its energy efficiency and load management programs during the prior calendar year. The specific reporting requirements are discussed in Section II.

With this 2011 Annual Report, SPS provides the expenditures and savings results for 16 energy efficiency and load management direct impact programs in the Residential Segment (including Low-Income) and Business Segment (including Large Customer). In addition, the Report includes a summary of the Planning and Research Segment, which supports the direct impact programs. The M&V Report of SPS's 2011 savings is included as Appendix A.

Background
SPS filed its 2010/2011 Energy Efficiency and Load Management Plan on September 21, 2009 and received final approval from the Commission for its 2010 Plan on March 11, 2010 in Case No. 09-00352-UT. The 2011 Plan was given provisional approval on this date. On October 1, 2010, SPS filed a modified 2011 Plan and received final approval from the Commission on March 15, 2011.

Summary of Results
In 2011, SPS had a successful year, achieving verified electric savings of 8,872 kW and 39,284,087 kWh at the generator, at a total cost of $8,097,490 (See Table 2 below.) This equals 105% of our 2011 approval energy goal, while spending 90 % of our approved budget. The portfolio was very cost effective with a Total Resource Cost ("TRC") of 3.17.

In compliance with 17.7.2.13 NMAC, Table 1 below, shows SPS's program goals, budgets, and TRC Test ratios as approved by the Commission on March 15, 2011 in Case No. 09-00352-UT. Also included is the budget increase for the Motor and Drive Efficiency Program and the budget decrease

for the following programs: Residential Low-Income, Cooling Efficiency, Custom Efficiency, Interruptible Credit Option, Lighting Efficiency, Consumer Education, Measurement & Verification and Product Development as approved by the Commission on December 15, 2011.

Table 1: 2011 NM DSM Plan Executive Summary – Final Order Approving Stipulation 03/15/11 – Includes December 2011 Motion to Modify Program Budgets

Program	Participants	Budget	Peak Demand Savings kW	Annual Energy Savings kWh	Energy Loss Factor	Demand Loss Factor	Generator kW	Generator kWh	TRC Test
Residential Segment									
Consumer Behavior Program (My Account)	15,000	$251,500	0	0	10.69%	12.99%	0	0	0.00
Electric Water Heating	0	$3,364	0	0	10.69%	12.99%	0	0	0.00
Evaporative Cooling	400	$132,013	384	564,798	10.69%	12.99%	442	632,402	24.35
Home Energy Services	4,345	$3,257,958	1,473	11,777,269	10.69%	12.99%	1,693	13,186,955	3.28
Home Lighting	37,500	$874,102	665	6,441,900	10.69%	12.99%	764	7,212,966	5.24
Low-Income	2,660	$168,111	103	877,631	10.69%	12.99%	119	982,679	2.13
Refrigerator Recycling	484	$144,871	54	544,500	10.69%	12.99%	62	609,674	2.04
School Education Kits	2,372	$164,465	18	540,604	10.69%	12.99%	21	605,311	2.41
Residential Energy Efficiency Subtoal	**62,761**	**$4,996,384**	**2,697**	**20,746,701**	**10.69%**	**12.99%**	**3,100**	**23,229,987**	
Saver's Switch - Residential	1,710	$546,883	1,802	13,473	10.69%	12.99%	2,071	15,086	0.34
Residential Load Management Subtoal	**1,710**	**$546,883**	**1,802**	**13,473**	**10.69%**	**12.99%**	**2,071**	**15,086**	
Residential Segment Total	**64,471**	**$5,543,267**	**4,499**	**20,760,174**	**10.69%**	**12.99%**	**5,171**	**23,245,073**	**3.33**
Business Segment									
Cooling Efficiency	45	$153,327	398	926,024	7.39%	9.11%	438	999,918	3.29
Custom Efficiency	40	$236,923	775	4,336,135	7.39%	9.11%	853	4,682,145	4.08
Large Customer	0	$0	0	0	7.39%	9.11%	0	0	0.00
Lighting Efficiency	170	$285,197	1,025	4,081,018	7.39%	9.11%	1,127	4,406,671	2.77
Motor & Drive Efficiency	21	$710,330	232	1,250,073	7.39%	9.11%	256	1,349,825	2.92
Small Business Lighting	91	$1,137,908	595	2,380,725	7.39%	9.11%	655	2,570,699	2.01
Business Energy Efficiency Subtoal	**367**	**$2,523,685**	**3,026**	**12,973,974**	**7.39%**	**9.11%**	**3,329**	**14,009,258**	
Interruptible Credit Option	7	$1,878	3,552	0	7.39%	9.11%	3,908	0	3.36
Saver's Switch - Business	164	$193,244	1,283	17,499	7.39%	9.11%	1,412	18,895	0.62
Business Load Management Subtoal	**171**	**$195,122**	**4,835**	**17,499**	**7.39%**	**9.11%**	**5,319**	**18,895**	
Business Segment Total	**538**	**$2,718,807**	**7,860**	**12,991,473**	**7.39%**	**9.11%**	**8,648**	**14,028,154**	**2.81**
Planning & Research Segment									
Business Education		$110,000							
Consumer Education		$89,656							
DSM Planning & Administration		$321,600							
Market Research		$58,420							
Measurement & Verification		$54,874							
Product Development		$50,998							
Planning & Research Segment Total		**$685,548**							
2011 TOTAL	**65,009**	**$8,947,622**	**12,359**	**33,751,648**	**9.45%**	**10.56%**	**13,819**	**37,273,226**	**2.86**

Table 2 below, provides SPS's actual 2011 program achievements, expenditures, and TRC test ratios, verified by the Independent Program Evaluator ("Evaluator"), ADM Associates.

Table 2: 2011 Program Achievements and Expenditures (As Verified in Third Party M&V Report)

Program	Participants	Actual Spend	Peak Demand Savings kW	Annual Energy Savings kWh	Energy Loss Factor	Demand Loss Factor	Generator kW	Generator kWh	TRC Test
Residential Segment									
Consumer Behavior Program (My Account)	0	$115,389	0	0	10.69%	12.99%	0	0	0.00
Electric Water Heating	0	$3,364	1	5,238	10.69%	12.99%	1	5,865	0.93
Evaporative Cooling	308	$101,422	338	495,381	10.69%	12.99%	388	554,676	15.81
Home Energy Services	3,895	$2,126,587	1,618	5,198,267	10.69%	12.99%	1,860	5,820,476	2.70
Home Lighting	47,630	$969,274	1,476	12,502,787	10.69%	12.99%	1,696	13,999,314	5.90
Low-Income	268	$346,853	208	968,735	10.69%	12.99%	239	1,084,688	2.96
Refrigerator Recycling	209	$133,566	57	272,935	10.69%	12.99%	65	305,604	1.16
School Education Kits	3,362	$111,245	15	539,628	10.69%	12.99%	17	604,219	2.72
Residential Energy Efficiency Subtoal	**55,672**	**$3,907,699**	**3,712**	**19,982,971**	**10.69%**	**12.99%**	**4,267**	**22,374,842**	**3.69**
Saver's Switch - Residential	1,552	$559,125	1,346	29,442	10.69%	12.99%	1,547	32,966	0.40
Residential Load Management Subtoal	**1,552**	**$559,125**	**1,346**	**29,442**	**10.69%**	**12.99%**	**1,547**	**32,966**	**0.40**
Residential Segment Total	**57,224**	**$4,466,825**	**5,058**	**20,012,413**	**10.69%**	**12.99%**	**5,814**	**22,407,808**	**3.29**
Business Segment									
Cooling Efficiency	8	$181,073	259	708,151	7.39%	9.11%	285	764,659	2.68
Custom Efficiency	3	$266,690	19	465,361	7.39%	9.11%	20	502,495	1.20
Large Customer	0	$0	0	0	7.39%	9.11%	0	0	N/A
Lighting Efficiency	12	$209,143	274	1,246,656	7.39%	9.11%	302	1,346,135	4.23
Motor & Drive Efficiency	14	$759,975	1,250	9,843,831	7.39%	9.11%	1,375	10,629,339	6.34
Small Business Lighting	51	$1,347,711	865	3,363,376	7.39%	9.11%	952	3,631,763	2.12
Business Energy Efficiency Subtoal	**88**	**$2,764,592**	**2,666**	**15,627,375**	**7.39%**	**9.11%**	**2,933**	**16,874,393**	**3.72**
Interruptible Credit Option	0	$1,975	0	0	7.39%	9.11%	0	0	0.00
Saver's Switch - Business	199	$234,122	113	1,747	7.39%	9.11%	125	1,886	0.07
Business Load Management Subtoal	**199**	**$236,097**	**113**	**1,747**	**7.39%**	**9.11%**	**125**	**1,886**	**0.07**
Business Segment Total	**287**	**$3,000,688**	**2,780**	**15,629,122**	**7.39%**	**9.11%**	**3,058**	**16,876,279**	**3.53**
Planning & Research Segment									
Consumer Education		$84,615							
DSM Planning & Administration		$345,445							
Market Research		$51,862							
Measurement & Verification		$19,170							
Product Development		$48,386							
Planning & Research Segment Total		**$629,978**							
2011 TOTAL	**57,511**	**$8,097,490**	**7,838**	**35,641,535**	**9.27%**	**11.65%**	**8,872**	**39,284,087**	**3.17**

As can be derived from Tables 1 and 2, the overall 2011 energy efficiency and load management portfolio exceeded the energy savings goal by 5% while spending 90% of the budget. Most of the direct impact energy efficiency programs were cost-effective and the overall portfolio achieved a TRC test ratio of 3.17. Three of the programs did not pass the modified Total Resource Cost (TRC) Test in 2011. While each of the products listed below are discussed in move detail in the Status Report section of this report, below is a bulleted summary of the primary reason for the failing of program TRC test ratios.

- Electric Water Heating: Electric Water Heating was removed from the 2011 plan during the plan approval process, which occurred in April of 2011. During the period of January through April 2011 the program was available and 3 customers participated.
- Residential Saver's Switch: In 2011, the residential Saver's Switch program did not produce a TRC score greater than 1.0. Switches deployed have a life expectancy of

15 years and participants remaining on the program will contribute load relief for years to come after the initial investment in hardware and installation have been absorbed. SPS anticipates the Saver's Switch program to exceed a TRC score of 1.0 within a couple of years.

- Business Saver's Switch: In 2011, the commercial Saver's Switch program did not produce a TRC score greater than 1.0. Switches deployed have a life expectancy of 15 years and participants remaining on the program will contribute load relief for years to come after the initial investment in hardware and installation have been absorbed. SPS anticipates the Saver's Switch program to exceed a TRC score of 1.0 within a couple of years.

SPS has been making dramatic progress towards our goals: In 2008 energy savings were 6.1 GWh. In 2009 energy savings were 15.8 GWh. In 2010 energy savings were 26 GWh. In 2011, we have increased our savings over the previous year by 50% to 39 GWh. The Business segment exceeded goals by 20% in 2011, due to the strong performance of the Motor & Drive Efficiency and Small Business Lighting Products. The successes and shortfalls of the individual program are discussed in Section III of this report. SPS is committed to continuing to improve its programs and increase customer awareness of them in the coming years. SPS is optimistic that as customer awareness grows, the programs will see increase participation, which will support cost-effective programs.

SPS worked in good faith to comply with EUEA and to offer cost-effective energy efficiency and load management programs to all of its customers. SPS will continue to work going forward to meet the statutory goals to obtain all cost-effective and achievable energy efficiency and load management, but no less than a reduction of 5% of 2005 retail sales by 2014 and 10% by 2020.

Section II: 17.7.2.13 NMAC Reporting Requirements

This section of the Annual Report follows the reporting requirements and section headings as specified in the 17.7.2.13.C NMAC.

(1) Independent Measurement and Verification Report:

17.7.2.13.C (1) requires that utilities provide an M&V Report compiled by an Independent Program Evaluator ("Evaluator") every year with its Annual Report. In compliance with the reporting requirements, the M&V Report (included as Appendix A) includes:

- Expenditure documentation, at both the total portfolio and individual program levels
- Measured and verified savings
- Cost-effectiveness of all of SPS's energy efficiency and load management programs
- Deemed savings assumptions and all other assumption used by the Evaluator
- Description of the M&V process, including confirmation that:
    - Measures were actually installed
    - Installations meet reasonable quality standards
    - Measures are operating correctly and are expected to generate the predicted savings

Table 1-6 within the 2011 M&V Report (Appendix A) contains a summary of technical assumption revisions as recommended by the Evaluator (ADM Associates, Inc.). SPS has evaluated these recommendations and will be implementing changes to its technical assumptions for the remainder 2012.

(2) Program Expenditures Not Included in the M&V Report:

In 2011, SPS spend a total of $8,097,490 for its energy efficiency programs. These expenditures included all expenses incurred by SPS to develop and implement the programs. All of these expenditures were included in the M&V Report provided by the Evaluator.

(3) Budgeted Funds Not Spent in Program Year, and

(4) Material Variances in Program Costs

SPS's 2011 forecasted budget was approved by the Commission on March 15, 2011. At that time, SPS anticipated that it would spend a total of $10,863,673. On December 1, 2011, SPS filed a motion to increase the 2011 program budget for the Motor and Drive Efficiency Program and decrease the budget for five direct programs and three indirect programs, pursuant to 17.7.2.15.C NMAC. Commission approval was received on December 15, 2011. With this approval, the final portfolio budget decreased to $8,947,622.

In 2011, SPS had actual expenditures of $8,097,490. As presented in Table 3, below, SPS had a total of $850,132 of unspent funds in 2011. SPS addresses the reasons for these unspent funds in the footnotes that follow Table 3. These unspent funds will not be carried over into 2012. Any over-collection above projected spending is returned to customers, with interest (discussed further in item (5) of this section).

Table 3: 2011 Forecasted Budget, Actual Expenditures and Variance by Program

Program	Original Budget	Modified Budget	Actual Spend	Variance	% Variance
Residential Segment					
Consumer Behavior Program (My Accoun	$251,500	$251,500	$115,389	($136,111)	-54% [1]
Electric Water Heating	$0	$3,364	$3,364	$0	0%
Evaporative Cooling	$132,013	$132,013	$101,422	($30,591)	-23%
Home Energy Services	$3,257,958	$3,257,958	$2,126,587	($1,131,371)	-35% [2]
Home Lighting	$874,102	$874,102	$969,274	$95,172	11%
Low-Income	$295,042	$168,111	$346,853	$178,742	106% [3]
Refrigerator Recycling	$144,871	$144,871	$133,566	($11,305)	-8%
School Education Kits	$164,465	$164,465	$111,245	($53,220)	-32% [4]
Residential Energy Efficiency Subtoal	**$5,119,950**	**$4,996,384**	**$3,907,699**	**($1,088,685)**	**-22%**
Saver's Switch - Residential	$546,883	$546,883	$559,125	$12,242	2%
Residential Load Management Subtoal	**$546,883**	**$546,883**	**$559,125**	**$12,242**	**2%**
Residential Segment Total	**$5,666,833**	**$5,543,267**	**$4,466,825**	**($1,076,442)**	**-19%**
Business Segment					
Cooling Efficiency	$329,347	$153,327	$181,073	$27,746	18%
Custom Efficiency	$1,008,913	$236,923	$266,690	$29,767	13%
Large Customer	$0	$0	$0	$0	N/A
Lighting Efficiency	$1,032,290	$285,197	$209,143	($76,054)	-27% [5]
Motor & Drive Efficiency	$400,264	$710,330	$759,975	$49,645	7%
Small Business Lighting	$1,137,908	$1,137,908	$1,347,711	$209,803	18%
Business Energy Efficiency Subtoal	**$3,908,722**	**$2,523,685**	**$2,764,592**	**$240,907**	**10%**
Interruptible Credit Option	$260,584	$1,878	$1,975	$97	5%
Saver's Switch - Business	$193,244	$193,244	$234,122	$40,878	21%
Business Load Management Subtoal	**$453,828**	**$195,122**	**$236,097**	**$40,975**	**21%**
Business Segment Total	**$4,362,550**	**$2,718,807**	**$3,000,688**	**$281,881**	**10%**
Planning & Research Segment					
Business Education	$110,000	$110,000	$80,500	($29,500)	-27% [6]
Consumer Education	$144,252	$89,656	$84,615	($5,041)	-6%
DSM Planning & Administration	$321,600	$321,600	$345,445	$23,845	7%
Market Research	$58,420	$58,420	$51,862	($6,558)	-11%
Measurement & Verification	$107,600	$54,874	$19,170	($35,704)	-65% [7]
Product Development	$92,418	$50,998	$48,386	($2,612)	-5%
Planning & Research Segment Total	**$834,290**	**$685,548**	**$629,978**	**($55,570)**	**-8%**
2011 TOTAL	**$10,863,673**	**$8,947,622**	**$8,097,490**	**($850,132)**	**-10%**

1. Energy Feedback – The Energy Feedback Program underspent the approved budget by $136,111. There were delays in the launch of New Mexico Energy Feed back caused by software anomalies in programs within Xcel's Terra Data data warehouse. The software anomalies delayed the coding of the data extraction and also delayed the preparation and mailing of the Home Energy Reports in New Mexico.
2. The Home Energy Services – The Home Energy Service program underspent the 2011 budget primarily due to the drop in contractor participation followed by a lower then forecasted customer participation in the program. Six of the eight participating contractors dropped from the program when they started to receive lower payments per kW and kWh then they had in years past. This generated from as adjustment to the deemed savings. The

decrease in customer participation was a direct result of less participating contractors in the market. In the third and fourth quarter contractor participation slowly started to increase.

3. Low Income – The Low Income Home Energy Services program overspent the modified budget in 2011 primarily due to the additional low income homes identified during the year. At the time of program sign up, contractors do not have a way of determining if the customer is participating in the Low Income Home Energy Services or the Residential Home Energy Services program. If we had not lowered the budget in the December 2011 modification, this program would have been within the allowed 25% flexibility. To avoid this in 2012, the two program budgets have been combined.
4. School Education Kits – School Education Kits spent only 68% of the approved budget. Our third party service provider, Resource Action Programs, was able to reduce operational kit costs by $32,947 following the approval of the filed budget. Additionally, during the planning process the total incentives for 2011 were overestimated by approximately $17,660.
5. Business Lighting Efficiency - Business Lighting Efficiency underspent the 2011 modified budget by 73% and lagged energy savings goals as medium and small-sized commercial businesses gravitated towards 50% higher rebates and special services offered in the Small Business Lighting product. Although Business Lighting Efficiency net energy savings rose 7%, and participation increased compared to the prior year, large commercial and industrial businesses continued to postpone or cancel capital purchases, such as major lighting system retrofits, even though return on investment is typically less than 5 years. Because Business Lighting Efficiency is a very cost-effective business energy efficiency product, in 2012 the company has proposed in the Uncontested Certificate of Stipulation for 2012 to equalize rebates and increase customer and trade communications to foster higher participation
6. Business Education – The budget was based on 15 oil and gas customer site visits being conducted in 2011. Due to other priorities at these customers' facilities, a total of 8 studies/audits were conducted in 2011 resulting in underspending the budget. Some energy saving measures are being evaluated and implemented based on the results of the studies/audits.

(5) Tariff Collections

On January 1, 2011, the EER was revised to include $3,300,000 recoverable over a 12-month period to provide a temporary allowance for an energy efficiency incentive and to remove regulatory disincentives, authorized by the Commission's Order in Case No. 10-00161-UT and in accordance with the EUEA, as amended in 2008 and in accordance with the amendments to NMPRC Rule 17.7.2. The revised per-kWh EER effective January 1, 2011 represented approximately 3.1921% of billed sales not including the EER amounts.

The EER was revised once again on April 1, 2011 following the Commission's Order in Case No. 09-00352-UT on SPS's 2011 Energy Efficiency Program, and represented approximately 4.4208% of billed amounts not including the tariff rider amounts. In December 2011, SPS requested a revision in the EER to:

- eliminate the expiration on December 31st, 2011 of the temporary $3.3 million for an energy efficiency incentive and address energy efficiency disincentives authorized in Case No. 10-00161-UT;
- address over-recovery at December 31st, 2011; which was $1,035,191; and

- reduce the base amount for recovery from $10.9 million authorized for the 2011 Plan budget to an expected $8.4 million in energy efficiency expenditures in 2012.

SPS continues to monitor its tariff rider collection on a monthly basis and will request a revision if the balance continues to grow beyond forecast expenditures. In June 2012, SPS revised the EER with the Commission's approval of the 2012 Plan. The revision in the EER took effect on July 1st, 2012; and is based upon $8.4 million in energy efficiency expenditures in 2012 reduced by the May 2012 over-recovery balance of $2,762,007 for a net 12-month recoverable amount of $5,637,993. The revised EER represents approximately 1.93% of test year base rate revenue from Case No. 10-00395-UT, the most recent SPS rate filing.

(6) Program-Specific Metrics

The following table provides SPS's 2011 program expenditures by cost category.

Table 4: Energy Efficiency Program Costs by Cost Category

Program	Total Incentive	Internal Admin.	Third-Party Delivery	Promotion	M&V	Total Cost
Residential Segment						
Consumer Behavior Program (My Accoun	$0	$7,889	$107,500	$0	$0	$115,389
Electric Water Heating	$940	$1,781	$0	$483	$160	$3,364
Evaporative Cooling	$71,000	$6,665	$0	$16,102	$7,655	$101,422
Home Energy Services	$941,093	$530,063	$655,351	$80	$0	$2,126,587
Home Lighting	$429,264	$52,910	$95,578	$380,233	$11,289	$969,274
Low-Income	$226,860	$21,239	$82,747	$283	$15,724	$346,853
Refrigerator Recycling	$48,300	$11,462	$38,866	$31,458	$3,480	$133,566
School Education Kits	$30,586	$4,495	$71,628	$0	$4,536	$111,245
Residential Energy Efficiency Subtoal	**$1,748,042**	**$636,504**	**$1,051,670**	**$428,639**	**$42,844**	**$3,907,699**
Saver's Switch - Residential	$64,037	$159,837	$313,811	$19,461	$1,978	$559,125
Residential Load Management Subtoal	**$64,037**	**$159,837**	**$313,811**	**$19,461**	**$1,978**	**$559,125**
Residential Segment Total	**$1,812,079**	**$796,342**	**$1,365,481**	**$448,101**	**$44,822**	**$4,466,825**
Business Segment						
Cooling Efficiency	$121,107	$47,650	$0	$4,353	$7,963	$181,073
Custom Efficiency	$47,105	$69,209	$148,950	$440	$985	$266,690
Large Customer	$0	$0	$0	$0	$0	$0
Lighting Efficiency	$86,947	$70,626	$37,155	$3,960	$10,454	$209,143
Motor & Drive Efficiency	$694,062	$22,802	$0	$26,444	$16,667	$759,975
Small Business Lighting	$499,878	$62,052	$755,022	$1,806	$28,954	$1,347,711
Business Energy Efficiency Subtoal	**$1,449,099**	**$272,339**	**$941,127**	**$37,004**	**$65,023**	**$2,764,592**
Interruptible Credit Option	$0	$1,975	$0	$0	$0	$1,975
Saver's Switch - Business	$18,850	$50,093	$155,679	$7,842	$1,658	$234,122
Business Load Management Subtoal	**$18,850**	**$52,068**	**$155,679**	**$7,842**	**$1,658**	**$236,097**
Business Segment Total	**$1,467,949**	**$324,407**	**$1,096,806**	**$44,846**	**$66,681**	**$3,000,688**
Planning & Research Segment						
Business Education	$0	$0	$80,500	$0	$0	$80,500
Consumer Education	$0	$5,020	$0	$79,595	$0	$84,615
DSM Planning & Administration	$0	$345,445	$0	$0	$0	$345,445
Market Research	$0	$51,862	$0	$0	$0	$51,862
Measurement & Verification	$0	$0	$0	$0	$19,170	$19,170
Product Development	$0	$48,386	$0	$0	$0	$48,386
Planning & Research Segment Total	**$0**	**$450,712**	**$80,500**	**$79,595**	**$19,170**	**$629,978**
2011 TOTAL	**$3,280,028**	**$1,571,461**	**$2,542,787**	**$572,542**	**$130,673**	**$8,097,490**

The following paragraphs and tables provide program-specific information by items a) through g) which correspond to the items listed in 17.7.2.13.C(7) NMAC.

a. Comparison of forecasted savings to verified achieved savings for each of the utility's energy efficiency programs

Please refer to Tables 1 and 2 above for SPS's forecasted and achieved verified savings by program.

b. Number of program participants served by each project

Please refer to Table 2 above for the number of program participants.

c. Utility and participant costs, including M&V costs broken down by program

d. Total avoided supply-side costs broken down by type of avoided cost (generation, transmission, distribution, etc.)

Table 5: Avoided Costs by Program and Type (As Verified in Third-Party M&V Report)

Program	Avoided Generation Costs (NPV)	Avoided Transmission and Distribution Costs (NPV)	Avoided Marginal Energy Costs (NPV)	Non-Electric Acquisition Costs (NPV)	Total Avoided Supply-Side Costs (NPV)
Residential Segment					
Consumer Behavior Program (My Accoun	$0	$0	$0	$0	$0
Electric Water Heating	$698	$174	$2,300	$0	$3,172
Evaporative Cooling	$313,098	$78,274	$295,638	$0	$687,010
Home Energy Services	$1,613,894	$403,474	$2,778,264	$0	$4,795,632
Home Lighting	$1,029,949	$257,487	$4,903,152	$0	$6,190,588
Low-Income	$265,670	$66,417	$693,756	$0	$1,025,843
Refrigerator Recycling	$34,769	$8,692	$92,841	$0	$136,302
School Education Kits	$14,235	$3,559	$284,344	$0	$302,138
Residential Energy Efficiency Subtoal	**$3,272,312**	**$818,078**	**$9,050,295**	**$0**	**$13,140,685**
Saver's Switch - Residential	$156,353	$39,088	$1,770	$0	$197,211
Residential Load Management Subtoal	**$156,353**	**$39,088**	**$1,770**	**$0**	**$197,211**
Residential Segment Total	**$3,428,665**	**$857,166**	**$9,052,065**	**$0**	**$13,337,896**
Business Segment					
Cooling Efficiency	$306,050	$76,513	$499,626	$0	$882,189
Custom Efficiency	$20,867	$5,217	$313,363	$0	$339,447
Large Customer	$0	$0	$0	$0	$0
Lighting Efficiency	$324,035	$81,009	$879,562	$0	$1,284,606
Motor & Drive Efficiency	$1,477,457	$369,364	$6,945,183	$0	$8,792,004
Small Business Lighting	$1,015,502	$253,876	$2,367,185	$0	$3,636,563
Business Energy Efficiency Subtoal	**$3,143,912**	**$785,978**	**$11,004,919**	**$0**	**$14,934,809**
Interruptible Credit Option	$0	$0	$0	$0	$0
Saver's Switch - Business	$12,610	$3,153	$101	$0	$15,864
Business Load Management Subtoal	**$12,610**	**$3,153**	**$101**	**$0**	**$15,864**
Business Segment Total	**$3,156,522**	**$789,131**	**$11,005,020**	**$0**	**$14,950,673**
Planning & Research Segment					
Business Education	N/A	N/A	N/A	N/A	N/A
Consumer Education	N/A	N/A	N/A	N/A	N/A
DSM Planning & Administration	N/A	N/A	N/A	N/A	N/A
Market Research	N/A	N/A	N/A	N/A	N/A
Measurement & Verification	N/A	N/A	N/A	N/A	N/A
Product Development	N/A	N/A	N/A	N/A	N/A
Planning & Research Segment Total	**$0**	**$0**	**$0**	**$0**	**$0**
2011 TOTAL	**$6,585,187**	**$1,646,297**	**$20,057,085**	**$0**	**$28,288,569**

e. Total cost per kWh and kW saved over the life of the measure

Table 6 below, shows the total cost per actual generator kWh and kW saved over the lifetime of the program.

Table 6: Lifetime Cost per Generator kW and kWh Saved (As Verified in Third-Party M&V Report)

Program	Total Utility Costs	Total Lifetime Generator kWh	Cost per Generator kWh	Total Generator kW	Cost per Generator kW
Residential Segment					
Consumer Behavior Program (My Accoun	$115,389	0	N/A	0	N/A
Electric Water Heating	$3,364	70,380	N/A	1	N/A
Evaporative Cooling	$101,422	5,546,758	$0.0183	388	$261
Home Energy Services	$2,126,587	58,434,142	$0.0364	1,860	$1,144
Home Lighting	$969,274	97,995,197	$0.0099	1,696	$571
Low-Income	$346,853	10,846,882	$0.0320	239	$1,451
Refrigerator Recycling	$133,566	1,528,020	$0.0874	65	$2,050
School Education Kits	$111,245	4,844,949	$0.0230	17	$6,540
Residential Energy Efficiency Subtoal	**$3,907,699**	**179,266,327**	**$0.0218**	**4,267**	**$916**
Saver's Switch - Residential	$559,125	32,966	N/A	1,547	N/A
Residential Load Management Subtoal	**$559,125**	**32,966**	**N/A**	**1,547**	**N/A**
Residential Segment Total	**$4,466,825**	**179,299,293**	**$0.0249**	**5,814**	**$768**
Business Segment					
Cooling Efficiency	$181,073	11,469,889	$0.0158	285	$636
Custom Efficiency	$266,690	6,029,951	$0.0442	20	$13,102
Large Customer	$0	0	N/A	0	N/A
Lighting Efficiency	$209,143	20,192,036	$0.0104	302	$694
Motor & Drive Efficiency	$759,975	191,328,098	$0.0040	1,375	$553
Small Business Lighting	$1,347,711	54,476,443	$0.0247	952	$1,416
Business Energy Efficiency Subtoal	**$2,764,592**	**283,496,418**	**$0.0098**	**2,933**	**$942**
Interruptible Credit Option	$1,975	0	N/A	0	N/A
Saver's Switch - Business	$234,122	1,886	N/A	125	N/A
Business Load Management Subtoal	**$236,097**	**1,886**	**N/A**	**125**	**N/A**
Business Segment Total	**$3,000,688**	**283,498,305**	**$0.0106**	**3,058**	**$981**
Planning & Research Segment					
Business Education	$80,500	0	N/A	0	N/A
Consumer Education	$84,615	0	N/A	0	N/A
DSM Planning & Administration	$345,445	0	N/A	0	N/A
Market Research	$51,862	0	N/A	0	N/A
Measurement & Verification	$19,170	0	N/A	0	N/A
Product Development	$48,386	0	N/A	0	N/A
Planning & Research Segment Total	**$629,978**	**0**	**N/A**	**0**	**N/A**
2011 TOTAL	**$8,097,490**	**462,797,598**	**$0.0175**	**8,872**	**$913**

f. Total economic benefits for the reporting period, and
g. Net present value of all economic benefits for the life of the measures.

Table 7 provides the total economic benefits and TRC net present economic value benefits by program. The total economic benefits are calculated by dividing the total economic net benefits of each program over the lifetime of the program. At the portfolio level, the total

lifetime net benefit is divided by the average lifetime of the programs, weighted on the generator kWh provided by each program.

Table 7: Total Economic Benefits Derived from 2011 Programs (As Verified in Third-Party M&V Report)

Program	Total TRC Net Benefits (NPV)	Lifetime (Years)	Total Economic Beneifts Reporting Period
Residential Segment			
Consumer Behavior Program (My Account)	($115,389)		
Electric Water Heating	($228)	12.00	($19)
Evaporative Cooling	$643,551	10.00	$64,355
Home Energy Services	$3,021,482	10.04	$300,962
Home Lighting	$5,141,712	7.00	$734,530
Low-Income	$678,990	10.00	$67,899
Refrigerator Recycling	$18,886	5.00	$3,777
School Education Kits	$190,893	8.02	$23,806
Residential Energy Efficiency Subtoal	**$9,579,897**		**$1,195,311**
Saver's Switch - Residential	($297,877)	1.00	($297,877)
Residential Load Management Subtoal	**($297,877)**		**($297,877)**
Residential Segment Total	**$9,282,020**		**$897,434**
Business Segment			
Cooling Efficiency	$553,141	15.000	$36,876
Custom Efficiency	$55,424	12.000	$55,424
Large Customer	$0		$0
Lighting Efficiency	$981,195	15.000	$65,413
Motor & Drive Efficiency	$7,405,035	18.000	$411,391
Small Business Lighting	$1,920,443	15.000	$128,030
Business Energy Efficiency Subtoal	**$10,915,238**		**$697,133**
Interruptible Credit Option	($1,975)		($1,975)
Saver's Switch - Business	($199,408)		($199,408)
Business Load Management Subtoal	**($201,383)**		**($201,383)**
Business Segment Total	**$10,713,855**		**$495,750**
Planning & Research Segment			
Business Education	($80,500)		($80,500)
Consumer Education	($84,615)		($84,615)
DSM Planning & Administration	($345,445)		($345,445)
Market Research	($51,862)		($51,862)
Measurement & Verification	($19,170)		($19,170)
Product Development	($48,386)		($48,386)
Planning & Research Segment Total	**($629,978)**		**($629,978)**
2011 TOTAL	**$19,365,897**		**$763,207**

(7) Non-Energy Benefits

Non-energy benefits ("NEB") refer to all monetary benefits of the energy efficiency and load management programs that are unrelated to the generation, transmission, distribution, or cost of energy. NEBs may include greenhouse gas emissions reductions, improvements

in safety and comfort, reduced arrearages on customer bills, reduced water consumption, and reduced labor and maintenance costs, amongst others. Generally speaking, non-energy benefits are difficult to quantify. ADM did not specifically identify the value of any NEBs in the TRC Test in this Report.

The following table shows the emission reductions associated with SPS's 2011 energy efficiency portfolio. These values were estimated by applying the lifetime and annual energy savings from the 2011 program achievements to the emission rates for SPS's Cunningham Station -2 Plant[1], which is believed to be a fair proxy for the generation avoided by the 2011 energy efficiency programs.

Table 8: Greenhouse Gas Emissions Avoided With 2011 Programs

Emission Type	Avoided Electric Emissions Rate (lbs/MWh)	Annual Avoided Emissions (lbs)	Lifetime Avoided Emissions (lbs)
CO_2	1,250.000000	49,105,108	578,496,998
SO_2	0.006319	248	2,924
NOx	2.490000	97,817	1,152,366

The following table shows the amount of water conserved by the 2011 program achievements, due to the reduced need for energy generation. These values are estimated by applying the lifetime and annual energy savings to the water consumption rate for SPS's Cunningham Station Plant average[2], which is believed to be a fair proxy for the energy generation avoided by the energy efficiency programs.

Table 9: Water Consumption Avoided With 2011 Programs

Non-Energy Benefit Type	Avoided Water Consumption Rate (gal/MWh)	Annual Avoided Water Consumption (gal)	Lifetime Avoided Water Consumption (gal)
Water Savings	840	32,998,633	388,749,982

(8) Self-Direct Programs

SPS did not propose any goals for the Large Customer (Self-Direct) Program because it was unknown at the time of filing who might choose to participate. This program had no participants or spending in 2011. For more information about this program, please refer to the program discussion in Section III.

[1] Source: Case No. 09-00295-UT, SPS's 2009 Integrated Resource Plan for New Mexico; Table 5-1: Emission Rates (p. 51).
[2] Ibid.

Section III: Segment and Program Descriptions

Residential Segment

SPS has approximately 85,000 customers in its Residential Segment in New Mexico. The service area is relatively rural, with only a few small cities, including Clovis, Roswell, and Hobbs. The climate in this part of New Mexico consists of winters with very little snow and hot, relatively dry summers.

SPS was slightly under the goal for the Residential Segment in 2011 due but had strong performance in the Home Lighting Program. While not meeting anticipated levels of savings Home Energy Services (HES) contributed heavily to the portfolio and Residential Low Income showed significant improvement over 2010.

Home Lighting performed very well due to increased efforts in marketing and advertising including television, radio, on-line, publication, bill inserts, community events and point of purchase displays. Residential Low Income improved over 2010 due to the improved comfort level and familiarity of participating contractors with the additional requirements of the program.

Customers continued to be reluctant to retire their still-operating secondary refrigerators in 2011. SPS renegotiated the third party contract to reduce program costs and has implemented a new marketing plan for 2012.

Electric Water Heating and Residential Saver's Switch were not cost effective in 2011. Electric Water Heating was removed from the 2011 plan during the plan approval process, which occurred in April of 2011. During the period of January through April 2011 the program was available and 3 customers participated. Residential Saver's Switches deployed have a life expectancy of 15 years and participants remaining on the program will contribute load relief for years to come after the initial investment in hardware and installation have been absorbed. Residential Saver's Switch is a relatively new program and will build benefits over time as customers stay on the program. We expect the program to be cost effective in the next couple of years. All other Residential programs were cost effective in 2011.

Consumer Behavior Program

Southwestern Public Service (SPS) began setting up a Customer Behavior Pilot in 2011 to quantify how residential customer energy usage is affected by providing 15,000 customers with a Home Energy Report mailed 6-7 times per year. The Home Energy Report contains information on the customer's energy usage and benchmarks their usage compared to 100 other similar customers. The Information is intended to result in a permanent decrease in energy usage by inducing changes in the behavior of the end-user and an increased or earlier adoption of energy efficient technologies and energy efficient practices that remain even after the feedback program stimulus is removed.

The three-year program (two years with a company option for a third year) began with set-up in 2011 and consisted of historical customer data extraction, participant/control selection and report set-up. There were several delays encountered in the customer data set-up that prevented the delivery of reports in 2011. We will quantify and claim energy savings in subsequent years as we focus on interpretation and evaluation of the results. Other trials in pilot programs similar to this have resulted in and average saving of about 2%.

Deviation from Goal

Table 12: Proposed Consumer Behavior Pilot Goals

Consumer Behavior Pilot	2011 Goal	2011 Achievement
Budget	$251,500	$115,000
Generator kW	0 kW	0 kW
Generator kWh	0 kWh	0 kWh
Participation	15,000	15,000

Delays in the set-up caused the postponement of the delivery of the first Home Energy Report by about 6 months (March 2012). The budget deviation for 2011 reflects that delay.

Changes in 2011

None

Evaporative Cooling

The Evaporative Cooling Rebate Product provides a cash rebate to electric customers who purchase and permanently install high-efficiency evaporative cooling equipment for residential use in New Mexico.

This is a tiered rebate program, which provides $200 or the cost of the unit, which ever is less, for Standard System (Tier 1) units with a cubic feet of air blown per minute of 2,500 or greater; or $1000 for Premium System (Tier 2) units with a minimum media saturation effectiveness of 85%, a remote thermostat, and a periodic purge water control.

Deviation from Goal

The Evaporative Cooling Program underspent the approved budget and did not meet the achievement goal for 2011 but still remained cost-effective. Outreach included online media, bill inserts, radio and customer/trade mailers, however, the program fell short overall. Additional marketing and advertising dollars have been planned for 2012, as well as rolling out trade incentives to further increase participation.

Changes in 2011

None

Home Energy Services

The Home Energy Services Program provides incentives to energy efficiency service provider contractors for the installation of a range of upgrades that save energy and reduce costs for existing residential households. Qualifying customers will receive attic insulation, air infiltration reduction, duct leakage repairs, and high efficiency central air conditioners.

The primary objective of this program is to achieve cost-effective reductions in energy consumption in residential homes. Additional objectives of the program are to:

- Encourage private sector delivery of energy efficiency products and services
- Utilize a whole-house approach to upgrade efficiently
- Significantly reduce barriers to participation by streamlining program procedures.

SPS partners with qualifying third-party contractors to deliver these services to residential households. Contractors must apply to the program and be approved in order to participate. SPS requires contractors to receive pre-approval for targeted multi-family sites prior to installation of any energy efficiency components for which an incentive will be requested.

Deviation from Goal

The Home Energy Services program achieved approximately 50% of the filed goal. At the beginning of the year, deemed savings reduced all energy efficiency measures in the program per third party evaluation. The decrease in deemed savings accounts for the overall reduction in savings because each home that participated in the program yielded less savings for the same amount of work, and contractors were not able to add enough homes to utilize the whole budget.

Changes in 2011

Deemed savings were lowered per third party evaluation.

Home Lighting

The Home Lighting and Recycling Program helps customers save energy and money by offering energy efficient compact fluorescent light bulbs ("CFL") at a discounted price. This provides an inexpensive way for customers to save on their energy usage and reduce their impact on the environment. SPS provides discounts on CFLs at participating retailers. SPS works with retailers and manufacturers to buy down the price of CFLs, and offer at least one bulb per location for approximately $1.00 each.

Xcel Energy promoted the program extensively through a variety of advertising and promotions, including television, radio, on-line, publications, bill inserts, community events and point of purchase displays. SPS also participated in many local events including the Eastern NM State Fair, annual Chili Cook-off and the Cinco De Mayo celebration. SPS partnered with Domino's Pizza to deliver CFLs with each pizza order for a limited time period. This was a unique promotion in that it delivered bulbs directly to customers' homes and was an extremely low cost method to reaching consumers. SPS also partnered with the Eastern New Mexico Medical Center on the Enlighten Roswell Project to provide CFLs and raise awareness of breast cancer.

The 2011 Home Lighting and Recycling Program was very successful, distributing and selling approximately 360,000 CFLs. SPS recycled 380 CFLs in 2011.

Deviation from Goal

SPS distributed and sold twice the expected number of CFL units during 2011. However, the approved budget was over spent by 11%. The savings achievements were reduced in the measurement and evaluation process due to market saturation. This lowered the savings per unit, making final achievement 96% of goal.

Changes in 2011

None

Residential Low-Income Program

The Low-Income Program serves residential customers with household incomes of less than 200 % of the federal poverty level. The purpose of this program is to provide low-income customers in SPS's New Mexico service area with the education and energy efficiency measures necessary to help lower energy costs and improve the comfort and safety of their dwellings.

In 2011 SPS continued the work with New Mexico LIHEAP agencies to put free CFL's into low income homes. At mid-year, the low-income Home Energy Services program was rolled out to provide home weatherization and energy efficiency measures to low-income customers.

There are four energy efficiency offerings that make up the Low-Income Home Energy Services Program:

- Infiltration control – Testing and sealing the thermal envelope of homes to reduce infiltration and use heating and air conditioning more efficiently.
- Duct Efficiency Improvement - Testing and sealing of central heating and air conditioning ductwork in unconditioned spaces to improve the efficiency of the HVAC system
- Home Lighting Giveaway - This is a CFL give-away that is offered by third party contractors in the Low-Income Home Energy Services program.
- Refrigerator Upgrades - This component provides free upgrades of qualified refrigerators to ENERGY STAR models and recycles the old refrigerator. This program is administered by third party contractors and is available for qualified low-income customers.
- Evaporative Cooling Installation - This component provides a free evaporative cooling unit and installation to customers in need. This program is administered by third party contractors and is available for qualified low-income customers.

Deviation from Goal

In December, the low-income budget was reduced based on best available information from the market. During the last part of the year several projects were identified and completed resulting in exceeding the new forecasted budget and savings.

Changes in 2011

The low-income budget was reduced.

Refrigerator Recycling

The Refrigerator Recycling Product is designed to decrease the number of inefficient secondary refrigerators in residential households. The product reduces energy usage by allowing customers to dispose of their operable, inefficient secondary refrigerators in an environmentally safe and convenient manner. Customers receive a $75 incentive and free pick up and disposal services to recycle the secondary refrigerator. This product is primarily marketed by a variety of bill inserts, direct mailers and online/social media efforts.

Deviation from Goal

The Refrigerator Recycling Product did not achieve the participant or electric energy savings goal in 2011. The product however, exceeded the 2010 achievement and continues to perform year over year with better results. Enhanced advertising and marketing efforts have been in increased in 2012 to surpass expected goals, as well as exploration in expanding the program to freezers and/or primary units to increase participation.

Changes in 2011

As a result of the measurement and verification analysis performed by ADM, the 2011 technical assumptions changed program net-to-gross value, the weighted average program lifetime, assumed wattage for baseline refrigerators, and the weighted average operating hours. Additionally, program participation was decreased slightly, and rebates were increased from $50 to $75 per unit.

Saver's Switch (Residential)

Saver's Switch is a demand response program that offers bill credits as an incentive for residential customers to allow SPS to control operation of their central air conditioners and electric water heaters on days when the system is approaching its peak. This program is generally utilized on hot summer days when SPS's load is expected to reach near-peak capacity. Saver's Switch helps reduce the impact of escalating demand and price for peak electricity.

When the program is activated, a control signal is sent to interrupt the air conditioning load during peak periods, typically in the afternoons on weekdays. For air conditioners, the switches utilize a cycling strategy. This strategy allows SPS to interpret how a customer's air conditioning is being operated in order to achieve a 50% reduction in load. For enrolled electric water heaters, the entire load is shed for the duration of the control period. Due to limitations in available paging systems, the program is currently available only in the cities of Portales, Hobbs, Clovis, Roswell, Artesia, and Carlsbad.

Saver's Switch was introduced in New Mexico in the fall of 2010, after the summer control season. In 2011 the program was activated on eight occasions.

In 2011, the residential Saver's Switch program did not produce a TRC score greater than 1.0. This is not surprising in a recently launched load management program. Switches deployed have a life expectancy of 15 years and participants remaining on the program will contribute load relief for years to come after the initial investment in hardware and installation have been absorbed. SPS anticipates the Saver's Switch program to exceed a TRC score of 1.0 within a couple of years.

Deviation from Goal

Due to the timing of the program launch, SPS has recognized the combined achievements of installations for 2010 and 2011. In all, we installed 1,552 residential Saver's Switches in 2010 and 2011, slightly below the combined 2-year goal of 1,710.

Changes in 2011

Eligibility was expanded to include Hobbs and Portales.

School Education Kits

The School Education Kits Product combines a set of classroom and in-home activities with projects that enable students and parents to install energy efficiency and water conservation products in their homes. The product is targeted to fifth grade students in our New Mexico service territory. Our third-party contractor fully implemented the School Education Kits Product, including recruiting and training teachers, providing all materials, and tracking participation by the students and teachers. Energy savings are based on the number of measures that are installed in the homes of the students. Parents are surveyed to determine the measure installation rates.

Deviation from Goal

The product reached its participant and savings goals for 2011. Installation rates for all measures were as expected. Spending was under budget for electric spend due to reduced costs for the kits supplies and materials.

Changes in 2011

None

Business Segment

SPS has approximately 19,000 customers in its Business Segment in New Mexico, including commercial, industrial, and agricultural customers of all sizes.

In 2011, SPS exceeded its goals in the business segment. The Business Segment made significant strides by working with industrial customers on their major energy consuming systems. Of particular note the Motor & Drive Efficiency program far exceeded expectations through the implementation of several large variable speed drive projects and pump off controller installations for use in oil extraction.

Small Business Lighting continued to perform above expectations and contributed significantly to the portfolio. Business Saver's Switch, Cooling Efficiency and Custom Efficiency improved over 2010 performance but fell short of expectations.

The Large Customer Self Direct and Interruptible Credit Option Business Programs had no participation in 2011. Commercial Saver's Switch was the only program that was not cost effective. Switches deployed have a life expectancy of 15 years and participants remaining on the program will contribute load relief for years to come after the initial investment in hardware and installation have been absorbed.

Saver's Switch (Business)

Saver's Switch is a demand response program that offers bill credits as an incentive for commercial customers to allow SPS to control operation of their central air conditioners on days when the system is approaching its peak. This program is generally utilized on hot summer days when SPS's load is expected to reach near-peak capacity. Saver's Switch helps reduce the impact of escalating demand and price for peak electricity.

When the product is activated, a control signal is sent to interrupt the air conditioning load during peak periods, typically in the afternoons on weekdays. The product utilizes a cycling strategy. This strategy allows SPS to determine how a customer's air conditioning is being operated in order to achieve a 50% reduction in load. Due to limitations in available paging systems, the program is currently available only in the cities of Portales, Hobbs, Clovis, Roswell, Artesia, and Carlsbad.

Saver's Switch was introduced in New Mexico in the fall of 2010, after the summer control season. In 2011 the program was activated on eight occasions.

In 2011, the commercial Saver's Switch program did not produce a TRC score greater than 1.0. This is not surprising in a recently launched load management program. Switches deployed have a life expectancy of 15 years and participants remaining on the program will contribute load relief for years to come after the initial investment in hardware and installation have been absorbed. SPS anticipates the Saver's Switch program to exceed a TRC score of 1.0 within a couple of years.

Deviation from Goal

Due to the timing of the program launch, SPS has recognized the combined achievements of installations for 2010 and 2011. We installed 199 commercial Saver's Switches in 2010 and 2011, below the combined 2-year goal of 400.

Changes in 2011

Eligibility was expanded to include Hobbs and Portales.

Cooling Efficiency

The Cooling Efficiency Program offers prescriptive rebates for common high efficiency cooling equipment and custom rebates for newer technologies and system-based high efficiency solutions. The program is designed to influence customers to select the most energy efficient option to meet their cooling requirements.

Deviation from Goal

The Cooling Efficiency Program did not meet its goal in 2011, but participation increased when compared to 2010, primarily in small business. The program realized significant improvements in kW and kWh achievements over 2010. Interviews with trade representatives confirmed that a decision to replace or repair is made, the lowest price is "key" in making that decision. In order to encourage the trade partners to sell high efficiency equipment, the cooling program offered a trade incentive equal to 25 percent of the customer rebate. However, there were no participants in the trade incentive. SPS continues to educate the trade in how to sell lifetime savings of high efficiency cooling products. Additionally, we continue to reach out to customers via direct mail, account management and the Business Solution Center.

Changes in 2011

None

Custom Efficiency

The Custom Efficiency Program offers rebates up to $400 per kW saved for energy saving measures with efficiencies higher than the standard that are not covered by our prescriptive programs. The program includes an evaluation/study component to the Custom Efficiency Program called the Large C&I study.

Deviation from Goal

The Custom Efficiency Program did not meet its 2011 goal but had a significant increase over 2010 achievements. It takes time for customers to understand this program because it can apply to any technology that offers energy savings. Preapproval is required prior to ordering equipment. Lead times for this program are longer because rebates are unknown during the planning stages of the project. After the rebates are determined customers must then budget for the project.

Changes in 2011

None

Interruptible Credit Option

The New Mexico Interruptible Credit Option ("ICO") Program was developed to offer significant savings opportunities to our New Mexico business customers who can reduce their electric demand for specific periods of time when notified. In return for participating, customers receive a monthly credit on their demand charges. In 2011, based upon customer feedback, two additional interruptible options were introduced: the summer only Interruptible Credit Option (SOICO) and a Voluntary Load Reduction Purchase Option (VLRPO). These additional options are meant to increase customer participation by addressing the limited amount of time of interruption and the voluntary nature of the product.

Deviation from goal:

After the introduction of the two additional options in 2011, this program did not have any participants during 2011. Due to the economic conditions, we are having a difficult time enticing our customers to sign up for this program. We only spent a small amount of the budget on marketing materials such as Customer ICO System Guides and Program Features and Benefits collateral. We will continue our current promotions throughout 2012.

Changes in 2011:

None

Large Customer Self Direct

The Large Customer Program is a self-direct program that allows SPS customers with contiguous facilities that use over 7,000 MWh per year to identify and administer their own energy efficiency and load management projects. This program offers customers two options: 1) a bill credit, or 2) an exemption from the Energy Efficiency Tariff Rider for 24 months. Customers are eligible for a bill credit or an exemption from the Energy Efficiency Tariff Rider of up to 70% of the incremental expenditures made towards cost-effective energy efficiency or load management measures.

Deviation from Goal

SPS did not have any customers participate in this program during 2011. Therefore, this program had zero program expenditures and achievements.

Changes in 2011

None.

Lighting Efficiency

The Lighting Efficiency Product offers cash rebates to offset the incremental, upfront costs of installing energy efficient lighting equipment. The product provides prescriptive rebates for both existing facilities and new construction projects, as well as custom rebates for new technologies or uncommon lighting solutions.

Subject to pre-approval, rebates are available for lighting retrofit projects that do not qualify for prescriptive rebates but still reduce energy costs and usage, under SPS's Custom Efficiency Product.

The Lighting Efficiency Product is marketed indirectly through lighting and electrical contractors, and directly to business customers through SPS account management staff and by Energy Efficiency Specialists in the inbound and outbound calling center. Additional strategies used to raise awareness and stimulate participation in 2011 included outreach and in-person visits with trade, customer visits, inbound and outbound telemarketing, mailings and sales collateral (applications, program summary), and Web content.

CFLs—hardwired CFL fixtures only in 2011—represented 2.2% of energy savings in the 2011 Lighting Efficiency Product. SPS will continue to monitor and address its level of reliance on CFLs.

Deviation from Goal

The Lighting Efficiency Product under spent the 2011 modified budget by 73% and did not meet the energy savings goals. The primary reason is medium and small-sized commercial businesses are attracted to the 50% higher rebates and special services offered in the Small Business Lighting product. In total the Business Lighting Efficiency net energy savings rose 7%, and participation increased compared to 2010. Large commercial and industrial businesses continued to postpone or cancel capital projects, such as major lighting system retrofits. One Trade Partner participated in the Trade Ally Incentive program in 2011, and the company hopes to increase trade participation in 2012.

Because Business Lighting Efficiency is a very cost-effective business energy efficiency product, the company proposes in 2012 to equalize rebates and increase customer and trade communications to foster higher participation.

Changes in 2011

Added the following rebate measures to stimulate participation:

- ENERGY STAR qualified LED Lamps ($20-35/lamp based on wattage) and interior luminaries ($100-125/fixture Retrofit and $50-75/fixture New Construction rebate, based on wattage.)
- Exterior LED Canopy and Soffit Fixtures - $275/fixture Retrofit and $150/fixture New Construction
- Refrigerated LED Case Lighting - $100/door Retrofit, and $70/door New Construction Rebate.

In a limited-time promotion, increased Trade Ally Incentive from 25% of customer's rebate to 50% of customer's rebate for projects to remove inefficient fluorescent T12 lighting systems and install high-efficiency T8 systems.

Motor and Drive Efficiency

The Motor and Drive Efficiency Product assists customers with awareness and incentives for various types of equipment purchases. In 2011, we offered prescriptive incentives on NEMA Premium Motors, Variable Frequency Drives, upgrades to Variable Speed Air Compressors, and Oil Well Pump-off Controllers. We also offered custom rebates for motor-related equipment that falls outside the prescriptive criteria. The products allow customers to operate more efficiently, and often with longer equipment life and reduced maintenance costs.

Deviation from Goal

The program surpassed its kW and kWh goals and, to a lesser extent, exceeded the approved budget. The results were substantially more cost-effective than planned. Success was primarily driven by:

1. Very high and rapid adoption of pump-off controllers by larger oil producers.
2. Account Management focus on opportunities for multiple variable frequency drives.
3. Reduction of administration costs.

Changes in 2011

During the year, we introduced prescriptive rebates for load-cell based pump-off controllers retrofit on existing oil well pump jacks. Their participation drove our request for additional budget, which the NMPRC approved in December, 2011. The additional budget was used for customer incentives.

During 2011, we discontinued rebates for NEMA Premium Efficient Motors purchased to create new capacity or restore capacity.

Small Business Lighting

Launched in August 2009, the Small Business Lighting (SBL) Product, offers free lighting audits, energy saving recommendations, paperwork assistance and attractive rebates for business customers with peak demand of up to 400 kW.

Rebates are available for lighting retrofit projects that do not qualify for SBL prescriptive rebates and are subject to pre-approval, but still reduce energy costs and usage, under SPS's Custom Efficiency Product.

The SBL product is marketed in a coordinated fashion through direct trade outreach and customer contact by Franklin Energy the lighting consultant implementing the product, as well as by Energy Efficiency Specialists in SPS's inbound and outbound calling center and general company branded trade and customer direct mail communication.

SBL addresses barriers that traditionally prevent small businesses from investing in energy efficiency products: limited financial resources and time, insufficient knowledge of lighting equipment and lack of awareness of energy savings potential in lighting system upgrades, lack of time and staff to

complete the necessary steps to upgrade lighting systems, lack of capital to make lighting improvements and lack of access to quality contractors.

Strategies used to raise product awareness and stimulate product participation in 2011 included:

- Increased staffing to meet growing program participation volume, in-person SBL audits and energy-saving recommendations by Franklin Energy's Energy Advisor
- Electrical and lighting trade outreach
- Updated sales literature, direct mail and Web content development.

CFLs – hard-wired fixtures and screw-in lamps – represented 7.2% of the product's energy savings in 2011. SPS will continue to monitor and address its level of reliance on CFLs.

Deviation from Goal

SBL exceeded its 2011 goal for energy savings by 31% and for peak demand reduction by 1%. However, the approved budget was overspent by 10%. This solid performance is attributable to the appeal of a free on-site lighting audit. The audit includes detailed and actionable recommendations for energy savings – including SPS's specific rebates – and Franklin Energy's assistance completing and submitting rebate paperwork on the customer's behalf.

Because Small Business Lighting is a cost-effective business energy efficiency product, the company will continue customer and trade communications to foster higher participation and will increase education and communication on the differing lighting technologies and provide more case studies for customers and trade to understand pay-back rates and benefits of lighting retrofits.

Changes in 2011

Added or improved the following measures to stimulate participation:

- ENERGY STAR qualified LED Lamps ($20-35/lamp based on wattage) and interior luminaries ($100-125/fixture Retrofit and $50-75/fixture New Construction rebate, based on wattage.)
- Exterior LED Canopy and Soffit Fixtures - $275/fixture Retrofit and $150/fixture New Construction
- Refrigerated LED Case Lighting - $100/door Retrofit, and $70/door New Construction Rebate.

Planning & Research Segment

The Planning and Research Segment consists of internal functions (not customer-facing), which support the direct impact programs. The segment includes energy efficiency and load management-related expenses for Business Education, Consumer Education, DSM Planning & Administration, Market Research, Measurement & Verification, and Product Development. The overall purpose of the Planning and Research Segment is to:

- Provide strategic direction for SPS's energy efficiency and load management programs
- Ensure regulatory compliance with energy efficiency legislation and rules
- Guide SPS internal policy issues related to energy efficiency
- Train SPS Marketing staff for effective performance
- Evaluate program technical assumptions, program achievements, and marketing strategies
- Provide oversight of all evaluation, measurement, and verification planning and internal policy guidance
- Provide segment and target market information
- Analyze overall effects of SPS's energy efficiency portfolio on customer usage and overall system peak demand and system energy usage
- Measure customer satisfaction with SPS's energy efficiency efforts
- Develop new conservation and load management programs

In 2011, the Planning and Research segment under spent their budget. We are continually trying to lower the costs of this indirect segment so this is a good result. Each Planning and Research program is discussed below.

Business Education

Through the settlement of the SPS 2011 DSM Plan, we proposed funding for an oil and gas industry expert to evaluate energy efficiency opportunities at customer sites. Xcel Energy operating companies offers study funding in other jurisdictions and has had success because it creates a prioritized list of projects so customers can evaluate and gain approval for upgrades, technical detail to assist our customers in preparing applications and analysis and gives SPS representatives specific knowledge on the customer's operations to engage in relevant energy efficiency opportunities.

Deviation from Goal

During 2011, eight studies/audits were conducted primarily at oil and gas production facilities. Due to other priorities at these customer's facilities it was difficult to schedule these visits. Energy saving potentials were identified through the site visits. One large VFD project was submitted through the Customer Program and was pre-approved by ADM with estimated savings. The project is being approved for implementation by customer management. Other potential energy saving projects are being evaluated by customers. SPS expects to conclude the customer site visits in 2012.

Changes in 2011

None.

Consumer Education

Consumer Education is an indirect program that focuses primarily on creating public awareness of energy efficiency while providing residential customers with information on what they can do in their daily lives to reduce their energy usage. The program will also support the various energy efficiency and load management products SOS will offer to residential customers. The Consumer Education Program started in 2009, and replaced the General Advertising Program from the 2008 Energy Efficiency and Load Management Plan that SPS had used to educate customers about conservation. SPS employs a variety of resources and channels to communicate conservation and energy efficiency messages, including: the Xcel Energy website, bill inserts, events, radio, print, and online advertising.

The Consumer Education Program is targeted to all New Mexico residential electric customers. In the initial implementation of the program, primary emphasis will be placed on:

- Web presence on ResponsibleByNature.com
- Community-based marketing events;
- Messaging through local radio stations as well as online advertising;
- Targeted communications to address seasonal usage challenges;
- Conservation messaging through Xcel Energy's newsletters and bill inserts to residential customers; and
- Publication of reference education materials (in English and Spanish)

SPS has approximately 88,000 residential customers in its New Mexico service territory. SPS plans to touch 80 percent of the residential customer base, or 70,000 customers, through bill inserts, community events, and conservation advertising.

Deviation from Goal

The approved budget for Consumer Education in 2011 was $89,656, with a participation goal of 70,000 customers. Actual achievements were $84,615 spent, and 80,000 customers reached. This budget was developed based on past experience building awareness and community outreach in New Mexico. Additionally, the primary costs associated with the Consumer Education Program were based on projected costs for reaching customers through multiple communication channels and tactics including:

- Community-based events;
- Bill inserts; and
- Advertising, including print, radio and online

The majority of the budget is driven by customer education, conservation promotion, and labor. As the year progressed, it was discovered that we were able to reach an additional 10,000 participants through bill inserts at a lower than projected cost.

Changes in 2011

No significant changes were made to the NM Consumer Education program in 2011.

DSM Planning & Administration

The Planning and Administration area manages all energy efficiency and load management regulatory filings (including this Report), directs and carries out benefit-cost analyses, provides tracking results of energy conservation achievements and expenditures, and analyzes and prepares cost recovery reports. Planning and Administration, which includes outside legal assistance, coordinates and participates in all DSM related rulemaking activities and litigated hearings. This area also sup ports the energy and demand conservation component of resource planning and provides planning and internal policy guidance to meet all energy efficiency and load management regulatory requirements. These functions are needed to ensure a cohesive and high-quality energy efficiency portfolio that meets legal requirements as well as the expectations of SPS's customers, regulators, and staff.

Deviation from Goal

During 2011, SPS's Planning and Administration area, including legal expenses, over spent its budget by approximately 7%. Some of the specific activities that contributed to the 2011 expenditures included: Preparation and filing of the 2010 Energy Efficiency and Load Management Annual Report, preparation and filing of the 2011 Plan Settlement and subsequent hearing, preparation and filing of the 2012 Plan, and the motion to increase and decrease the program budgets for: Motor and Drive Efficiency, Residential Low-Income, Cooling Efficiency, Custom Efficiency, Interruptible Credit Option, Lighting Efficiency, Consumer Education, Measurement & Verification, and Product Development.

Changes in 2011

None

Market Research

The Market Research area spearheads energy efficiency-related research efforts that are used to inform SPS's decision-making concerning energy efficiency and load management. In 2011, the Market Research group oversaw the SPS portion of several company-wide projects that were identified in the filing such as the Awareness, Attitude & Usage (AAU) study, the E-Source Membership and the Dun & Bradstreet List purchase.

Deviation from Goal

Market Research under spent its budget in 2011. The main reason for this deviation was the cost savings SPS was able to achieve through effective project cost negotiations and aligning project scopes to more accurately reflect current business information needs.

Changes in 2011

None

Measurement & Verification

Internal staff from the Planning and Administration area oversees M&V planning and internal policy guidance. In addition, this area coordinates the day-to-day activities providing necessary information and program tracking data to the Evaluator as well as serving on the Commission's Evaluation Committee. NMAC 17.7.2.13.C1 requires that utilities provide an M&V Report provided by an Evaluator every year with its Annual Report. All New Mexico utilities have contracted with ADM Associates, Inc. as their Evaluator for 2011 programs.

In compliance with the reporting requirements, the M&V Report should include:

- Expenditure documentation, at both the total portfolio and individual program levels
- Measured and verified savings
- Cost-effectiveness of all of SPS's energy efficiency and load management programs;
- Deemed savings assumptions and all other assumptions used by the Evaluator
- Description of the M&V process, including confirmation that:
    - Measures were actually installed
    - Installations meet reasonable quality standards
    - Measures are operating correctly and are expected to generate the predicted savings

See Appendix A for ADM's M&V Report of SPS' 2011 Programs.

Deviation from Goal

The line item budget contains both SPS labor and expenses to manage the M&V process as well as charges from ADM which cover their general administration and report preparation that are not directly related to individual programs. Measurement & Verification under spent the approved budget by approximately 15%. Specific activities that contributed to the 2011 expenditures included: SPS internal labor and expenses working with ADM, expenses related to being part of the Evaluation Committee and expenses from ADM in administration and report preparation.

Changes in 2011

In December 2011, a modification was filed with New Mexico Public Utilities Commission requesting a reduction in budget. The reduction in budget was requested because of the late start of M&V in 2011 by the independent M&V evaluator, ADM. This was caused by a delay in approval to extend ADM's contract for the 2011 and 2012 program years.

Product Development

Product Development identifies, assesses, and develops new energy efficiency and load management products and services. The product development process starts with ideas and concepts from customers, regulators, energy professionals, interest groups, and Xcel Energy staff. These ideas are

then carefully screened and only ideas with the most potential are selected for the development process.

In 2011, the Product Development team launched prescriptive rebates for the following list of products as part of the 2012 Plan:

Business

- Computer Efficiency (new product)
- Cooling Efficiency (additional measures)
  - Plate & Frame Heat Exchangers
  - ("VSD")s on Chillers
- Motor Efficiency (additional measures)
  - ECMs for Evaporators
  - "Plan A" for 10-49 HP VSD Compressors

Residential

- LED Lighting

Deviation from Goal

In 2011, the Product Development area was under budget. This was due to less Product Development labor focused on developing products for 2011 as we were able to leverage work done in our other jurisdictions.

Changes in 2011

None.

Appendix A: Measurement & Verification Report:
SPS 2011 Program Year

Provided by ADM Associates Inc., June 2012

Southwestern Public Service Company DSM Portfolio
Program Year 2011

Prepared for:

Southwestern Public Service Company

Final, June 2012

Prepared by:

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1. Executive Summary

This report is to provide a summary of the evaluation effort of the 2011 Demand Side Management (DSM) portfolio by the Southwestern Public Service Company (SPS, a division of Xcel Energy). In 2011, the SPS portfolio consisted of six residential and four non-residential programs. ADM estimated gross realization, net savings, and cost-effectiveness for the 9 evaluated programs.

1.1 Summary of SPS Energy Efficiency Programs

New Mexico Investor-Owned Utilities (IOUs) are required to develop cost-effective DSM programs, using ratepayer funds to reduce energy demand and consumption. IOUs submit their portfolios to the New Mexico Public Regulatory Commission (NMPRC) for approval. In 2011, the SPS DSM portfolio contained the following programs:

- Residential Evaporative Cooling
- Residential Home Energy Services
- Residential Low Income
- Electric Water Heating[1]
- Energy Feedback
- Home Lighting & Recycling
- School Education Kits
- Residential Refrigerator Recycling
- Business Cooling Efficiency
- Business Lighting Efficiency
- Business Custom Efficiency
- Business Motor Efficiency
- Large Customer Self-Direct
- Small Business Lighting Efficiency

[1] This program was cancelled in 2011

- Residential Saver's Switch
- Business Saver's Switch
- Interruptible Credit Option[2]

For 2011, ADM evaluated a subset of the portfolio. The programs evaluated for this program year include:

- Business Comprehensive[2];
- Home Energy Services;
- Home Lighting & Recycling;
- Residential Saver's Switch; and
- Business Saver's Switch.

1.2 Evaluation Objectives

The objectives of this evaluation include:

- Development of program-specific evaluation plans;
- Design a sample allowing for 90% confidence and +/- 10% statistical precision for each program;
- Conduct onsite verification inspections, telephone surveying, and onsite metering as needed;
- Evaluate gross savings by program;
- Provide net savings totals through evaluation of free-ridership;
- Evaluate cost-effectiveness of each program using the Total Resource Cost (TRC) test; and
- Evaluate programs within the portfolio and make recommendations for amendments and improvements.

[2] In this evaluation, ADM aggregated SPS business programs into Business Comprehensive in order to more efficiently spend M&V resources. This aggregation includes Business Lighting, Business Cooling, Business Motors, Business Custom, and Small Business Lighting Efficiency. Savings for component programs are still reported separately.

1.3 Summary of Findings

Gross savings were estimated by engineering analysis, simulation modeling, participant surveying, and on-site monitoring where appropriate for the program and measure type. ADM then estimated free-ridership and associated net-to-gross ratios (NTGRs) for the evaluated programs Table 1-1 and 1-2 below present the gross and net impact by program. It should be noted that these tables include both evaluated and non-evaluated programs. Non-evaluated programs are shown as having 100% gross and net realization rates.

Table 1-1 Gross Impact Summary

Program	Peak Demand Savings (kW)		Annual Energy Savings, (kWh)		Lifetime Energy Savings (kWh)		Gross Realization Rate
	Expected	Realized	Expected	Realized	Expected	Realized	
Home Energy Services	2,111	1,739	6,838,909	5,589,535	68,609,369	56,115,626	82%
Home Lighting & Recycling	1,641	1,800	15,955,854	15,247,301	111,690,980	106,731,110	96%
Business Lighting	436.3	398.9	1,891,656	1,814,638	28,374,840	27,219,570	96%
Business Cooling	245.0	289.2	799,665	791,230	11,994,975	11,868,450	99%
Business Custom	26.3	26.3	629,507	662,908	7,554,084	7,954,896	105%
Business Motors & Drives	1,242.3	1,304.3	8,347,683	10,275,397	166,953,660	184,957,146	123%
Small Business Lighting	922.1	870.4	3,325,800	3,383,677	49,887,000	50,755,155	102%
Electric Water Heating	.87	.87	5,238	5,238	62,856	82,856	100%
Evaporative Cooling Rebates	563	563	825,635	825,635	8,256,350	8,256,350	100%
Low Income	208	208	968,735	968,735	9,687,350	9,687,350	100%
Refrigerator Recycling	81	81	419,900	419,900	2,099,500	2,099,500	100%
School Education Kits	14.8	14.8	539,628	539,628	4,237,024	4,327,024	100%
Total	7,492	7,296	40,548,210	40,523,822	469,407,988	470,055,033	100%

Table 1-2 Net Impact Summary

Program	Peak Demand Savings (kW)		Annual Energy Savings, (kWh)		Lifetime Energy Savings (kWh)		Net Realization Rate
	Expected	Realized	Expected	Realized	Expected	Realized	
Home Energy Services	1,963	1,618	6,360,185	5,198,267	63,806,713	52,187,532	82%
Home Lighting & Recycling	1,362	1,476	13,243,359	12,502,787	92,703,513	87,519,510	96%
Business Lighting	349.0	274.1	1,513,325	1,246,656	22,699,872	18,699,845	82%
Business Cooling	208.3	258.9	679,715	708,151	10,195,725	10,622,264	104%
Business Custom	22.9	18.5	547,671	465,361	6,572,053	5,584,338	85%
Business Motors & Drives	1,080.8	1,249.5	7,762,484	9,843,831	145,249,684	177,188,952	127%
Small Business Lighting	876.0	865.2	3,159,510	3,363,376	47,392,650	50,450,634	106%
Electric Water Heating	.87	.87	5,238	5,238	62,856	82,856	100%
Evaporative Cooling Rebates	338	338	495,381	495,381	4,953,810	4,953,810	100%
Low Income	208	208	968,735	968,735	9,687,350	9,687,350	100%
Refrigerator Recycling	56.7	56.7	272,935	272,935	1,364,675	1,364,675	100%
School Education Kits	14.8	14.8	539,628	539,628	4,237,024	4,327,024	100%
Total	6,480	6,379	35,548,166	35,610,346	408,925,925	422,668,790	100%

Additionally, ADM evaluated the Residential and Business Saver's Switch programs, providing independent verification of the per-unit kW Factor and total available demand reduction. The results of these evaluations are presented in

Table 1-3 below.

Table 1-3 Saver's Switch Evaluation Results

Sector	Peak kW Factor	# Units	Available Demand Reduction	kWh Savings
Residential	.87	1,552	1,346	29,442
Business	.57	199	113.4	1,747
Total	.83	1,751	1,459	31,189

The SPS portfolio exceeded net customer kWh savings targets in both residential and business sectors. The portfolio's performance against goals is summarized in Table 1-4 below.

Table 1-4 SPS Performance against Program-Year Goals

Sector	Net Customer kW		Net Customer kWh	
	Goal	Achieved	Goal	Achieved
Residential	4,279	5,069	21,000,156	20,068,214
Business	7,933	2,760	12,869,866	15,630,869

The SPS portfolio exceeded most goals. Where the program did not meet goals was in Business peak KW reduction. This is due in large part to there being no participation in the Interruptible Credit Option program, which as a large C&I Demand Response Program would provide a significant portion of the Business sector peak savings. The portfolio exceeded kWh goals by a significant margin, due to the successful implementation of the Business energy efficiency programs.

Finally, ADM estimated cost-effectiveness of the 2011 programs and overall portfolio using the Total Resource Cost (TRC) test and Program Administrator Cost (PAC) test. The results are provided in Table 1-5 below.

Table 1-5 Cost Effectiveness Testing by Program

Program	NPV of Benefits	NPV of TRC Costs	NPV of PAC Costs	TRC	PAC
Home Energy Services	$4,795,632	$1,774,150	$2,126,587	2.70	2.26
Home Lighting & Recycling	$6,190,588	$1,048,876	$969,275	5.90	6.39
Evaporative Cooling	$687,009	$43,459	$101,422	15.81	6.77
Low Income	$1,025,843	$346,853	$346,853	2.96	2.96
Refrigerator Recycling	$136,302	$117,416	$133,566	1.16	1.02
School Education Kits	$302,138	$111,245	$111,245	2.72	2.72
Electric Water Heating	$3,172	$3,400	$3,364	.93	.94
Energy Feedback	-	$115,389	$115,389	-	-
Business Lighting	$1,284,606	$303,410	$209,143	4.23	6.14
Business Cooling	$882,190	$329,048	$181,073	2.68	4.87
Business Custom	$339,447	$284,023	$266,690	1.20	1.27
Business Motors & Drives	$8,792,004	$1,386,969	$759,935	6.34	11.57
Small Business Lighting	$3,636,563	$1,716,120	$1,225,506	2.12	2.97
Residential Saver's Switch	$197,212	$495,088	$559,125	.40	.35
Business Saver's Switch	$15,864	$215,272	$234,121	.07	.07
Interruptible Credit Option	-	$1,975	$1,975	-	-
Planning & Research	-	$657,314	$657,314	-	-
Total:	$28,288,570	$8,950,007	$8,002,583	3.16	3.53

The SPS portfolio met cost-effectiveness requirements in 2011. However, three program failed to meet a TRC score of at least 1.0. Electric Water Heating fell below 1. Electric Water Heating was anticipated to fail to meet cost-effectiveness standards and

was cancelled mid-year. Due to low savings in prior years, this program was not evaluated in 2011.

Additionally, the Residential and Saver's Switch programs failed to reach a TRC score of 1.0. This is to be expected of load management programs in their first year of operation, however, in that there are exceedingly high upfront costs to implementing a load management program. With the participant pool recruited, the program costs drop markedly following the first year, as the prior-year installations do not require significant maintenance cost but contribute to program benefits year-over-year.

1.4 Recommendations

After completing evaluation of the 2011 SPS DSM Portfolio, ADM's recommendations for Technical Assumption Revisions are limited. The evaluated programs performed well, though ADM does recommend slight modification to the deemed savings for Pump-Off Controllers. These are a new prescriptive measure, and the deemed savings assumes an 80% time clock setting as the baseline. Based upon ADM's fieldwork, it is recommended that the baseline time clock setting be reduced to 70%.

The bulk of ADM's technical assumption revisions are focused on Net-to-Gross Ratios. ADM's recommendations for NTGRs are presented in Table 1-6 below.

Table 1-6 Tech Assumption Recommendations

Program	*NTGR from 2011 Tech Assumptions*	*NTGR from 2011 Evaluation*	*ADM Recommended NTGR*
Home Lighting & Recycling	83%	82%	80%
Business Lighting	80%	68%	75%
Business Cooling	85%	89.5%	85%
Business Motors & Drives	93%	95.8%	93%
Small Business Lighting	85%	99.4%	93%

Where ADM would recommend improvement, however, is in SPS' treatment of large projects constituting prescriptive measures. There are a small number of projects that provide the majority of SPS' business portfolio savings, and these projects are large enough in savings and in incentive dollars to warrant applying a custom M&V protocol even if the measures installed qualify as prescriptive. ADM recommends treating prescriptive projects as custom when:

- Lighting: the reduced connected load exceeds 150 kW
- Motors: treat VFD or motor controls projects as custom if a project meets one of three criteria:
    - A single drive of 200 HP or greater;
    - When multiple, smaller drives add up to 400 HP or greater; or

- Expected kWh savings of the project are 250,000 kWh or greater.

ADM found that the Business Motors tech assumptions consistently undervalued savings from VFDs in industrial process applications. Treating such projects as custom when they reach sufficient size will allow for more accurate estimation of savings and appropriate rebate amounts, with an effort level in accordance with the size of the project relative to SPS' overall business portfolio savings.

2. Program Descriptions

The SPS 2011 DSM portfolio contained eight residential and six non-residential programs. These programs are detailed in the subsections below

2.1 Home Energy Services

The Home Energy Services Program provides incentives to energy efficiency service providers (EESPs or "contractors") to install a range of residential upgrades to existing homes that save energy and reduce energy costs. Professionally trained technicians use field tested protocols and advanced diagnostic equipment to determine the most cost-effective energy savings measures appropriate for each home. Typical upgrade services include installing insulation in the attic; stopping heat loss around windows, doors, and other infiltration points; repairing leaky ducts; and installing high efficiency central air conditioning. In 2011, no central air conditioning replacements were rebated through the program.

2.2 Home Lighting & Recycling

The HLRP program provides upstream incentives to retailers for the sale of CFLs. The goal of the program is to buy down the retail price to $1-2 per bulb (varying by CFL type), in an effort to drive residential customers to replace incandescent lighting with high efficiency CFLs. Additionally, the program provides a mail-order option that allows for distribution to areas that may lack a participating retailer or a specialty bulb type. This program provides benefits to both retailers and customers in that:

- Retailers can achieve a higher sales volume without a reduction in profit margin, as the lost revenue from the price reduction is absorbed by SPS; and
- Customers can save money on their electric bills as well as in replacement costs, as typical lifetime for an incandescent bulb is roughly 1,000 hours, compared to an average lifetime of 8,000 hours for CFLs sold through this program

2.3 Business Comprehensive Program

SPS' business portfolio is disaggregated into separate programs by measure category. In this evaluation effort, these programs were aggregated into Business Comprehensive (the structure that the SPS business program offerings will have beginning 2012). As presently constituted, this includes:

Business Lighting Efficiency

SPS is offering the Lighting Efficiency to facilitate the implementation of cost-effective efficient lighting in non-residential facilities. This program is available to existing

nonresidential customers as well as new construction and offers prescriptive and custom incentives.

- Prescriptive incentives are offered on a per unit basis for lamps and fixtures for the following lighting types:

– Compact fluorescent

– T8 & T5 Fluorescent

– Ceramic Metal Halide

– Pulse-Start Metal Halide

– LED exit signs

- In addition to lamp and fixtures, prescriptive incentives are offered on a per-unit basis for the following measures:

– Occupancy Sensors

– Photocells

– T8 Delamping

- Custom incentives are determined based on the estimated amount of electrical energy and peak demand savings, calculated at rates per kWh for on peak or non-peak hour time frames.

Business Cooling Efficiency

The Business Cooling Efficiency Program (BCEP) is designed to help non-residential customers reduce their energy consumption by installing high efficiency cooling equipment. SPS is offering the Business Cooling Efficiency Program in New Mexico to facilitate the implementation of cost-effective cooling efficiency improvements in businesses. This program is available to existing nonresidential customers as well as new construction applications and offers prescriptive and custom incentives.

Prescriptive incentives are offered on a per-ton basis for common several classes of cooling equipment. These include the following:

– Condensing Units

– Split Systems

– Rooftop Units

– PTAC

– Water-Source Heat Pumps

– Chillers

– VAV Boxes

Custom incentives are available as well, and are determined based on the estimated amount of electrical energy and peak demand savings, calculated at rates per kWh for on peak or non-peak hour time frames.

Business Custom Efficiency

The Business Custom Efficiency Program (BCEP) is designed to help customers reduce their energy consumption by providing rebates for a wide variety of unique or unusual equipment and process improvements that are not covered by available prescriptive programs.. This program is available to existing nonresidential customers as well as new construction applications.

The measures covered by this program fall outside of the scope of other SPS business programs; Business Lighting Efficiency, Business Cooling Efficiency, and Business Motor & Drive Efficiency each have custom components in addition to prescriptive measures, and cover a large amount of custom measures.

Businesses can receive rebates of up to $400 per kW saved. Participants must receive pre-approval for a measure before installation. In an effort to expand this program, beginning in 2011 SPS is targeting customers with aggregated annual consumption greater than 10 GWh in order to increase awareness of the program. SPS intends to

- Increase awareness of energy conservation measures;
- Identify specific conservation opportunities;
- Drive customers to participate in existing prescriptive and customized rebate programs; and
- Drive customers to implement low-capital or short payback measures, even though they may not qualify for an implementation rebate under existing programs.

Business Motor Efficiency

SPS is offering the Business Motor & Drive Efficiency Program in New Mexico to facilitate the implementation of cost-effective energy efficiency improvements in businesses. This program is available to existing nonresidential customers as well as new construction applications and offers prescriptive and custom incentives.

- Prescriptive incentives are offered on a per HP or kW basis for the following measure types:

– 1-500 HP motors meeting or exceeding NEMA Premium Efficiency standards

– Variable frequency drives (VFDs)

– Constant speed motor controllers

– Energy efficient compressed air equipment upgrades

- No-loss air drains
    - Custom incentives are determined based on the estimated amount of electrical energy and peak demand savings, calculated at rates per kWh for on peak or non-peak hour time frames.

Businesses participating in the Motor & Drive Efficiency Program can receive:

- Cash incentives to help alleviate the costs of installing efficient motors/controls;
- Custom measures that address customers specific needs;
- Cost reductions in electricity bills; and
- Education via a motor inventory assessment.

In addition, participants will benefit from reduced downtime due to motor failure and lower maintenance expenses as NEMA Premium Efficiency Motors are manufactured with high quality materials and standards.

Small Business Lighting

SPS is offering the Small Business Lighting Program to facilitate the implementation of cost-effective efficient lighting in non-residential facilities with peak demand of up to 400 kW. This program is available to existing nonresidential customers and offers prescriptive and custom incentives. In addition, customers receive a free energy audit, with recommendations for lighting as well as other measures, including heating, cooling, ventilation, motors, and recommissioning of their existing equipment. The program provides outreach to small businesses, who traditionally have lower participation rates in utility-sponsored energy efficiency rebate programs than larger businesses.

- Prescriptive incentives are offered on a per unit basis for lamps and fixtures for the following lighting types:

- Compact fluorescent
- T8 & T5 Fluorescent
- Ceramic Metal Halide
- Pulse-start metal halide
- LED exit signs
    - In addition to lamp and fixtures, prescriptive incentives are offered on a per-unit basis for the following measures:

- Occupancy Sensors
- Photocells
- T8 Delamping

Custom incentives are determined based on the estimated amount of electrical energy and peak demand savings, calculated at rates per kWh for on peak or non-peak hour time frames.

3. General Methodology

This chapter details general impact evaluation methodologies by program-type as well as data collection methods applied. This chapter will present full descriptions of:

- Gross Savings Estimation;
- Sampling Methodologies;
- Free-Ridership determination; and
- Data Collection Procedures.

3.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, ADM provides a glossary of terms to follow:

- *Ex Ante* – A program parameter or value used by implementers/sponsoring utilities in estimating savings before implementation
- *Ex Post* – A program parameter or value as verified by ADM following completion of the evaluation effort
- *Deemed Savings* – A savings estimate for homogenous measures, in which an assumed average savings across a large number of rebated units is applied (e.g., assuming 398 kWh savings for a low-flow showerhead)
- *Gross Savings* – Energy or demand savings as determined through engineering analysis and verification
- *Gross Realization Rate* – Ratio of Ex Post Savings / Ex Ante Savings (eg. If ADM verifies 300 kWh per showerhead, Gross Realization Rate = 300/398 = 75%)
- *Free-Ridership* – Percentage of participants who would have implemented the same energy efficiency measures in a similar timeframe absent the program
- *Net Savings* – Gross savings factoring off free-ridership, (eg., if Free-Ridership for low-flow showerheads = 50%, net savings = 398 kWh x 50% = 199 kWh)
- *Net-to-Gross-Ratio (NTGR)* = (1 – Free-Ridership %), also defined as Net Savings / Gross Savings
- *Ex Ante Net Savings* = Ex Ante Gross Savings x Ex Ante Free-Ridership Rate
- *Ex Post Net Savings* = Ex Post Gross Savings x Ex Post Free-Ridership Rate
- *Net Realization Rate* = Ex Post Net Savings / Ex Ante Net Savings
- *Effective Useful Life (EUL)* – The average lifetime of a measure, denominated in years

- *Gross Lifetime kWh* = Ex Post Gross Savings x EUL
- *TRC* – Total Resource Cost Test, taking the ratio of net benefits over net costs, including both participant and utility costs

3.2 Overview of Methodology

ADM's methodology in the evaluation of the 2011 SPS DSM Portfolio is intended to provide:

- Net impact results at the 90% confidence and +/-10% precision level;
- Program feedback and recommendations via process evaluation; and
- Cost effectiveness testing at the program and portfolio level.

In doing so, ADM's evaluation will provide the NMPRC with verified net savings results, provide the sponsoring utilities with recommendations for program improvement, and ensure cost-effective use of ratepayer funds. By leveraging experience and lessons learned from impact evaluation of past program years, ADM has been able to expand upon the 2011 evaluation effort, in order to use the results of this impact evaluation to better inform SPS as to methods by which program and portfolio performance could be improved.

3.3 Sampling

Sampling is necessary to evaluate savings for the SPS DSM portfolio insomuch as verification of a census of program participants is typically cost-prohibitive. As per NMPRC requirements, samples are drawn in order to ensure 90% confidence at the +/-10% precision level. Programs are evaluated on one of three bases:

- Census of all participants
- Simple Random Sample
- Stratified Random Sample

3.3.1 Census of Participants

A census of participant data was used for select programs where such review is feasible. No SPS programs incorporated a census approach in their entirety, but some programs had a census approach to a subset of the analysis. For example, Residential Lighting was evaluated by reviewing the deemed savings calculations for a census of line items in the provided tracking data, ensuring that energy and demand savings for each rebated CFL were calculated appropriately.

3.3.2 Simple Random Sampling

For programs with relatively homogenous measures (largely in the residential portfolio), ADM conducted a simple random sample of participants. The sample size for

verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants. Coefficient of Variation (CV) is defined as:

$$CV(x) = \frac{Standard\ Deviation\ (x)}{Mean(x)}$$

Where x is the average kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of .5 in residential program evaluations. The resulting sample size is estimated at:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

With 10% required precision (RP), this calls for a sample of 68 for programs with a sufficiently large population. However, in some instances, programs did not have sufficient participation to make a sample of this size cost-effective. In instances of low participation, ADM then applied a finite population correction factor, defined as:

$$n = \frac{n_0}{1 + {}^{n_0}/_{N}}$$

Where

n_0 = Sample Required for Large Population

N = Size of Population

n = Corrected Sample

For example, if a program were to have only 100 participants, the finite population correction would result in a final required sample size of 41. ADM applied finite population correction factors in instances of low participation in determining samples required for surveying or onsite verification.

3.3.3 Stratified Random Sampling

For the SPS business portfolio, Simple Random Sampling is not an effective sampling methodology as the CV values observed in business programs are typically very high

because the distributions of savings are generally positively skewed. Often, a relatively small number of projects account for a high percentage of the estimated savings for the program.

For example, the 2011 SPS business portfolio had a CV of 4.53 at year's end. Using the base simple random sample function, this would call for a sample of 5,553. The 2011 portfolio had 269 participating facilities, and as such, a finite population adjustment is needed. Adjusting for the population, the required simple random sample is 257, which would be prohibitively expensive.

To address this situation, we use a sample design for selecting projects for the M&V sample that takes such skewness into account. With this approach, we select a number of sites with large savings for the sample with certainty and take a random sample of the remaining sites. To further improve the precision, non-certainty sites are selected for the sample through systematic random sampling. That is, a random sample of sites remaining after the certainty sites have been selected is selected by ordering them according to the magnitude of their savings and using systematic random sampling. Sampling systematically from a list that is ordered according to the magnitude of savings ensures that any sample selected will have some units with high savings, some with moderate savings, and some with low savings. Samples cannot result that have concentrations of sites with atypically high savings or atypically low savings. As a result of this methodology, the required sample for the SPS business portfolio was reduced to 28, with one certainty stratum and 4 sample strata.

3.3.4 Free-Ridership

In determining ex post net savings for the SPS DSM portfolio, ADM provides estimates of free-ridership for individual programs. Free-riders are program participants that would have implemented the same energy efficiency measures at nearly the same time absent the program. Rather than apply a binary scoring (0% vs. 100% free-ridership), ADM applied a free-ridership probability to program participants, based upon four factors:

(1) Financial ability to purchase high efficiency equipment absent the rebate

(2) Importance of the rebate in the decision-making process

(3) Prior planning to purchase high efficiency equipment

(4) Demonstrated behavior in purchasing similar equipment absent a rebate

In this methodology, Part (1) is essentially a gateway value, in that if a participant does not have the financial ability to purchase energy efficient equipment absent a rebate, the other components of free-ridership become moot. As such, if they could not have afforded the high efficiency equipment absent the rebate, free-ridership is scored at 0%. If they did have the financial capability, ADM then examines the other three components, each contributing an equal scoring of 33% to free-ridership. It should be noted that having financial ability does not necessarily imply free-ridership; it just opens

the possibility that other factors could contribute. A participant that was financially able to purchase high efficiency lighting, for example, could still be scored at 0% free-ridership if it is demonstrated that:

(1) The rebate factored into their decision-making process;

(2) They did not have prior plans to install high efficiency equipment before learning of the available rebates; and

(3) They did not demonstrate prior behavior of purchasing similar equipment absent a rebate.

There are other contributing factors to free-ridership, specifically in instances of programs that provide outreach to customers. For example, if in a large commercial retrofit, a sponsoring utility provides assistance in energy efficiency measure recommendation, or in providing cost-benefit analysis of a measure to a business, these could factor into the decision-making in ways that mitigate free-ridership, in that there are cases where a participant did not need a rebate to participate, but was induced to participate by the sponsoring utility's efforts in recommending and/or evaluating energy efficiency measures for them. Additional issues such as this are addressed on a program-by-program basis in methodology sections to follow.

For residential programs, free-ridership is calculated as the average score determined for the sample of participants surveyed. For business programs, a weighted average is taken of verified kWh savings, as the free-ridership scores of high-savers contribute a larger share of the overall free-ridership rate. Once free-ridership is determined, ADM then estimates the Net-to-Gross Ratio (NTGR), calculated as:

NTGR = 1 – % Free-Ridership

3.4 Data Collection

This subsection provides descriptions of ADM's data collection procedures, including:

- Telephone Surveying;
- Residential On-Site Verification; and
- Business On-Site Verification & Metering.

3.4.1 Telephone Surveying

ADM conducted a large volume of telephone surveys in evaluating the 2011 SPS DSM portfolio. These surveys were designed to collect a variety of data needed in the evaluation effort, including:

- Verification of installation of rebated equipment;
- Parameters used in gross savings calculations (room of installation for residential CFLs, whether a refrigerator was used indoors vs. outdoors, etc.);

- Data on decision-making to be used in determining program free-ridership; and
- Feedback from participants from their experiences with the program.

Table 3-1 below presents the total surveys conducted by program.

Table 3-1 Telephone Surveys by Program

Program	***Surveys***
Business Lighting Efficiency	22
Business Cooling Efficiency	5
Business Custom Efficiency	1
Business Motor & Drive Efficiency	36
Small Business Lighting	12
Home Energy Services	300
Home Lighting & Recycling	120
Total Surveys:	496

Surveys with business program participants, rebate consultancies, CFL distributing agencies, and trade allies were conducted by ADM staff. Surveys with residential program participants were conducted by Research America, an experienced survey firm, with ADM performing quality control checking on the survey programming and monitoring a sample of phone calls. This ensured that interviewers were adhering to the survey script and that all questions were read correctly.

3.4.2 Onsite Surveys

On-site data collection procedures varied by program. For residential programs, site visits constituted a verification inspection of rebated equipment. For business participants, ADM conducted onsite metering at facilities where factors contributing to energy savings, including lighting schedule and motor load factors, were subject to high uncertainty. Table 3-2 below provides a summary of on-site visits by program.

Table 3-2 Summary of Site Visits by Program

Program	***# Site Visits***
Business Lighting Efficiency	2
Business Cooling Efficiency	3
Business Custom Efficiency	2
Business Motor & Drive Efficiency	8
Small Business Lighting	13
Home Energy Services	25
Residential Saver's Switch	20
Business Saver's Switch	10
Total	83

4. M&V Methodologies

This section will present the M&V methodology for each evaluated program.

4.1 Residential & Business Saver's Switch

The Saver's Swtich programs provide incentives to SPS residential and business customers to have control switches installed on their air conditioning units, allowing SPS to curtail these units as needed during system critical peaks. During these events, the ACs are put into 50% cycling.

Demand reductions are evaluated metered data for a curtailed group with a baseline determined from adjusting usage on prior days. Reductions are calculated as:

$$Baseline\ kW = Mean\ kW(Baseline\ Days) * Offset\ Factor$$

Where,

Baseline Days = Three of the previous 5 non-weekend, non-holiday, non-event days displaying the highest average event-time load, and

Offset Factor = kW for the hour preceding curtailment / Average kW for this hour during baseline days

This is then translated to the entire population. What comes from these two methodologies is an "availability analysis", in which the in-season performance is multiplied by the number of installations at the end of the 2011 program year. This provides estimates of the value of the resource developed by the program implementation staff.

4.2 Home Energy Services

The M&V approach for the Residential Home Energy Services Program is aimed at the following:

- Verifying participation through participant surveying;
- Verifying post-retrofit duct leakage and infiltration at a sample of participants; and
- Providing estimates of net-to-gross savings and free-ridership.

Table 4-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 4-1 Data Sources for Gross Impact Parameters – Residential Home Energy Services

Parameter	***Source***
Home Specifications	Tracking Data & Onsite Verification
Post-installation Duct Leakage & Infiltration	On-site Measurement

4.2.1 Review of Deemed Savings Estimates

ADM reviewed the deemed savings estimates for measures rebated through the program in 2011. The deemed savings assumptions were based upon simulation models using weather from the Texas panhandle region, incorporating various home-specific characteristics, including:

- Heating/cooling type;
- Baseline & post retrofit duct leakage;
- Home square footage & number of stories; and
- Baseline & post retrofit Air Changes per Hour (ACH).

These values were verified based upon pre- and post-retrofit billing analysis of program participants.

4.2.2 Verification of Installed Measures

Verification of the weatherization measures installed was done in two steps;

- Review of the tracking data presented;
- Surveys of customers who installed rebated equipment; and
- On-site measurement of duct leakage and infiltration

On-Site Measurement Procedures

To measure duct leakage, ADM field staff performed duct pressurization testing (using Duct Blasters®) on the ducting for central air conditioning systems. System static pressure (SSP) on the duct system was first measured, where SSP is a measurement of static pressure at the supply side plenum of the duct system when the supply fan is on and operating with registers in their normal position. This pressure is unique for each system. The ducts were then pressurized by means of a Duct Blaster® connected to the return side of the system. Total duct leakage was measured with the registers

sealed and the Duct Blaster® pressurizing the duct system. Total Duct leakage at 50 Pa was then recorded.

An additional step was required to measure duct leakage to unconditioned space. A Blower Door® was set up in an exterior doorway and used to pressurize the house to the same pressure as the ducts. This prevented any leakage to other conditioned spaces within the residence; all leakage measured, once the home was pressurized, would therefore be only to unconditioned spaces. Duct leakage to unconditioned space was then measured at 25 Pa, where possible.

Finally, total home infiltration, measured in CFM, was calculated. One-time measurements of pressure differential between the conditioned and unconditioned space were taken to calculate a snap shot of total home infiltration, in CFM. However, this measurement of infiltration will not remain constant throughout the year, as it is a function of pressure differential between the interior and exterior of the home. As this pressure varies, with changing wind and outdoor temperatures, so will infiltration of the residence's envelope.

Data Review & Sampling

ADM reviewed tracking data for anomalous entries and to ensure that savings were calculated according to the methodologies outlined in SPS tech assumptions. Having validated the tracking data, we verified installation of rebated measures through telephone surveys with program participants.

The sample size for verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants, which is assumed at .5 based on our previous experience with residential weatherization rebate programs.

With 10% required precision (RP), this calls for a sample of 68. In order to provide greater accuracy in savings across varying measure types, ADM oversampled on surveying, completing a total of 300 participant interviews.

From this, a subset of 30 homes was visited for on-site measurement of duct leakage and infiltration. This was used to validate the values for these measurements listed n the program tracking database.

4.3 Home Lighting & Recycling

The SPS Residential Lighting Program provides rebates for CFLs through three channels:

- CFL Retail Coupons;
- CFL Retail Markdowns; and

- Direct Distribution Events.

The M&V approach for the Residential Lighting Program is aimed at the following:

- Verifying the numbers of CFLs purchased as a result of the program;
- Determining the percentage of purchased CFLs that are actually installed; and
- Estimating the extent to which installed CFLs are used.

Table 4-2 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 4-2 Sources for Gross Impact Parameters – Residential Lighting Program

Parameter	***Source***
CFL Quantities & Specifications	Program tracking data
Location of Installation	Telephone follow-up surveys with lighting purchasers
Hours of Use Per Day	California Residential Lighting Metering Study (KEMA, 2009)
CFL Installation Rate	Telephone follow-up surveys with lighting purchasers
Baseline Wattage	Manufacturer's specifications for lumen equivalence by CFL size & configuration

4.3.1 HLRP Review of Deemed Savings Estimates

ADM reviewed the deemed savings estimates used by SPS for the 2011 HLRP. ADM then surveyed 120 program participants, collecting customer feedback on the program. The survey provided other useful data, including:

- Rooms in which pre-existing CFLs were installed;
- Rooms in which newly purchased CFLs were installed;
- Customer feedback on the program;
- Insight into customer decision-making in purchasing CFLs; and
- Changes in customer behavior after having learned of the program.

4.3.2 HLRP Verification of Installation

ADM used follow-up surveys with 120 lighting purchasers to verify installation of CFLs. In these surveys, customers were asked how many of their purchased CFLs were installed, and where in their home they were installed. These values were used in calculating the installation rate of giveaway CFLs. Purchased CFLs are estimated at 96% installation, based upon the KEMA study, which determined that 4% of purchased CFLs are never installed..

4.3.3 HLRP - Net Savings Estimates

Evaluation of net savings from the RLP requires determination of free-ridership through participant surveying. ADM applies the general methodology described in Section 3.3.4, in separating free-ridership into four component parts: financial ability, prior planning, importance of the rebate in decision making, and the likelihood of installing similar equipment without a rebate. The components were addressed with questions detailed in the subsections to follow.

4.3.3.1 Prior Planning

Customers are asked as to any plans they had to purchase any CFLs, or if they had planned on purchasing fewer CFLs than they had intended to purchase after having learned of the rebate. This is addressed in the following questions:

> Question 8: Did you plan on purchasing CFLs prior to entering the store that day?
>
> Question 12: After learning of the available discount, did you purchase more CFLs than you otherwise would have? If so, how many more?

If the respondent indicates in Question 8 that they already planned on purchasing CFLs before entering the store that day, and answer "No" to Question 12, then the respondent is considered to have been planning to purchase the same quantity of CFLs with or without the rebate and is thus a partial free-rider.

4.3.3.2 Importance of Rebate in Decision Making

Once customers learn of the rebate, it is possible that this knowledge will sway their decision making process to install incandescent vs. CFL lamps. To address this, we examined responses to the following two questions:

> Question 10: Prior to learning of the program, how many CFLs did you have in your home?
>
> Question 14: Would you purchase CFLs if they cost twice as much per bulb?

If the respondent indicates that they would not have purchased any CFLs if they cost twice as much per bulb, they are not a free-rider on this component. Additionally, if the customer had no pre-existing CFLs in their home prior to this purchase, then they are considered to be likely to have been motivated by the SPS discount.

4.3.3.3 Likelihood of Installing Similar Equipment without Rebate

Finally, customers are asked whether they would have purchased CFLs if the rebate were not available. This is addressed with a series of questions:

> Question 11: If the CFLs were not discounted through the SPS program, how likely is it that you would purchase CFLs anyway?
>
> Question 14: After learning of SPS' discount, have you since purchased any CFLs that were not rebated through the program?

If the respondent indicates in Question 11 that they "definitely would have purchased" CFLs without a rebate, then they are considered to be a free-rider on this component. If they indicate that they "probably would have purchased" CFLs, their response to Question 14 is then examined. If the respondent states that they have purchased non-rebated CFLs after having learned of the SPS discount, then this responses are used in concert with their answer to Question 11 in determining that they are a free-rider on this component.

4.4 Business Lighting Efficiency

Evaluation of the Business Lighting Efficiency Program (BLEP) requires the following:

- Stratified random sampling, selecting large saving sites with certainty;
- Review of deemed savings parameters; and
- Onsite verification inspection, with metering in facilities where lighting runtime is uncertain;

Parameters required for evaluation of the BLEP are presented in Table 4-3 below.

Table 4-3 Data Sources for Gross Impact Parameters – Business Lighting Efficiency Program

Parameter	***Source***
Project Details	Program Tracking Data
Fixture Wattage Review	Manufacturer's Literature
Hours of Operation	Comparison of deemed values with CA DEER values, on-site metering for projects with uncertainty
HVAC Interactive Factors	Simulations of archetypical buildings using Roswell NM TMY weather data
Peak Coincident Factor	Review of deemed values, assignment of new values based upon facility operating hours should deemed values not provide accurate estimates
Effective Useful Life	Comparison against CA DEER values
Net-to-Gross Ratio (NTGR)	Participant Surveying

4.4.1 Business Lighting Efficiency Gross Savings Estimates

The 2011 BLEP encompassed lighting retrofits, occupancy sensors retrofits, and installation of high efficiency lighting as part of new construction projects. The subsections below present the savings calculation methodology for each of these measure types.

4.4.1.1 Gross Savings Methodology for High Efficiency Lighting Retrofits

To calculate annual savings from lighting retrofits, ADM applies the following equation:

$$Annual\ kWh\ Savings = (kW_{base} - kW_{post}) * Hours * HCEF$$

Parameters for this equation are defined in Table 4-4 below.

Table 4-4 Parameters for kWh Savings Calculation of Lighting Retrofit Measures

Parameter	Definition
kW_{base}	Total Baseline Fixtures x $W/Fixture_{base}$ / 1000W/kW
kW_{post}	Total Installed Fixtures x $W/Fixture_{post}$ / 1000W/kW
Hours	Annual Hours of Operation
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon n SPS-defined peak of 3:00 – 6:00 PM during the hottest summer weekdays. To provide the peak savings estimate for lighting, the facility's average runtime during the period of 3:00 – 6:00 PM on all summer weekdays was applied, in order to better reflect typical operation during the occurrence of a system peak. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for this equation are defined in Table 4-5 below.

Table 4-5 *Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures*

Parameter	Definition
kW_{base}	Total Baseline Fixtures x $W/Fixture_{base}$ / 1000W/kW
kW_{post}	Total Installed Fixtures x $W/Fixture_{post}$ / 1000W/kW
PCF	Peak Coincident Factor: % Time During Peak Period in Which Lighting is Operating
HCDF	Heating/Cooling Demand Interactive Factor

4.4.1.2 Gross Savings Methodology for High Efficiency Lighting in New Construction Applications

The 2011 BLEP provided rebates to three participating facilities for energy efficient lighting in new construction applications. These three facilities accounted for 97% of program-level savings. Calculations of savings for lighting in new construction applications differs from retrofits in that the baseline is denominated in W/ft^2 for the space type. This is to capture the reduction in Lighting Power Density (LPD) generated by the project. Annual savings from an LPD reduction are calculated as:

$$Annual\ kWh\ Savings = \left(\frac{kW}{ft^2}_{base} - \frac{kW}{ft^2}_{post}\right) * Hours * HCEF * ft^2$$

Parameters for this equation are defined in Table 4-6 below.

Table 4-6 Parameters for kWh Savings Calculation of Lighting New Construction Measures

Parameter	Definition
kW/ft^2_{base}	Baseline LPD as Set by Building Code or Industry Standard
kW/ft^2_{post}	Total Installed Fixtures x $W/Fixture_{post}$ / 1000W/kW / Sq. Ft.
Hours	Annual Hours of Operation
HCEF	Heating/Cooling Energy Interactive Factor
Ft^2	Square Footage of the Facility

In a manner similar to lighting retrofits, ADM then calculates peak savings for the measure. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = \left(\frac{kW}{ft^2}_{base} - \frac{kW}{ft^2}_{post}\right) * PCF * HCDF * ft^2$$

The parameters for this equation are defined in *Table 4-7* below.

Table 4-7 Parameters for Peak Demand (kW) Savings Calculation of Lighting New Construction Measures

Parameter	Definition
kW/ft^2_{base}	Baseline LPD as Set by Building Code or Industry Standard
kW/ft^2_{post}	Total Installed Fixtures x $W/Fixture_{post}$ / 1000W/kW / Sq. Ft.
PCF	Peak Coincident Factor: % Time During Peak Period in Which Lighting is Operating
HCDF	Heating/Cooling Demand Interactive Factor
Ft^2	Square Footage of the Facility

4.4.1.3 Gross Savings Methodology for Lighting Controls in Retrofit & New Construction Applications

The methodology to be detailed encompasses ADM's gross savings methodology for all lighting control measures, including:

- Occupancy Sensors;
- Photocell Controls; and
- Daylighting Controls;

The methodology for this measure does not differ between retrofit and new construction applications as in a new construction application, the measure is considered as a retrofit to the installed lighting. Annual kWh savings from lighting controls are calculated as follows:

$$Annual\ kWh\ Savings = (Hours_{base} - Hours_{post}) * kW_{post} * HCEF$$

This captures savings attributable to a reduction in operating hours as a result of the lighting controls. In instances where controls are installed alongside a lighting retrofit, savings from occupancy sensors are calculated using the installed kW of the energy efficient lighting, in order to account for disynnergies (i.e., a simultaneous lighting retrofit

and lighting control installation saves less than each of the two measures would have individually). ADM then calculated peak savings for lighting controls as:

$$Peak\ kW\ Savings = (PCF_{base} - PCF_{post}) * kW_{post} * HCDF$$

Savings from lighting controls are attributable to a reduction in the facility's Peak Coincident Factor, that is, after installation of lighting controls, the facility lighting operates for fewer hours within the 3:00 – 6:00 PM range.

4.4.2 Business Lighting Efficiency Net Savings Estimates

In evaluating the 2011 BLEP, ADM was tasked with providing net savings estimates. The net savings attributable to a program may differ from gross savings because of free-ridership. Free ridership impacts are the energy savings impact attributable to the installation of energy efficiency measures by participants who would have installed energy efficient lighting or lighting controls without the SPS rebate.

We used information collected through surveys of program participants to develop estimates of free-ridership. In these surveys, customers were questioned regarding their knowledge of energy efficiency, their reasons for participating, and the measure implementation decisions they would have made had they not participated in an IOU's program.

Our approach to estimating free-ridership using self-reported survey data has the following main features:

- We ask respondents two related sets of questions: (1) How much of the savings or measures would have been installed without the program, and (2) what was the likelihood that measures of the same or better efficiency would have been installed without the program. Using a combination of questions, we can derive the base value by filling in missing data with a hierarchy of responses.

- We use a variety of survey methods to help confirm the validity or consistency of responses provided to questions about free ridership. Asking related questions about the importance of incentives, prior plans to install, increases in efficiency and timing of investment allows examination of the consistency of self-reports on free ridership.

The factors are then combined to assign individuals a probability of free-ridership. The assignments are split into terciles, with respondents labeled as having a 0%, 33%, 67%, or 100% chance of free-ridership. The categories of free-ridership are detailed in the subsections to follow.

4.4.2.1 Financial Ability

For Part 1, customers were asked:

> Question 13: Would you have been able to install the measure without the financial incentive from SPS?

If the customer answered No to this, then they are assigned 0% free-ridership, as without the financial ability to purchase high efficiency lighting equipment, other factors in the decision making process cannot contribute to the decision making absent the available rebate. This value essentially serves as a free-ridership "gateway". Respondents that lacked financial ability are definitely not free-riders, but being financially able to install a measure is not sufficient to label as a free-rider.

4.4.2.2 Prior Planning

Following this, customers are asked as to any plans they had to install high efficiency lighting equipment. This is addressed in the following questions:

> Question 36: When did you learn of the lighting efficiency program?
>
> Question 15: Did you have plans to install the equipment before participating in the program?

If the respondent indicates that they did have prior plans, or that they had not learned of the program until after having selected the equipment, then they can be considered a partial-free rider on this component.

4.4.2.3 Importance of Rebate in Decision Making

Once customers learn of the rebate, it is possible that this knowledge will sway their decision making process to install standard vs. high efficiency lighting equipment. To address this, we examined responses to the following two questions:

> Question 5: How important was SPSs' rebate in your decision to buy high efficiency lighting equipment?
>
> Question 14: Before participating in the lighting efficiency program, had you installed any equipment similar to [Equipment/Measure] at your facility?

Question directly addresses the importance of the rebate, by having the respondent weigh its importance in the decision-making process for the project. Question 14 also addresses how important the rebate was to the decision making process as if the respondent had installed the same measure elsewhere at the facility then the rebate was likely not required to induce them to install the rebated project

4.4.2.4 Likelihood of Installing Similar Equipment without Rebate

Finally, customers are asked whether they would have installed high efficiency lighting equipment if the rebate were not available. This is addressed with four questions:

> Question 19: If the financial incentive from the lighting efficiency program had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?
>
> Question 20: How did availability of information and financial incentives through the lighting efficiency program affect the quantity (or number of units) of [Equipment/Measure] that you purchased and installed? Did you purchase and install more [Equipment/Measure] than you otherwise would have without the program?
>
> Question 21: How did availability of information and financial incentives through the lighting efficiency program affect the level of efficiency you chose for [Equipment/Measure] that you purchased and installed? Did you choose equipment that was more energy efficient than you otherwise would have chosen because of the program?
>
> Question 22: How did availability of information and financial incentives through the lighting efficiency program affect the timing of your purchase and installation of [Equipment/Measure]? Did you purchase and install more [Equipment/Measure] earlier than you otherwise would have without the program?

If the respondent indicates on Question 19 that they "Probably would have installed" or "Definitely would have installed" the same equipment without the rebate, their answers to the three questions to follow are examined. Questions 20-22 address whether the project was modified due to available rebates from the program. If the respondent indicates that they did not modify the project, then they are likely a free-rider on this component. If they had modified the project, then that is an indicator that the program did affect their decision making, even if this runs counter to their response in Question 19.

4.4.2.5 Assignment of Free-Ridership and Partial Free-Ridership Scores

Based upon the answers to these four categories of questions, the respondents are placed in Free-Ridership Terciles, with scores of 0%, 33%, 67%, and 100% Free-Ridership. The scoring is based upon all possible interactions between the four questions. Part 1 of free-ridership, Financial Ability, essentially serves as a gateway; if it does not equal "Yes" then other aspects of free-ridership are irrelevant. Table 4-8

below presents the associated free-ridership score for each permutation of answers in the four free-ridership components/.

Table 4-8 Free-Ridership Scoring

Financial Ability	*Prior Planning*	*Rebate Was Important*	*Likely to Install w/o Rebate*	*Aggregated Category*	*Free-Ridership Score*
Y	N	N	Y	YNNY	.67
Y	N	N	N	YNNN	.33
Y	N	Y	Y	YNYY	.33
Y	N	Y	N	YNYN	0
Y	Y	N	Y	YYNY	1
Y	Y	N	N	YYNN	.67
Y	Y	Y	Y	YYYY	.67
Y	Y	Y	N	YYYN	.33
N	N	N	Y	NNNY	0
N	N	N	N	NNNN	0
N	N	Y	Y	NNYY	0
N	N	Y	N	NNYN	0
N	Y	N	Y	NYNY	0
N	Y	N	N	NYNN	0
N	Y	Y	Y	NYYY	0
N	Y	Y	N	NYYN	0

4.5 Business Cooling Efficiency

Evaluation of the Business Cooling Efficiency Program (BCEP) requires the following:

- Stratified random sampling, selecting large saving sites with certainty;
- Review of deemed savings parameters;
- Onsite verification inspections;
- DOE-2 Simulation of large, complicated retrofits and use of Equivalent Full Load Hours (EFLH) values for smaller projects.

Parameters required for evaluation of the BCEP are presented in Table 4-9 below.

Table 4-9 Data Sources for Gross Impact Parameters – Business Cooling Efficiency Program

Parameter	Source
Project Details	Program Tracking Data
Facility Billing Data (For Calibration of Large Retrofit Simulation Models)	SPS
Equipment Specifications (Size, Efficiency, etc.)	Manufacturer's Literature
Equivalent Full-Load Hours (EFLH)	SPS Deemed values, reviewed by ADM through simulation of archetypical facilities with Roswell NM TMY Weather Data
Effective Useful Life	Comparison against CA DEER values
Net-to-Gross Ratio (NTGR)	Participant Surveying

4.5.1 Business Cooling Efficiency Gross Savings Estimates

As stated above, gross savings estimates for facilities participating in the 2011 BCEP are evaluated by one of two methodologies:

- Calibrated DOE-2 simulation, for large retrofits; and
- Equivalent Full Load Hour calculations for smaller retrofits.

4.5.1.1 DOE-2 Simulation Modeling

In evaluating the 2011 BCEP, ADM performed DOE-2 simulation modeling of one participating facility, using eQuest software. This facility implemented a large chiller retrofit and accounted for 48% of program savings.

Before making the analytical runs for each sample site with HVAC measures, we prepare a Model Calibration Run. This is a base case simulation to ensure that the energy use estimates from the simulations have been reconciled against actual data on the building's energy use. This run is based on the information collected in an on-site visit pertaining to types of equipment, their efficiencies and capacities, and their operating profiles. Current operating schedules are used for this simulation, as are local weather data covering the study period. The Model Calibration Run is made using actual weather data for a time period corresponding to the available billing data for the site.

The goal of the model calibration effort is to have the results of the DOE-2 simulation come within approximately 10% of the patterns and magnitude of the energy use observed in the billing data history. In some cases, it may not be possible to achieve this calibration goal because of idiosyncrasies of particular facilities (e.g., multiple buildings, discontinuous occupancy patterns, etc.).

Once the analysis model has been calibrated for a particular facility, there are three steps in our procedure for calculating estimates of energy savings for HVAC measures installed or to be installed at the facility.

- First, we perform an analysis of energy use at a facility under the assumption that the energy efficiency measures are not installed.
- Second, we analyze energy use at the facility with all conditions the same but with the energy efficiency measures now installed.
- Third, we compare the results of the analyses from the preceding steps to determine the energy savings attributable to the energy efficiency measure.

Following this, ADM determines peak kW savings by examining the reduction observed in the summer peak provided in the Typical Meteorological Year (TMY) dataset. The time picked is set to match the conditions under which SPS observes its typical system peaks.

4.5.1.2 EFLH Calculations

For simpler cooling measures, including Package Terminal Heat Pumps (PTHPs) and Roof Top Units (RTUs), ADM applies deemed EFLH values along with specifications of installed capacity and efficiency in evaluating savings. The general form through which kWh savings are calculated in this manner is:

Parameters for this equation are defined in Table 4-10 below.

Table 4-10 Parameters for kWh Savings Calculation of HVAC Retrofits

Parameter	***Definition***
#Units	Quantity of Rebated HVAC Units
Cap	Unit Capacity (Measured in Tons)
$SEER_{base}$	Baseline SEER
$SEER_{Post}$	Installed SEER
EFLH	Equivalent Full Load Hours (Encompassing both heating and cooling hours in cases of heat pumps)

EFLH values are provided in SPS' technical assumptions for business cooling measures. ADM tests these values via DOE-2 simulation modeling of archetypical building types using Roswell NM TMY weather data, and revises EFLH by facility type where appropriate. Following this, ADM calculates peak kW savings by the following equation:

EER is used in peak demand calculations as it reflects unit efficiency during peak weather conditions.

4.5.2 Business Cooling Efficiency Net Savings Estimates

Net savings for the BCEP are estimated in the same manner as detailed in Section 4.4.2 for the Business Lighting Efficiency Program.

4.6 Business Custom Efficiency

The Business Custom Efficiency Program provides incentives for measures that fall outside the scope of other SPS programs. Measures rebated through the Custom Efficiency Program in 2011 include:

- Pump-Off Controllers for Oil Well Applications; and
- Custom HVAC controls

Gross savings analyses for these measures are inherently project-specific, and as such the subsections to follow will detail how savings for each measure type were calculated.

4.6.1 Gross Savings for Pump-Off Controllers

The 2011 BCEP provided two rebates to one customer for the installation of SAMS Pump-Off Controllers on oil well pumps. The wells were considered retrofit with a time clock baseline. Later in the program year, prescriptive protocols were developed for this measure and it was added to the Business Motors Efficiency Program.

In order to calculate the annual energy savings attributed to the installation of the pump-off controllers, ADM relied on a sample of pre and post power monitoring to obtain typical operating profiles. When pre and post monitoring were available, annual savings estimates were determined by extrapolating pre and post monitoring periods to a typical year profiles. Annual energy savings were calculated by subtracting the as-built annual profile from the baseline annual profile.

At a small percentage of the oil well locations, pre-power monitoring was unavailable due to the pump-off controllers already being installed. In these instances ADM used pre-monitoring data from metered wells, normalized to the following well characteristics:

- Nipple depth;
- Motor Horsepower; and
- Motor Efficiency.

This allowed ADM to extrapolate the baseline profile of the well at hand. Annual energy savings were calculated by subtracting the as-built annual profile from the baseline annual profile.

4.6.2 Gross Savings for Custom HVAC Controls

The 2011 BCEP rebated three projects that included installation of HVAC controls that control the staging of the units to ensure that the units never run in full coincidence as

well as providing nighttime and weekend thermostat setback. These projects were evaluated through billing analysis, through which ADM determined HVAC load prior to retrofit and then calculated savings from the setback controls.

4.6.3 Business Custom Efficiency Net Savings Estimates

Net savings for the Business Custom Efficiency Program are estimated in the same manner as detailed in Section 4.4.2 for the Business Lighting Efficiency Program.

4.7 Business Motor & Drive Efficiency

Evaluation of the Business Motor & Drive Efficiency Program (BMEP) requires the following:

- Stratified random sampling, selecting large saving sites with certainty;
- Review of deemed savings parameters; and
- Onsite verification inspections;

Parameters required for evaluating savings from the BMEP are detailed in Table 4-11 below.

Table 4-11 Data Sources for Gross Impact Parameters – Business Motor & Drive Efficiency Program

Parameter	***Source***
Project Details	Program Tracking Data
Load Factor	SPS deemed values & one-time readings for simple applications, power metering for larger, complicated applications.
Equipment Specifications (Size, Efficiency, etc.)	Manufacturer's Literature
Equivalent Full-Load Hours for HVAC Pumps & Ventilation Fans (EFLH)	SPS Deemed values, reviewed by ADM through simulation of archetypical facilities with Roswell NM TMY Weather Data
Hours of Operation for Industrial Motors & Drives	SPS deemed values for simple applications, end-use metering & facility staff interviews for complicated applications
Effective Useful Life	Comparison against CA DEER values
Net-to-Gross Ratio (NTGR)	Participant Surveying

4.7.1 Business Motor & Drive Efficiency Gross Savings Estimates

The 2011 BMEP provided rebates to participating facilities for projects including:

- NEMA Premium Efficiency Motors;

- Pump-Off Controllers (POCs);
- Variable Frequency Drives (VFDs) for Air Handler Units (AHUs) in HVAC Applications; and
- VFDs in industrial pumping applications.

4.7.1.1 Gross Savings for NEMA Premium Efficiency Motors

Savings from NEMA Premium Efficiency Motors are calculated as:

$$Annual\ kWh\ Savings = HP \times LF \times .746\ {}^{kW}/_{HP} * \left(\frac{1}{Eff_{std}} - \frac{1}{Eff_{prem}}\right) * Hrs$$

Parameters for this equation are detailed in Table 4-12 below.

Table 4-12 Parameters for kWh Savings Calculation of Premium Efficiency Motor Retrofits

Parameter	Definition
HP	Motor Horsepower
LF	Load Factor
Eff_{std}	Efficiency Rating of a Standard Efficiency Motor of the Specified HP
Eff_{prem}	Efficiency Rating of a Premium Efficiency Motor of the Specified HP
Hrs	Hours of Operation Per Year

Following this, peak demand (kW) reduction is calculated. Peak Coincident Factors for NEMA Premium Efficiency Motors are taken from SPS technical assumptions, which ADM determined to be reasonable estimates of PCF. Demand savings are calculated as:

$$Peak\ kW\ Savings = HP \times LF \times .746\ {}^{kW}/_{HP} * \left(\frac{1}{Eff_{std}} - \frac{1}{Eff_{prem}}\right) * PCF$$

4.7.1.2 Gross Savings for HVAC VFDs

Savings from VFDs are calculated as:

$$Annual\ kWh\ Savings = HP \times LF \times .746\ {}^{kW}/_{HP} * \left(\frac{1}{Eff_{std}}\right) * Hrs * \%_{Savings}$$

Parameters for this equation are detailed in Table 4-13 below.

Table 4-13 Parameters for kWh Savings Calculation of Premium Efficiency Motor Retrofits

Parameter	Definition
HP	Motor Horsepower
LF	Load Factor
Eff_{std}	Efficiency Rating of a Standard Efficiency Motor of the Specified HP
Hrs	Hours of Operation Per Year
$\%_{savings}$	Average Savings Achieved by the VFD

Following this, peak demand (kW) reduction is calculated. Peak Coincident Factors for VFDs are taken from SPS technical assumptions, which ADM determined to be reasonable estimates of PCF. Demand savings are calculated as:

$$Peak\ kW\ Savings = HP \times LF \times .746\ {}^{kW}/_{HP} * \left(\frac{1}{Eff_{std.}} - \right) * \%_{savings} * PCF$$

4.7.1.3 Gross Savings for VFDs in Industrial Applications

The 2011 BMEP had numerous participants install VFDs on industrial pumps. These applications included mining, oil pumping, and food processing. Typically, ADM treated these projects as custom, in that savings were calculated from end-use monitoring. Such sites were large savers, and in the sample frame were certainty sites, making the analysis constitute a one-off "case study".

4.7.2 Business Motor & Drive Efficiency Net Savings Estimates

Net savings for the Business Motor & Drive Efficiency Program are estimated in the same manner as detailed in Section 4.4.2 for the Business Lighting Efficiency Program.

4.8 Small Business Lighting

The Small Business Lighting Program (SBLP) provides rebates to customers for energy efficient lighting & controls measures, similar to the manner that the standard Business Lighting Efficiency Program provides them. The program differs in having SPS trade allies providing outreach to recruit businesses to the program, as small business customers are traditionally unlikely to participate in standard rebate programs. Gross and net savings for the SBLP are evaluated in the same manner as detailed for the Business Lighting Efficiency Program in Section 4.4..

4.9 Cost Effectiveness Testing

In evaluating the 2011 SPS DSM Portfolio, ADM performed cost-effectiveness testing at the program and portfolio levels. ADM performed a series cost-effectiveness tests,

including, Total Resource Cost (TRC), Utility Cost (PC), Participant Cost (PC), and Ratepayer Impact (RIM) tests.

4.9.1 Total Resource Cost Test

The TRC value is defined as:

$$TRC = \frac{\text{Electric Cost Decrease} + \text{Capacity Credit} + \text{NonElectric Cost Decrease}}{\text{Net Customer Investment} + \text{Utility Administrative Costs}}$$

The parameters for this equation are defined in Table 4-14 below.

Table 4-14 Parameters for TRC Testing

Parameter	Definition
UEPCD	Utility Electric Cost Decrease: The Net Present Value (NPV) of avoided production costs. Estimated by taking NPV of net kWh savings multiplied by $/kWh production costs over the life of the measure.
UGCC	Utility Generation Capacity Credit: The NPV of avoided capacity expansion costs. Estimated by taking NPV of net demand reduction multiplied by $/kW capacity expansion costs over the life of the measure.
NEACD	Non-Electric Acquisition Cost Decrease: NPV of gas savings created incidentally by electric DSM programs (from measures such as weatherization, low-flow showerheads, etc.). Estimated by taking NPV of net Therms savings multiplied by $/Therm of gas production/distribution by gas utilities serving the SPS territory.
NCI	Net Customer Investment: Net incremental costs accrued by program participants. Estimated by taking total measure-level incremental costs and multiplying by Net-to-Gross Ratio, as costs paid by free-riders would have occurred absent the program. For give-away programs, the incremental cost of equipment paid by the utility is substituted for this value as participant costs are $0 in such programs.
UAC	Utility Administrative Costs: Costs accrued by SPS for running the program. Costs include internal administration costs, marketing, and third-party implementation costs. Rebates are not considered a cost as they represent transfer payments from SPS to program participants.

4.9.2 Utility Cost Test

The PAC test is defined as:

$$PAC = \frac{\text{Electric Cost Decrease} + \text{Capacity Credit} + \text{NonElectric Cost Decrease}}{\text{Utility Equipment Expenditures} + \text{Utility Administrative Costs}}$$

Most terms in this equation are defined and calculated in the same manner as the components of the TRC test. Where the UC test differs, however, is in costs applied. The TRC test treats rebates as a transfer payment; it is simultaneously a cost to the utility and a benefit to the participant, and as such its impact ton TRC is neutral. The UC is focused on the costs the sponsoring utility incurs in running a program, and as such rebate payments are included in the cost side of the equation. Net Customer Investment (NCI) is not factored in, as this cost is external to the utility. In giveaway programs, such as the School Education Kits program, Utility Equipment Expenditures (UEE) will be equal in value to NCI, as the “rebate” (100% of the measure incremental cost) is paid in full by the utility, and thus the NCI is paid by SPS.

5. Impact Results by Program

This chapter provides a summary of the evaluation results for each program and recommendations by ADM for the 2011 program year.

5.1 Residential Saver's Switch

ADM estimated the available critical peak reduction from the Residential Saver's Switch (RSS) by analysis of metered data from the curtailment group on all event days in 2011. The analysis was conducted with a sample of 79 metered units. Monitoring equipment was deployed by contractors on behalf of SPS. The sample was drawn by ADM, and ADM staff rode along for 20 residential installations to ensure proper procedures were adhered to.

5.1.1 Residential Event Summaries

ADM calculated hourly kW reductions for all hours of all events in 2011. Table 5-1 below summarizes the average hourly per-unit kW reductions for this group by event.

Table 5-1 Hourly kW Reductions by Event

Date	1:00 – 2:00 PM	2:00 – 3:00 PM	3:00 – 4:00 PM	4:00 – 5:00 PM	5:00 – 6:00 PM	6:00 – 7:00 PM
July 12th	-	.72	.80	.84	-	-
Jul7 18th	-	.66	.72	.75	.67	-
July 19th	-	.95	1.10	1.05	.91	-
July 22nd	-	.81	1.04	1.06	1.01	-
July 27th	-	.66	.80	.84	.69	-
August 23rd	.56	.49	.60	.64	.69	.41
August 24th	-	.75	.83	.90	.85	-
August 30th	.61	.69	.76	.73	.73	-
Average:	.59	.72	.83	.85	.79	.41

Figure 5-1 through Figure 5-8 below present the load shapes for each event day for the 2011 Residential Saver's Switch Program.

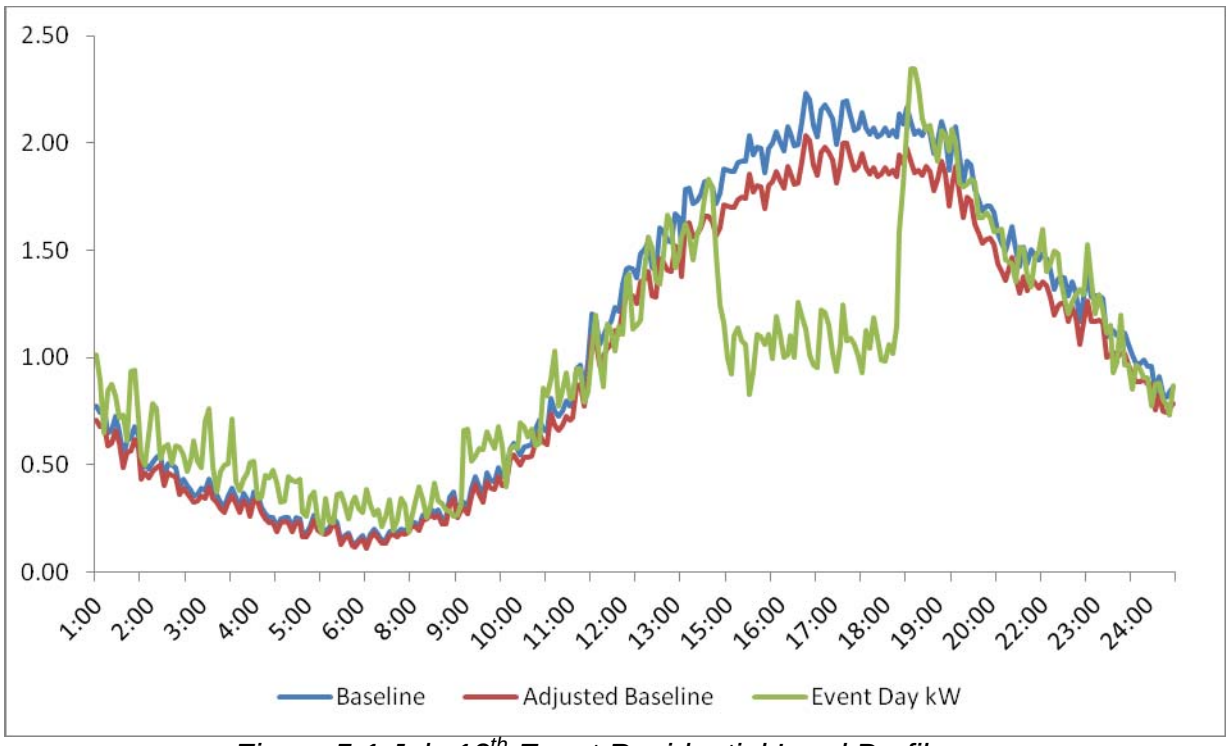


Figure 5-1 July 12th Event Residential Load Profile

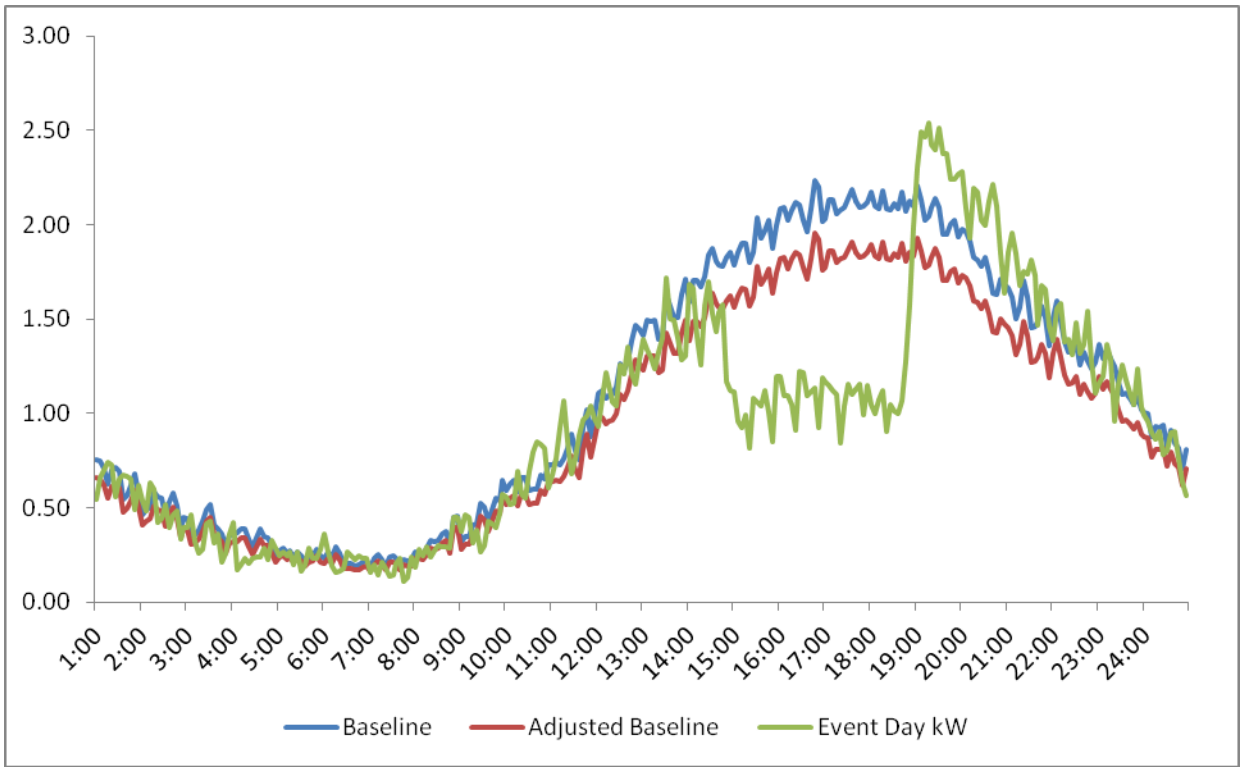


Figure 5-2 July 18th Event Residential Load Profile

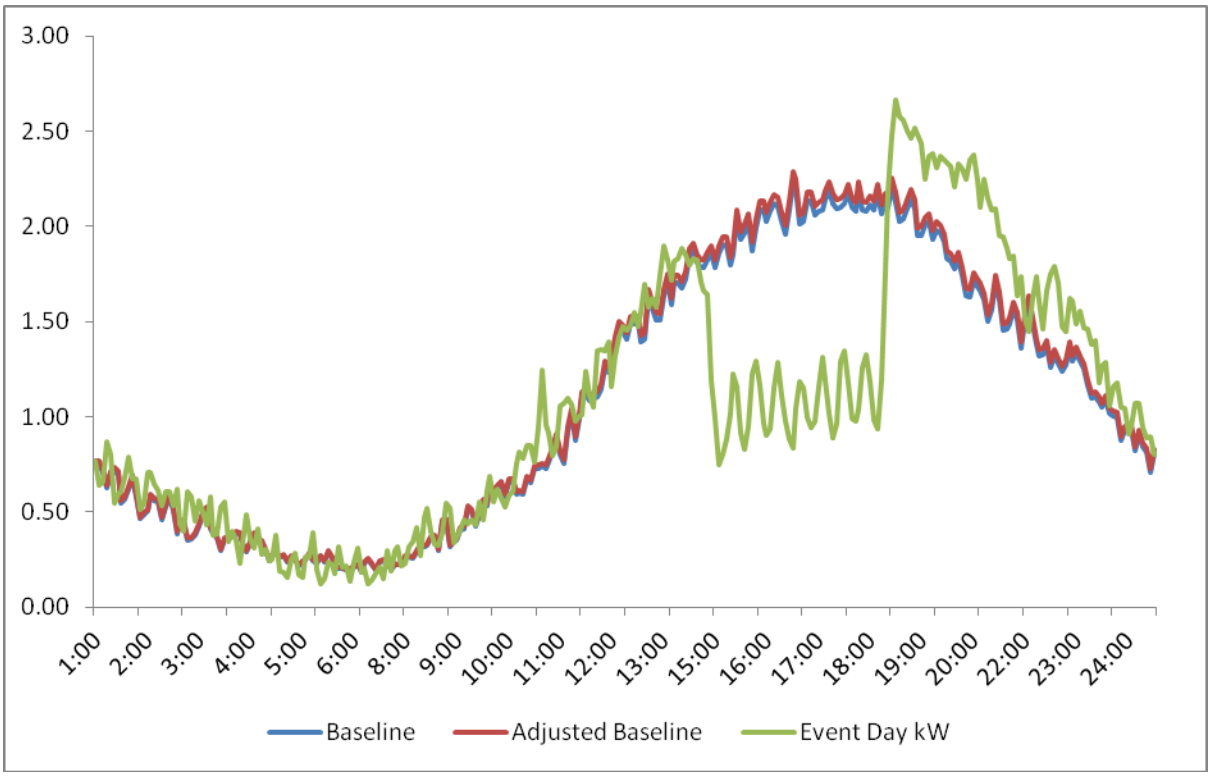


Figure 5-3 July 19th Event Residential Load Profile

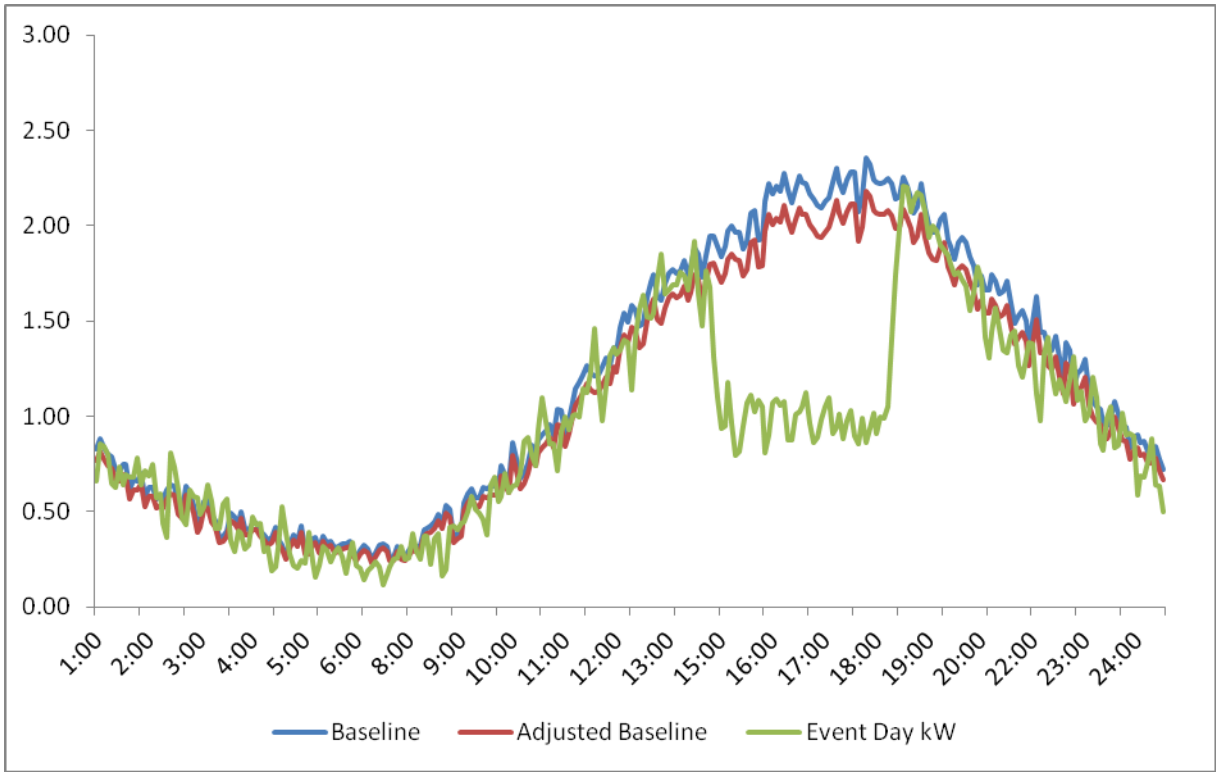


Figure 5-4 July 22nd Event Residential Load Profile

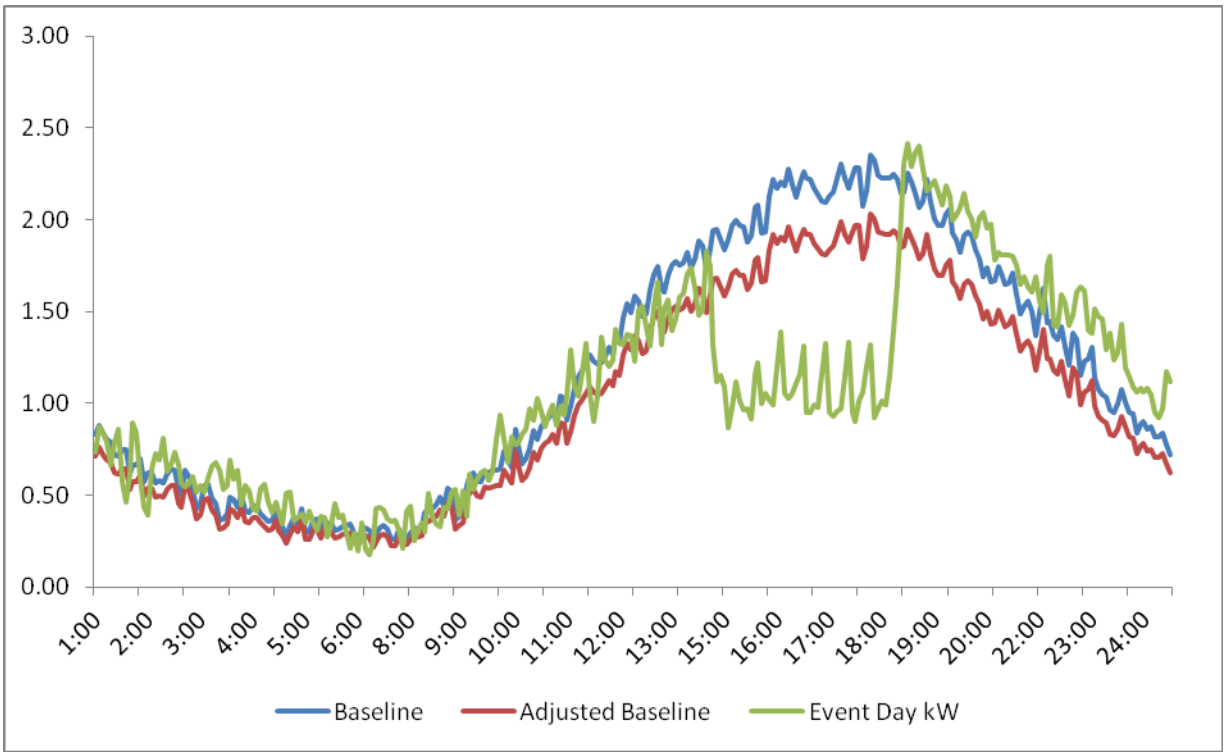


Figure 5-5 July 27th Event Residential Load Profile

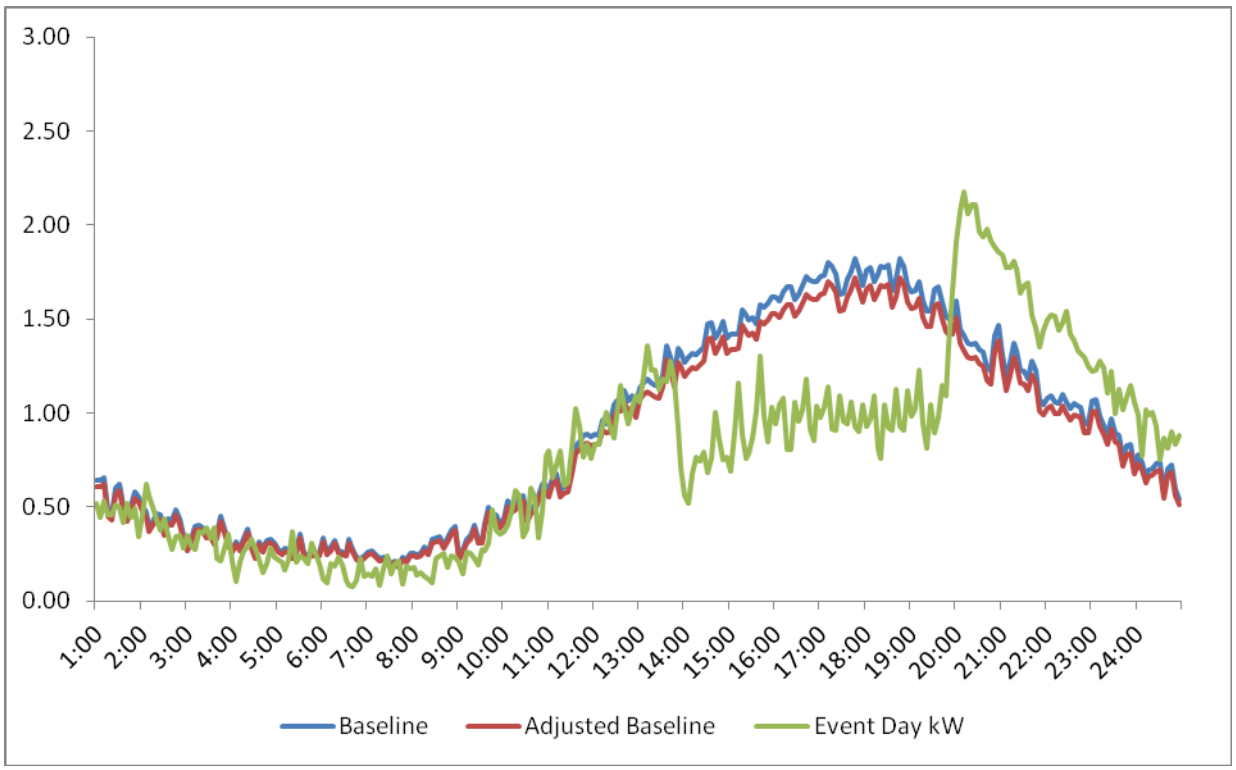


Figure 5-6 August 23rd Event Residential Load Profile

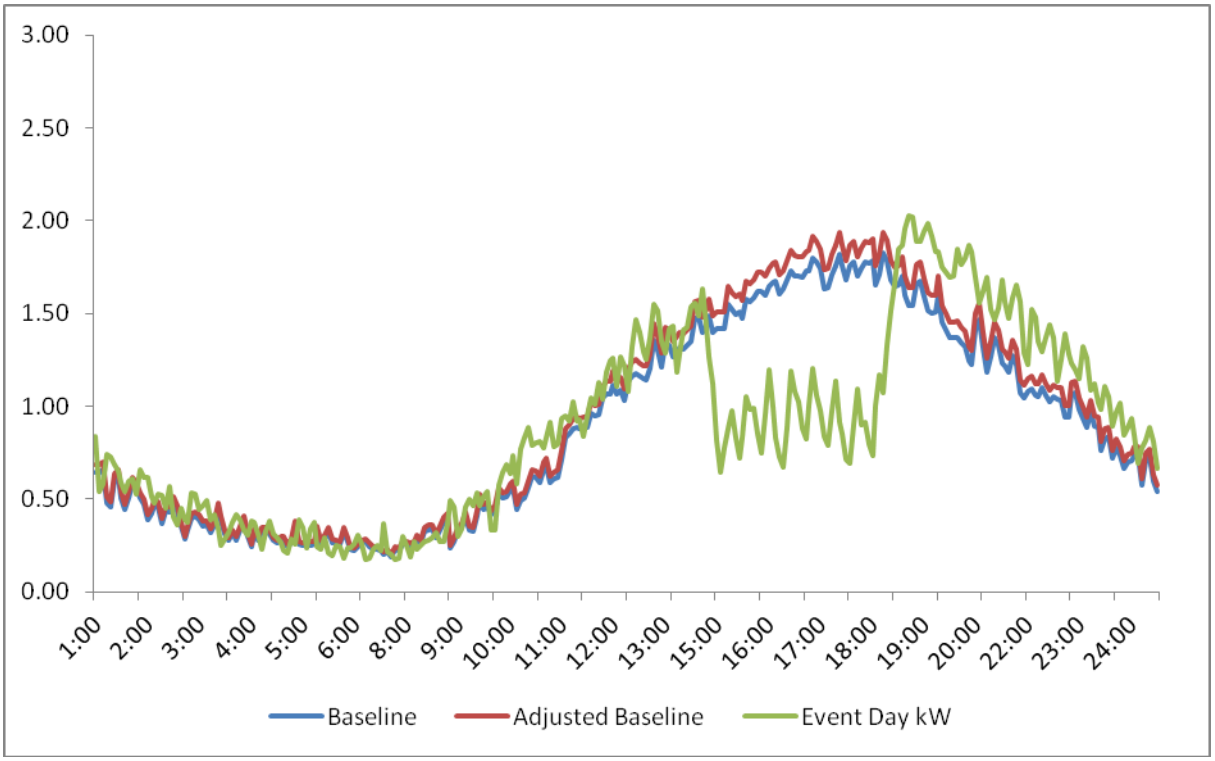


Figure 5-7 August 25th Event Residential Load Profile

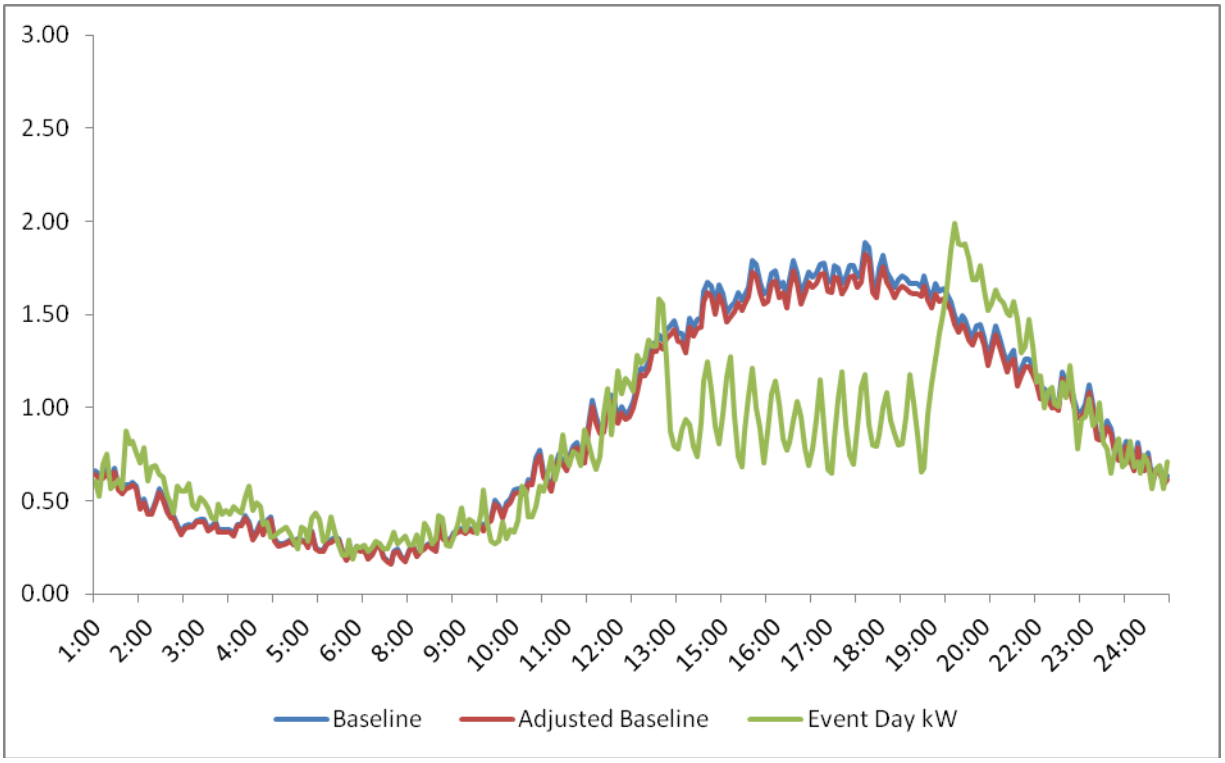


Figure 5-8 August 30th Event Residential Load Profile

5.1.2 kWh Savings

Though RSS is a load-shifting program, it can provide overall kWh savings. To calculate savings, ADM calculated two values for each event:

(1) kW Factor; and

(2) Snapback Factor.

These factors were determined as follows:

Reduction Factor:

The Reduction Factor is taken as the sum of kW reductions across all hours of the event.

Snapback Factor:

Snapback Factors are the sum of kW/Ton differences between the curtailment and control groups for the three hours following the end of a curtailment event.

These three factors are then summed to develop the kWh Factor. kWh savings for an event are then calculated as:

This is repeated for all eight events in the season. The resulting savings from each event are summarized in Table 5-2 below.

Table 5-2 Residential Saver's Switch kWh Savings

Event Date	Reduction Factor	Snapback Factor	kWh Factor	Units	kWh Savings
July 12th	2.35	.36	2.71	1,552	4,206
Jul7 18th	2.80	-1.45	1.35	1,552	2,095
July 19th	4.01	-1.44	2.57	1,552	3,989
July 22nd	3.91	-.12	3.79	1,552	5,882
July 27th	2.99	-1.60	1.39	1,552	2,157
August 23rd	3.40	-1.90	1.5	1,552	2,328
August 24th	3.32	-.98	2.34	1,552	3,632
August 30th	3.52	-.20	3.32	1,552	5,153
				Total:	29,442

5.1.3 Residential Saver's Switch Performance Summary

To quantify the available demand reduction from the RSS, ADM took the maximum kW reduction observed for each event and averaged these values across events. The resulting available reduction from the RSS is presented in Table 5-3 below.

Table 5-3 Residential Saver's Switch Performance Results

Measure	*Value*
Average Per-Unit Peak kW Reduction	.867
Number of Units	1,552
Peak kW Reduction	1,346
kWh Savings	29,442

5.2 Business Saver's Switch

ADM estimated the available critical peak reduction from the Business Saver's Switch (BSS) in the same manner as for the Residential component. A sample of 50 units was developed by ADM, and though SPS contractors installed the monitoring equipment, ADM staff were present at 10 business installations in order to ensure that proper procedures were adhered to.

5.2.1 Business Event Summaries

ADM calculated hourly kW reductions for all hours of all events in 2011. Table 5-4 below summarizes the average hourly per-unit kW reductions for this group by event.

Table 5-4 Hourly kW Reductions by Event

Date	*1:00 – 2:00 PM*	*2:00 – 3:00 PM*	*3:00 – 4:00 PM*	*4:00 – 5:00 PM*	*5:00 – 6:00 PM*	*6:00 – 7:00 PM*
July 12th	-	.91	.90	.90	-	-
Jul7 18th	-	.68	.56	.46	.25	-
July 19th	-	.92	.88	.82	.35	-
July 22nd	-	.36	.46	.54	.36	-
July 27th	-	.35	.34	.44	.22	-
August 23rd	.20	.22	.27	.30	.25	.08
August 24th	-	.28	.34	.20	.03	-
August 30th	.11	.21	.43	.33	.33	-
Average:	.16	.49	.52	.50	.26	.08

Figure 5-9 through Figure 5-16 below present the load shapes for each event day for the 2011 Residential Saver's Switch Program.

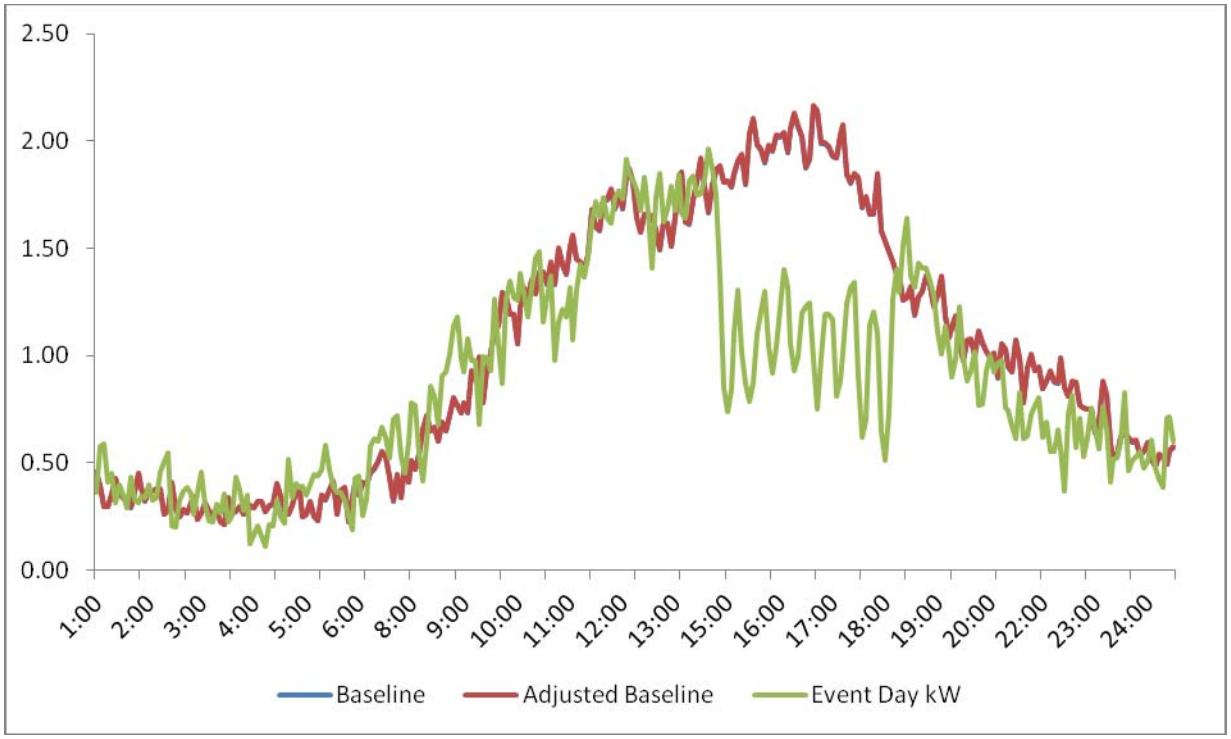


Figure 5-9 June 12th Event Business Load Profile

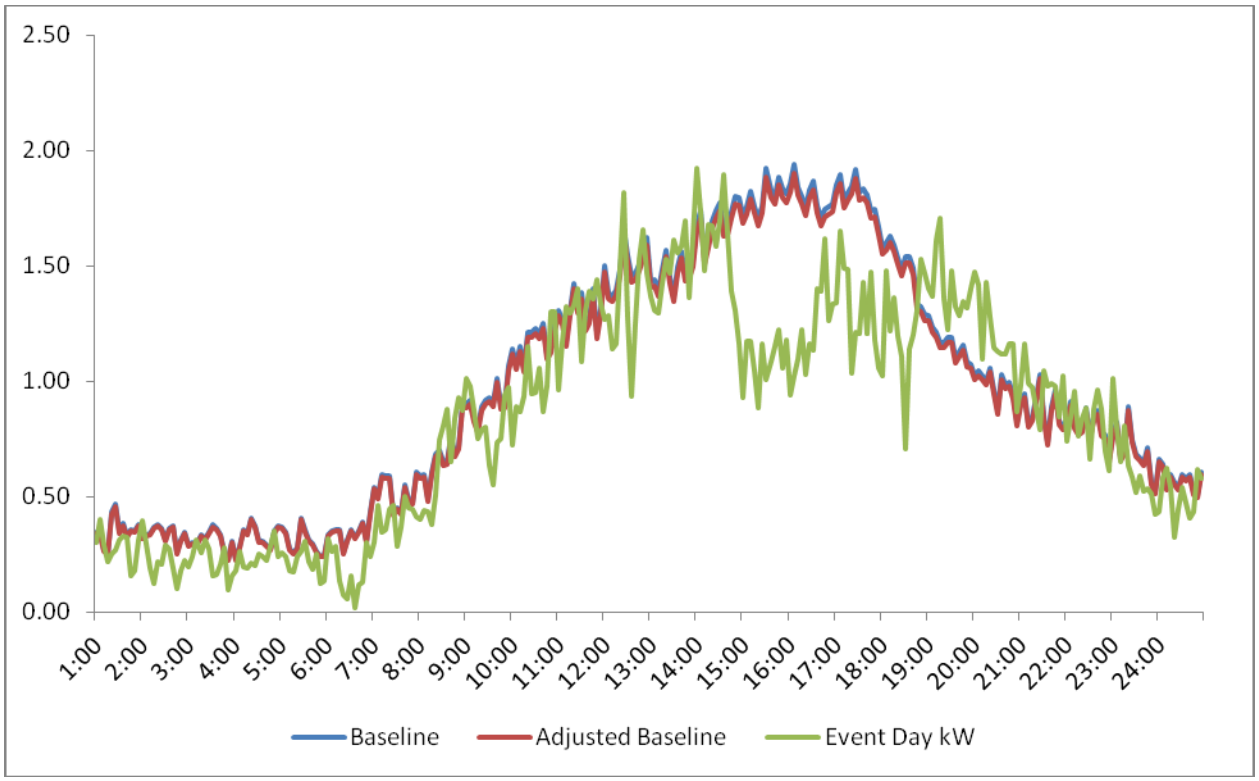


Figure 5-10 July 18th Event Business Load Profile

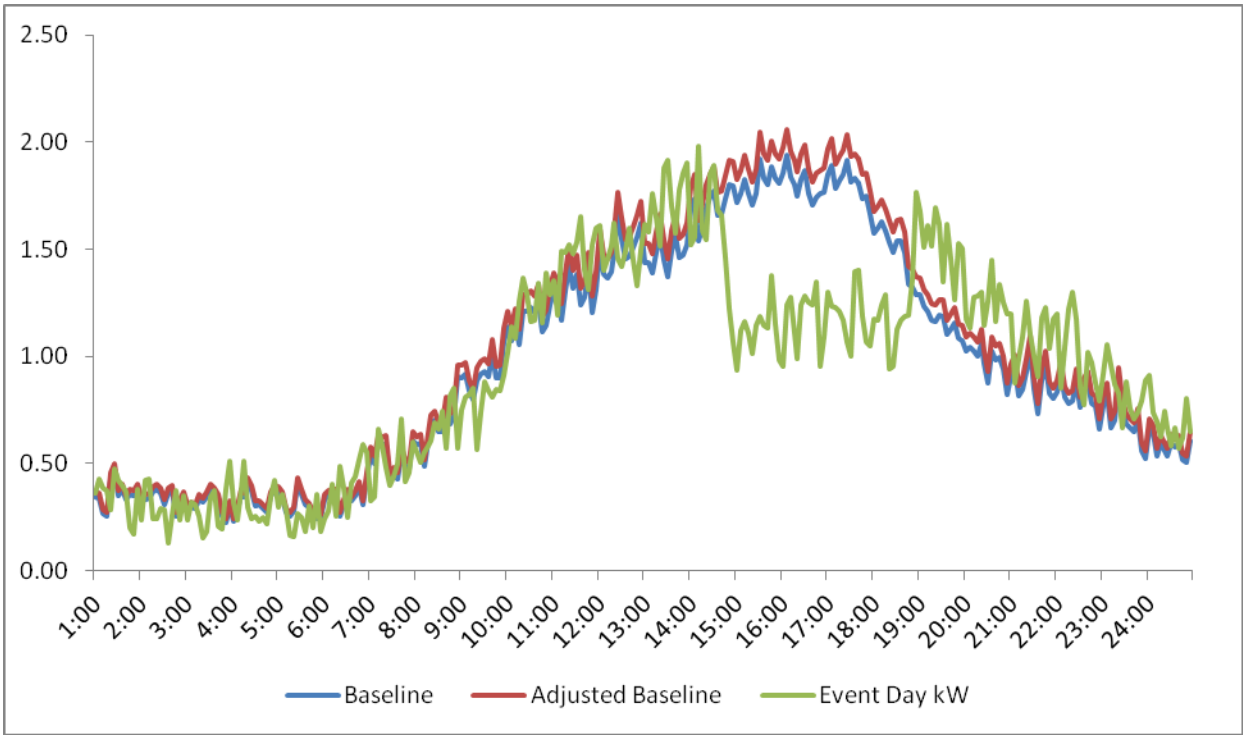


Figure 5-11 July 19th Event Business Load Profile

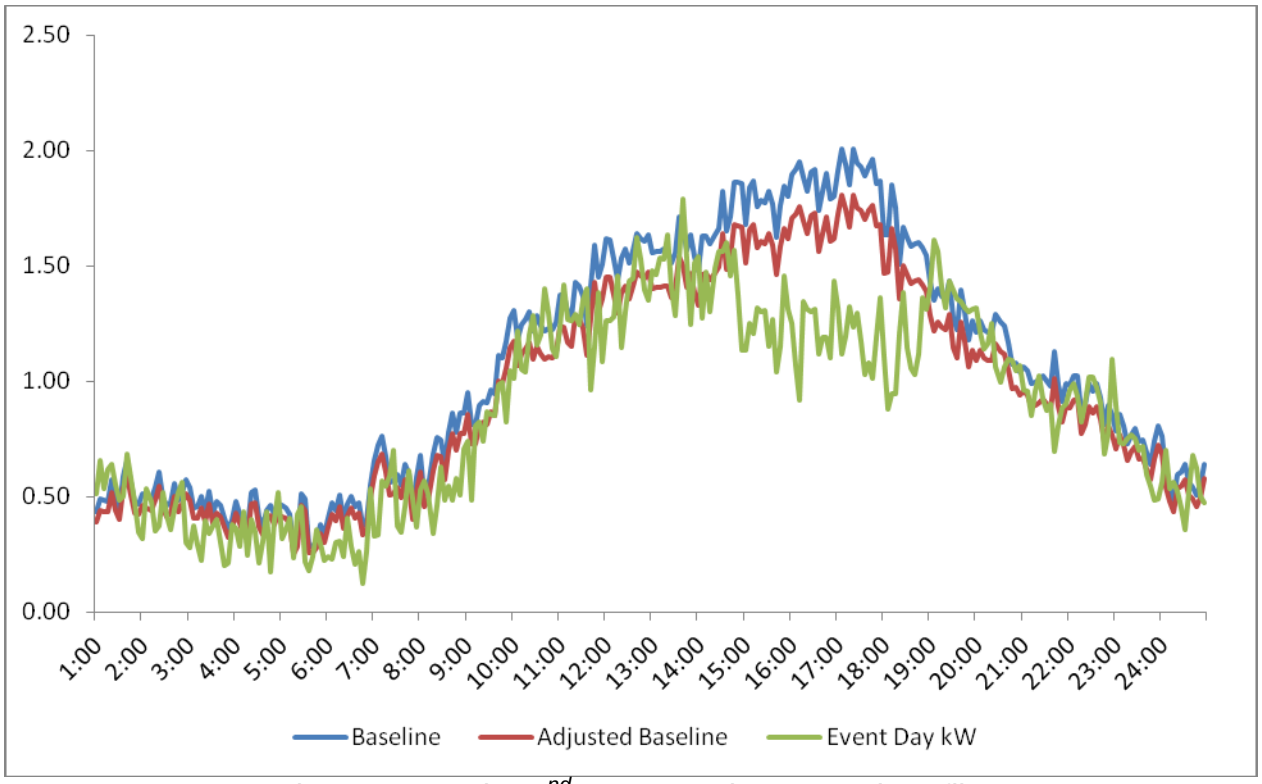


Figure 5-12 July 22nd Event Business Load Profile

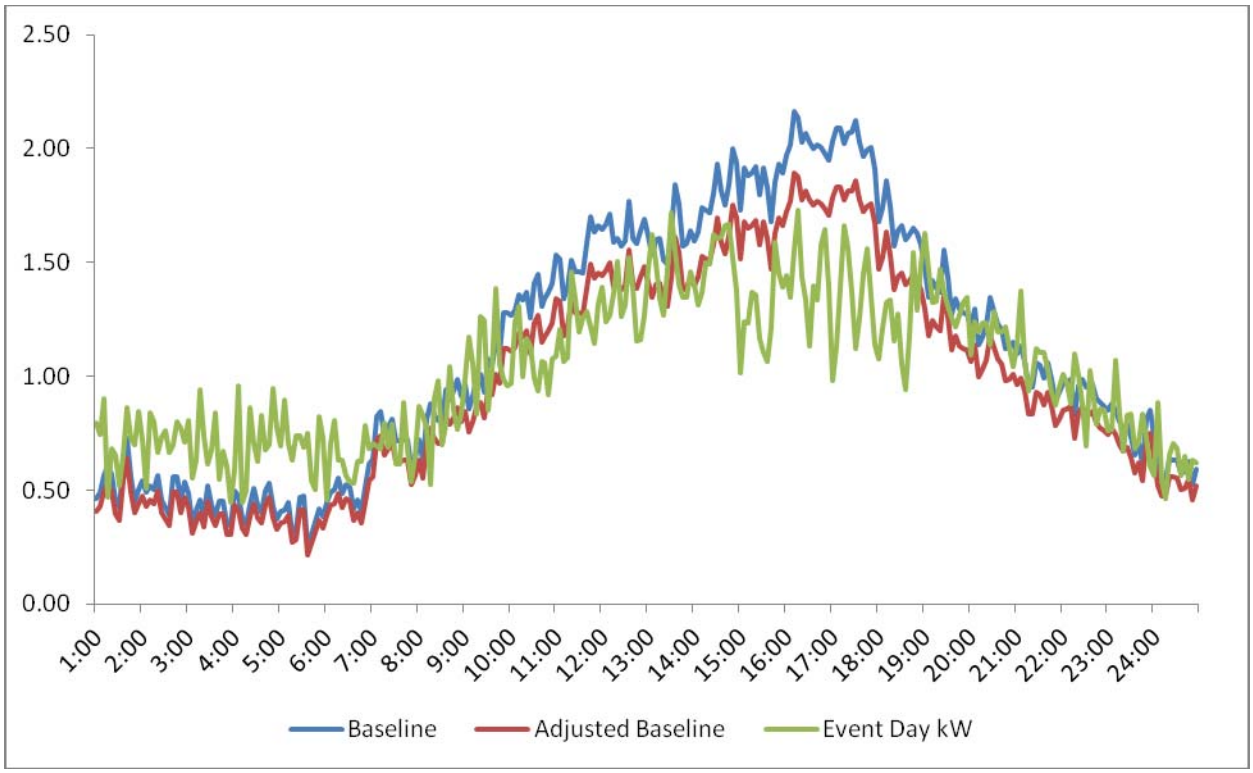


Figure 5-13 July 27th Event Business Load Profile

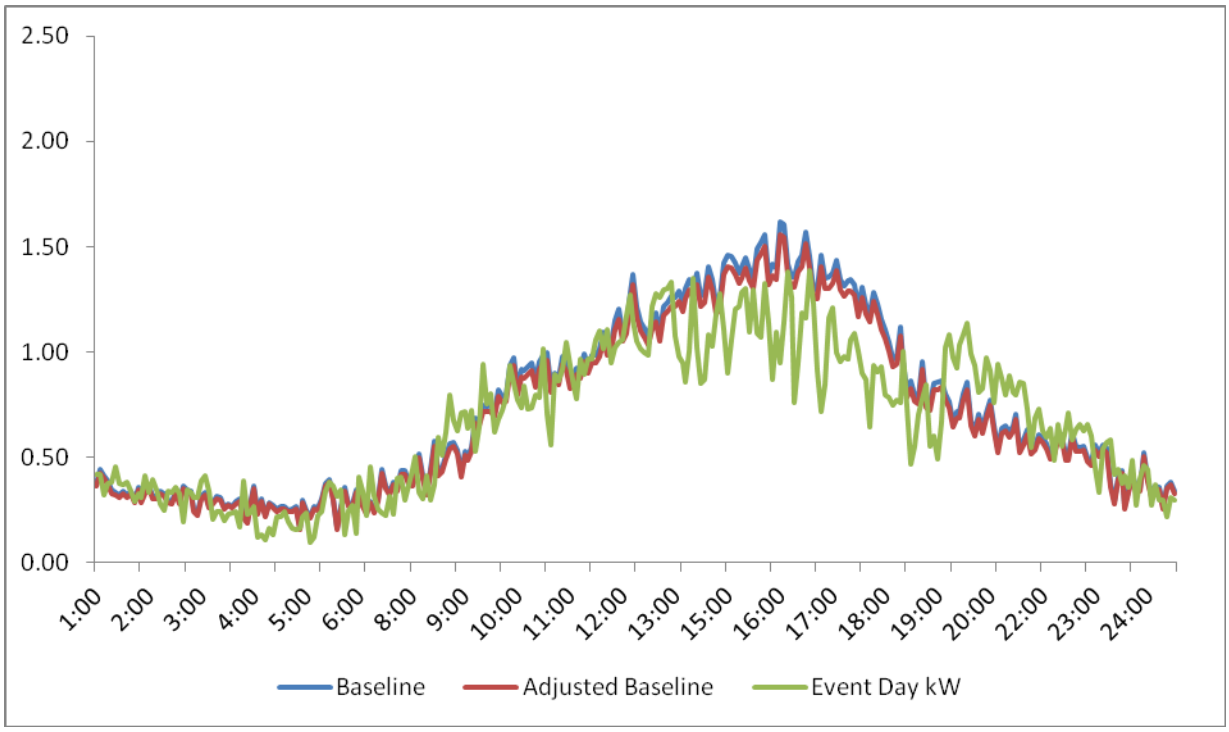


Figure 5-14 August 23rd Event Business Load Profile

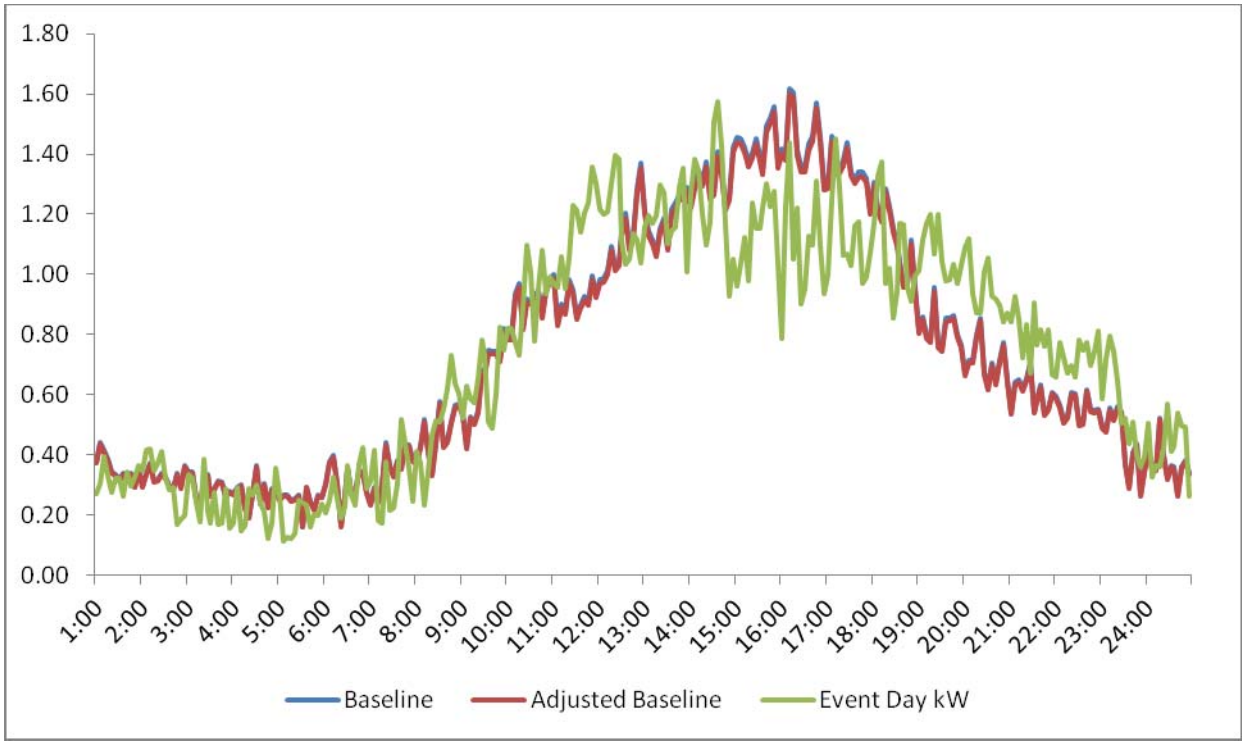


Figure 5-15 August 24th Event Business Load Profile

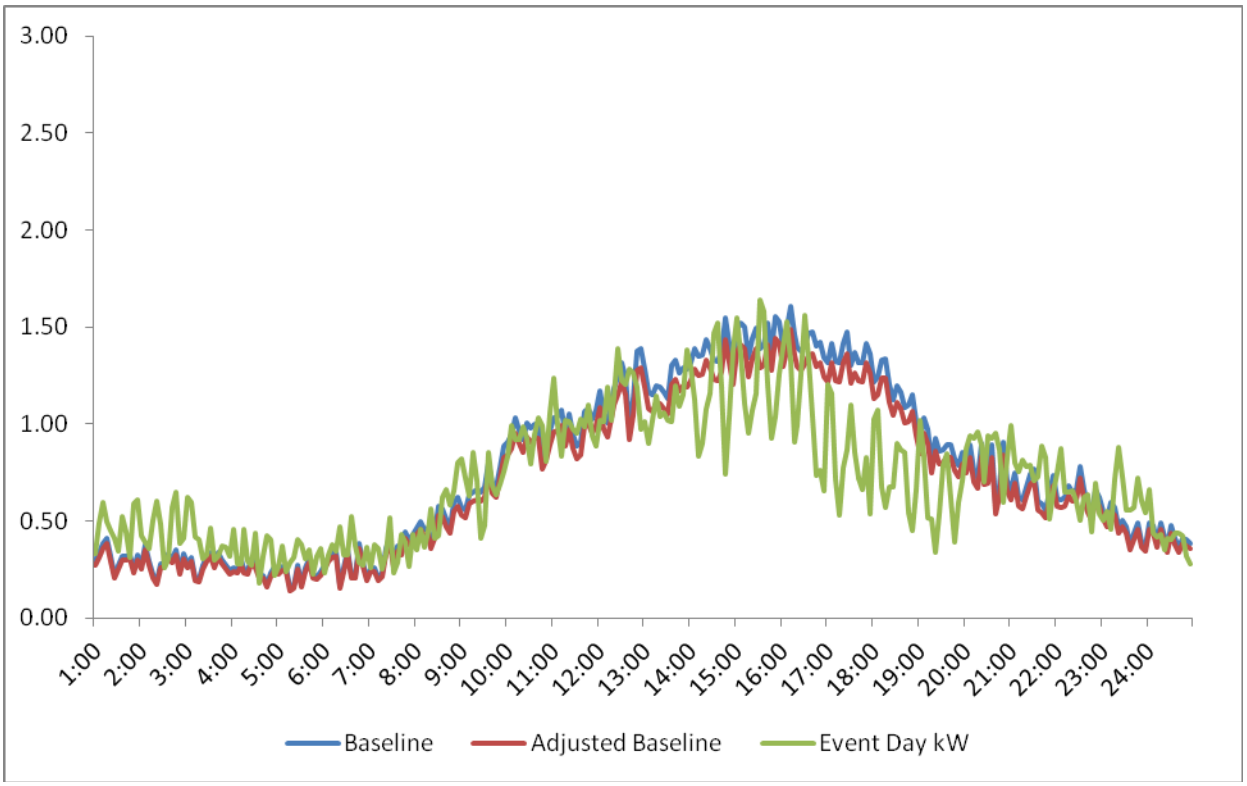


Figure 5-16 August 30th Event Business Load Profile

5.2.2 Business Saver's Switch kWh Savings

As with Residential Saver's Switch, the BSS can provide kWh savings; they are calculated in the same manner as the Residential Saver's Switch program. The resulting savings from each event are summarized in Table 5-5 below.

Table 5-5 Business Saver's Switch kWh Savings

Event Date	Reduction Factor	Snapback Factor	kWh Factor	Units	kWh Savings
July 12th	2.71	.68	3.39	199	675
Jul7 18th	1.95	-.60	1.35	199	269
July 19th	2.96	-3.52	-.56	199	(111)
July 22nd	1.71	-.25	1.46	199	291
July 27th	1.36	-.43	.93	199	185
August 23rd	1.30	-.54	.76	199	151
August 24th	.84	-.70	.14	199	28
August 30th	1.41	-.10	1.31	199	261
				Total:	1,747

5.2.3 Business Saver's Switch Performance Summary

As with Residential Saver's Switch, to quantify the available demand reduction from the RSS, ADM took the maximum kW reduction observed for each event and averaged these values across events. The resulting available reduction from the RSS is presented in Table 5-3 below.

Table 5-6 Residential Saver's Switch Performance Results

Measure	Value
Average Per-Unit Peak kW Reduction	.570
Number of Units	199
Peak kW Reduction	113.43
kWh Savings	1,747

5.3 Home Energy Services

To evaluate savings from the HESP, ADM used 2009 participant data along with pre- and post-retrofit billing data to develop a regression model to be used to forecast savings from 2011 participants that received duct sealing or infiltration control improvements. Program-level realization by measure category is summarized in Table 5-7 below.

Table 5-7 Home Energy Services Gross Realization Summary

Measure	Expected kWh	Verified kWh	Expected kW	Verified kW	Expected Lifetime kWh	Verified Lifetime kWh
Duct Sealing	5,914,447	4,607,354	1,776	1,383	59,144,471	46,073,543
Infiltration Control	901,851	959,569	330	351	9,018,509	9,595,694
Ceiling Insulation	22,028	22,028	5.19	5.19	440,559	440,559
Radiant Barrier	583	583	.01	.01	5,830	5,830
Total	6,838,909	5,589,535	2,111	1,739	68,609,369	56,115,626
Realization:	82%					

5.3.1 Home Energy Services Gross Savings Estimates

ADM evaluated gross savings estimates for each measure type installed through the 2011 HESP. Measures installed in 2011 included:

- Duct sealing;

- Infiltration control;
- Ceiling insulation; and
- Radiant Barriers.

5.3.2 Gross Savings Estimates – Duct Sealing & Infiltration Control

Gross savings estimates for duct sealing and infiltration control measures were evaluated via on-site testing at 25 residences, covering 39 individual applications. ADM conducted duct blast and blower door tests to verify post-retrofit measurements of Duct Leakage and Infiltration CFM@50 Pascals. The test results are presented in Table 5-8 below.

Table 5-8 HES On-Site Testing Results

Field Work Designation	*Ex Ante Duct Leakage Reduction (CFM)*	*Ex Post Duct Leakage Reduction (CFM)*	*Ex Ante Infiltration Reduction (CFM)*	*Ex Post Infiltration Reduction (CFM)*
HES1	227	120	-	-
HES2	232	167	816	629
HES3	175	191	1,328	1,758
HES4	191	199	523	25,96
HES5	350	295	-	-
HES6	389	275	853	151
HES7	191	71	-	-
HES8	222	184	-	-
HES9	231	116	-	-
HES10	562	582	468	1,996
HES11	33	264	-	-
HES12	135	56	04	167
HES13	221	89	755	788
HES14	950	840	530	176
HES15	225	181	715	594
HES16	140	21	935	900
HES17	285	200	570	362

HES18	210	106	325	225
HES19	185	101	-	-
HES20	370	370	-	-
HES21	853	757	1,221	1,084
HES22	-	-	977	542
HES23	-	-	675	56
HES24	182	115	-	-
HES25	107	124	632	472
Total:	6,963	5,424	12,075	12,795
Realization:	77.9%		106.4%	

5.3.1 Gross Savings Estimates – Ceiling Insulation & Radiant Barriers

Participation in these measure categories was exceedingly low. There were 26 insulation participants and one radiant barrier, which combined accounted for 0.3% of program expected savings. ADM opted not to evaluate these measures and granted 100% realization.

5.3.2 Home Energy Services Net Savings Estimates

The HESP provided training and certification to contractors to perform duct sealing and infiltration control services. Prior to the training of SPS trade allies, these services were not available within SPS service territory. To evaluate free-ridership, ADM thus took the approach of interviewing the participating contractors, in order to address whether:

- They had experience in providing these services prior to joining the program; and
- They had plans to obtain certification for these services prior to participation.

ADM interviewed four participating contractors in the HESP, and based upon these interviews, ADM has concluded that participating contractors would not have obtained the necessary certifications for duct sealing and infiltration control work absent the program. With that, ADM is applying the ex ante NTGR of 93%. This is applied in discounting program kWh, kW, and lifetime kWh savings. The resulting net savings are presented in Table 5-9 below.

Table 5-9 Home Energy Services Net Realization Summary

Measurement	***Expected Net Savings***	***Realized Net Savings***	***Net Realization Rate***
Annual Energy (kWh)	6,360,185	5,198,267	82%
Demand (kW)	1,963	1,618	82%
Lifetime Energy (kWh)	63,806,713	52,187,532	82%

5.4 Home Lighting & Recycling Program

ADM estimated savings from the HLRP by surveying a sample of program participants to determine installation rate, hours of use (via data collection on the room of installation), and net-to-gross ratio. ADM interviewed 120 coupon customers to develop gross impact parameters. Table 5-10 below presents gross realization for the 2011 Home Lighting & Recycling Program.

Table 5-10 Residential Lighting Gross Realization Summary

Measurement	Expected Gross Savings	Realized Gross Savings	Gross Realization Rate
Annual Energy (kWh)	15,955,854	15,247,301	96%
Demand (kW)	1,641	1800	110%
Lifetime Energy (kWh)	111,690,980	106,731,110	96%

Additionally, ADM estimated free-ridership for the HLRP via participant surveying, obtaining a value of 82% for NTGR. This value was applied in discounting program savings, and the net savings results are presented in Table 5-11 below.

Table 5-11 Residential Lighting Net Realization Summary

Measurement	Expected Net Savings	Realized Net Savings	Net Realization Rate
Annual Energy (kWh)	13,243,359	12,502,787	96%
Demand (kW)	1,362	1,476	110%
Lifetime Energy (kWh)	92,703,513	87,519,509	96%

The results of ADM's evaluation effort are detailed in the subsections to follow.

5.4.1 Database Review

The program distributed a total of 360,190 CFLs via retail buydowns, coupons, and program-sponsored direct distribution. ADM first examined the tracking database for systemic entry errors for each channel, i.e., duplicate entries and/or erroneous entries (such as data entered into improper columns). ADM found quantities and unit specifications to match manufacturer's literature when reviewing a sample of rebated CFLs. Figure 5-17 below presents a summary of CFLs sold and distributed through the 2011 HLRP.

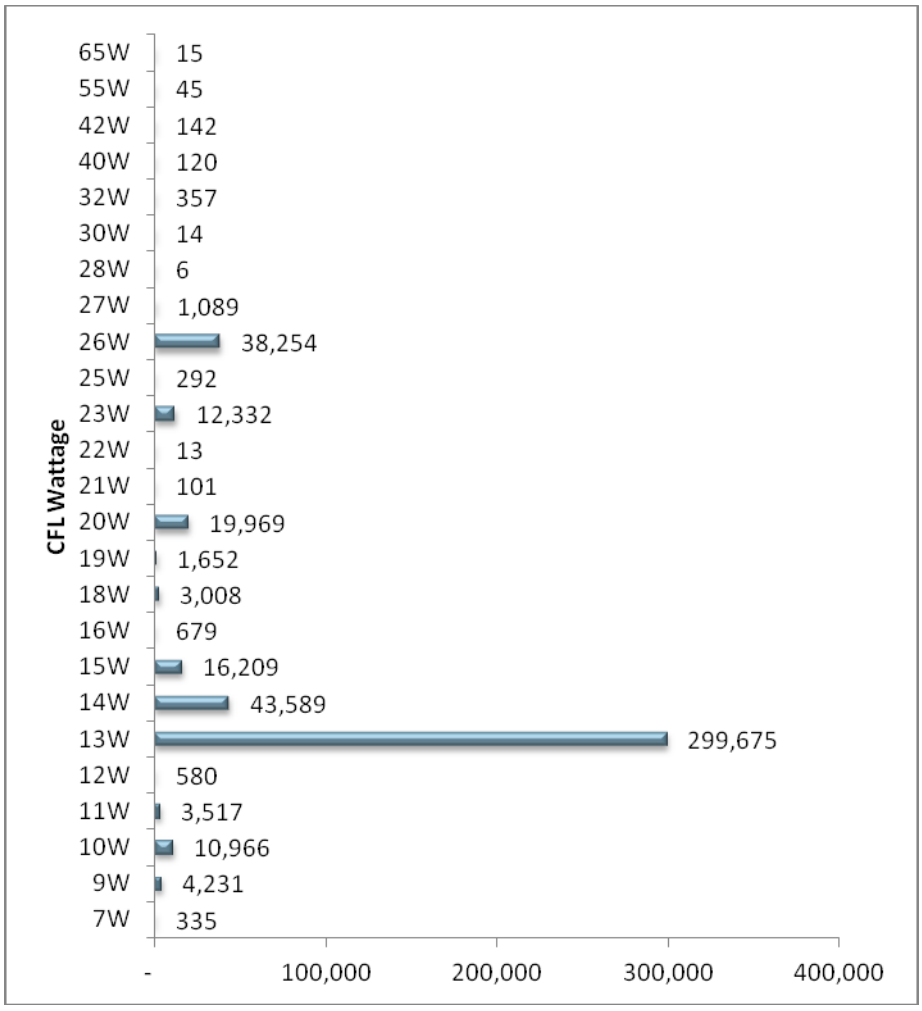


Figure 5-17 Home Lighting Summary of Distribution by Wattage

5.4.2 Home Lighting Gross Savings Estimates

Gross savings estimates for residential CFLs require the following parameters:

- Baseline wattage;
- Installation rate; and
- Hours of use

5.4.2.1 Baseline Wattage

Baseline wattage is dependent upon CFL wattage and configuration, i.e., spiral, flood, globe, or candelabra. ADM researched each SKU number listed in the program tracking data for residential lighting programs run by each of the three New Mexico investor-owned electric utilities to find the appropriate baseline for the model. These results are presented in Table 5-12 below.

Table 5-12 CFL Baseline Wattage Table

CFL Wattage	CFL Configuration	Ex Ante Baseline	Ex Post Baseline

		Wattage	***Wattage***
7	Spiral	40	25
7	Candelabra	40	40
9	Spiral	40	40
9	A-Lamp	40	40
9	Globe	40	40
10	Spiral	40	40
11	Globe	40	40
11	Candelabra	40	40
11	Flood	40	50
12	Globe	40	60
13	Spiral	60	60
13	Candelabra	60	60
14	Spiral	60	60
14	A-Lamp	60	60
14	Flood	60	65
15	Globe	60	60
15	Spiral	60	60
15	Flood	60	65
16	Flood	60	65
18	Spiral	75	75
18	Flood	75	90
19	Spiral	75	75
20	Spiral	75	75
23	Spiral	75	75
23	Flood	75	90
24	Spiral	100	100
26	Spiral	100	100
26	Flood	100	120
27	Spiral	100	100
28	Spiral	100	100
29	Spiral	100	100
32	Spiral	150	150
40	Spiral	150	150
42	Spiral	150	150
65	Spiral Grow-Light	150	300

5.4.2.2 Installation Rate

Installation rate of CFLs is determined via surveying of lighting purchasers, asking how many have been installed and how many are intended to be installed in the coming month. These values were summed and then divided by total CFLs purchased in determining the overall program installation rate, which is applied to giveaway CFLs. An install rate of 96% is applied to purchased CFLs, based upon the Kema CFL metering study. From the 120 follow-up surveys, ADM found an installation rate of 83%.

5.4.2.3 Hours of Use

SPS determines hours of use for residential CFLs by examining:

- Number of lamps available by room type;

- Hours of use by room type; and
- Number of lamps purchased per customer

In a 2009 study of California by KEMA[3], CFL use was monitored in statistically significant samples by room type, with the resulting average daily hours of operation by room type summarized in Table 5-13 below.

Table 5-13 Daily Hours of Operation by Room Type – KEMA Study

Room Type	CFL Hours Per Day
Kitchen	3.5
Living Room	3.3
Outdoor	3.1
Family Room	2.5
Garage	2.5
Bedroom	1.6
Bathroom	1.5
Hall/Entry	1.5
Laundry Room	1.2

The hours of use by room type that SPS applied in their deemed savings estimates was based upon a DOE study conducted by Navigant[4]. The KEMA study is the more recent study and is based upon a significant amount of residential monitored lighting runtime data. However, there are room types from the Navigant study that are not covered in the KEMA study. ADM has applied hours of use from the KEMA study where available and those from Navigant for room types that the KEMA study did not cover. These hours are displayed in

Table *5-14* below.

Table 5-14 Daily Hours of Operation by Room Type – Navigant Study

Room Type	CFL Hours Per Day
Utility Room	2.4
Dining Room	2.3
Office	1.9
Closet	1.4
Other	1.2

[3] KEMA, "CFL Metering Study", prepared for the California Public Utilities Commission, 2009

[4] US DOE, US Lighting Market Characterization, Navigant Consulting, 2002

The results from these two studies provide an up-to-date depiction of hours of use by room type for a wide array of residential end-uses. ADM surveyed program participants to address how many CFLs were in their home prior to participating and the room of installation, and then addressing the location of installation of purchased CFLs. From our surveying, ADM found an average of 4.21 pre-existing CFLs per household. Figure 5-18 presents the room of installation of CFLs installed in 2011.

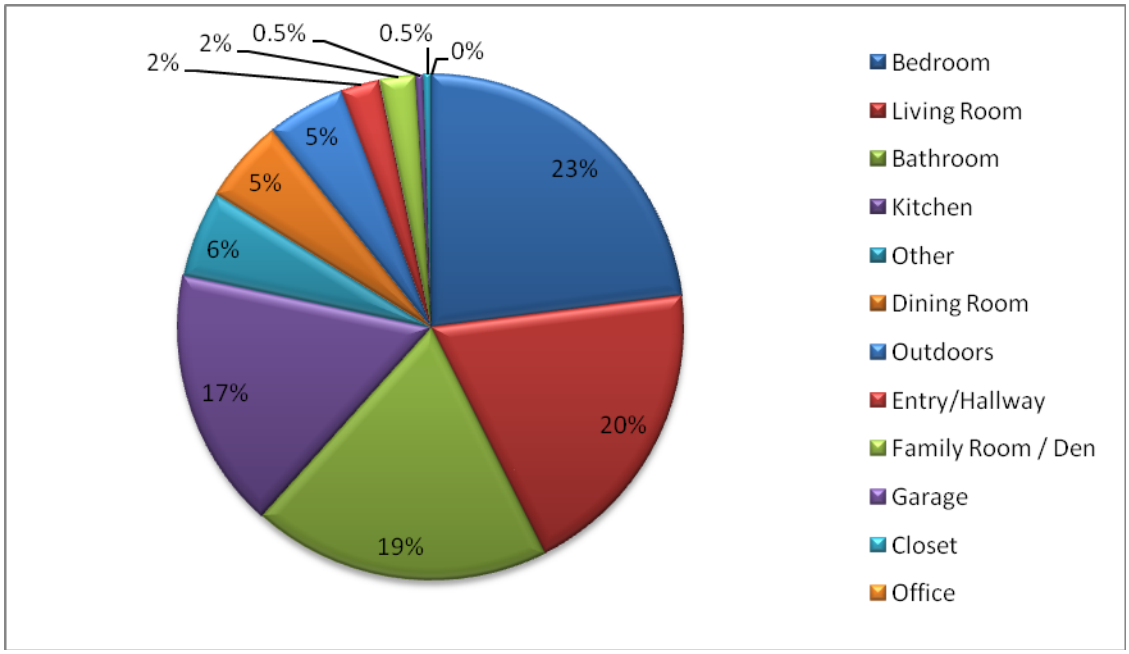


Figure 5-18 Room of Installation of 2011 Installed CFLs

ADM used the share of installations by room type from 2011 along with the values for hours of use by room type from the KEMA and Navigant studies to develop an average hours of use estimate for CFLs distributed through the 2011 HLRP. Table 5-15 below presents a summary of hours of use values by room type and the share that they constitute of the 2011 CFL distribution.

Table 5-15 Hours of Use Summary

Room Type	***Hours of Use***	***% of 2011 CFLs***
Kitchen	3.5	13%
Living Room	3.3	18%
Outdoor	3.1	12%
Family Room	2.5	0%
Garage	2.5	5%
Utility Room	2.4	0%
Dining Room	2.3	7%

Office	1.9	6%
Bedroom	1.6	19%
Bathroom	1.5	18%
Hall/Entry	1.5	5%
Laundry Room	1.2	0%
Closet	1.4	3%
Other	1.2	5%

From this, a weighted average hours of use value of 2.36 per day was estimated, for 861 hours annually.

5.4.2.4 Peak Demand Reduction

Peak demand reduction is dependent upon the peak coincident factor (PCF), which is defined as the percent of available peak hours in which lighting is operating. SPS' peak period is set on summer weekdays between 3:00 and 6:00 PM. Applying the KEMA CEL metering study, ADM found that the PCF defined for this period is 10.17%, which was applied in the analysis.

5.4.3 Residential Lighting Net-to-Gross Evaluation

To obtain net savings for the 2011 HLRP, ADM surveyed program participants to develop estimates of free-ridership. As detailed in Section 4.3, developing free-ridership estimates for the HLRP is dependent upon survey questions addressing financial ability, prior planning, importance of the rebate in decision making, and likelihood of installing similar equipment absent the program. Table 5-16 through Table 5-18 below summarizes the Reponses to questions addressing free-ridership for the 2011 HLRP.

Table 5-16 HLRP Prior Planning Results

Component	*Question*	*Yes*	*No*	*Don't Know*
Prior Planning	Question 8: Did you plan on purchasing CFLs prior to entering the store that day?	49%	48%	3%
	Question 12: After learning of the available discount, did you purchase more CFLs than you otherwise would have?	42%	37%	22%

Table 5-17 HLRP Importance of Rebate Results

Component	*Question*	*Pre-Existing CFLs*	*Yes*	*No*	*Don't Know*
Importance of Rebate	Question 10: Prior to learning of the program, how many CFLs did you have in your home?	43%	-	-	-
	Question 15: Would you purchase CFLs if they cost twice as much per bulb?	-	13%	80%	7%

Table 5-18 HLRP Behavior Absent Program Results

Component	Question	Yes	No	Don't Know	Definitely	Probably	Probably Not	Definitely Not
Behavior Absent Program	Question 11: If the CFLS were not discounted through the SPS program, how likely is it that you would have purchased CFLs anyway?	-	-	-	19%	38%	31%	12%
	Question 16: After learning of SPS' discount, have you since purchased CFLs that weren't rebated through the program?	20%	67%	13%	-	-	-	-

The resulting NTGR for this program was 82%. This value was applied in discounting annual kWh, lifetime kWh, and peak demand savings for the 2011 HLRP.

5.5 Business Comprehensive

The Business Lighting, Business Cooling, Business Custom, Business Motors & Drives, and Small Business Lighting programs were aggregated for on-site sampling, organizing these programs in the manner similar to SPS' 2012 filing. The main features of the approach used for the impact evaluation are as follows:

- Data for the study have been collected through review of program materials, on-site inspections, and end-use metering. Based on data provided by SPS, sample designs were developed for on-site data collection for the impact evaluation. Sample sizes were determined that provide savings estimates for the program with ±10% precision at the 90% confidence level.
- On-site visits were used to collect data for savings impacts calculations. The on-site visits were used to verify installations and to determine any changes to the operating parameters since the measures were first installed. Facility staff were interviewed to determine the operating hours of the installed system and to locate any additional benefits or shortcomings with the installed system. For some sites, monitoring of lighting or HVAC equipment was conducted to obtain more accurate information on operating characteristics.

Gross savings were estimated using proven techniques, including engineering calculations using industry standards and verification of computer simulations developed by program contractors to determine energy savings. Table 5-19 summarizes the total participation in the 2011 BCP.

Table 5-19 2011 BCP Participation Summary

Program	# Applicants	# Projects	Expected kWh	Expected kW

Business Lighting	37	39	1,891,656	426
Business Cooling	21	21	799,665	245
Business Custom	4	5	629,507	26
Business Motors & Drives	45	57	8,347,683	1,242
Small Business Lighting	162	172	3,325,800	922
Total	269	294	14,994,311	2,872

Data provided by SPS showed that during 2011, there were 294 projects at 268 sites in total for all program components, which were initially expected to provide gross savings of 14,994,311 kWh. The resulting overall sample is presented in Table 5-20 below.

Table 5-20 BCP Sample Summary

Component	***# Sites in Population***	***Site Visit Sample Size***	***# Interviews***	***# Sites Represented in Interviews***
Business Lighting	37	2	5	22
Business Cooling	21	3	5	5
Business Custom	4	2	1	1
Business Motors & Drives	45	8	3	36
Small Business Lighting	162	13	7	12
Total	269	28	21	76

5.5.1 BCP Gross Savings Estimates

Sampling for evaluation of SPS' BCP was developed using the Stratified Random Sampling procedure detailed in Section 3.3.3. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than random sampling would require, by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

5.5.1.1 BCP Sample Design

The participant population for BCP was divided into 5 strata. Table 5-21 summarizes the strata boundaries and sample frames for the BCP.

Table 5-21 BCP Sample Design

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (kWh)	<7,000	7,000 – 23,000	23,000 – 55,000	55,000 – 230,000	> 230,000	
Number of sites	101	80	53	27	8	269
Total kWh savings	336,490	1,063,673	1,803,796	2,923,197	8,867,155	14,994,311
Average kWh	3,332	13,296	34,034	108,267	1,108,394	55,743
Standard deviation of kWh	1,985	3,332	7,994	47,828	1,045,607	252,628

savings						
Coefficient of variation	.60	.39	0.23	0.44	.94	4.53
Final sample	4	5	5	6	8	28

5.5.1.2 Site-Level Realization

Sites chosen within each stratum are visited in order to verify installation of rebated measures and to collect data needed for calculation of ex post verified savings. The realization rates for sites within each stratum are then applied to the non-sampled sites within their respective stratum. Table 5-22 presents realization at the stratum level, with Table 5-23 presenting results at the site level.

Table 5-22 Summary of kWh Savings for BCP by Sample Stratum

Stratum	Expected kWh Savings	Realized kWh Savings	Realization Rate
5	8,867,155	10,679,822	120%
4	940,753	1,020,947	109%
3	189,154	188,001	99%
2	61,509	52,981	86%
1	14,149	15,417	109%
Total	10,072,720	11,957,168	119%

Table 5-23 Expected and Realized Savings by Project

Project ID(s)	City	Facility Type	Program Category	Expected kWh Savings	Realized kWh Savings
1-8CR7E	Carlsbad	Industrial	Motors & Drives	2,742,974	3,798,675
1-7XYHB, 1-7XYH5, 1-7YG9G, 1-82RNV, 1-82QA1, 1-8DL9F, 1-87IHB, 1-87IHH, 1-	Roswell	Industrial	Motors & Drives	2,679,129	3,494,672

8F1HH, 1-8F1GV, 1-8F1H1, 1-87IOB					
1-89GKW	Carlsbad	Retail/Service	Lighting	1,154,042	1,049,216
1-87AUV	Carlsbad	Industrial	Motors & Drives	1,010,331	761,263
1-8E33M	Eunice	Industrial	Motors & Drives	385,611	281,348
1-7YZVT	Hobbs	Medical	Cooling	382,902	372,701
1-87RS1, 1-882EL	Eunice	Industrial	Motors & Drives	274,486	684,267
1-81JU3, 1-81P6V	Hobbs	Industrial	Custom	237,680	237,680
1-8C6GK	Roswell	Grocery	Small Business Lighting	225,322	219,523
1-8DO40, 1-832QD, 1-8DK4B, 1-8DK4K	Jal	School/K-12	Small Business Lighting	203,687	266,256
1-8530C	Hobbs	Retail / Service	Custom	178,173	0
1-7ZCUR	Artesia	Industrial	Small Business Lighting	128,472	116,857
1-7WYWL	Carlsbad	Industrial	Motors & Drives	125,190	337,398
1-89H11	Carlsbad	Retail/Service	Cooling	80,913	50.97
1-7YVU3	Clovis	Retail/Service	Small Business Lighting	51,252	69,275
1-7ILKW	Artesia	Retail/Service	Small Business Lighting	49,557	50,225
1-7YXDU	Hobbs	Office	Small Business Lighting	34,960	36,382
1-8CGSZ	Eunice	Industrial	Motors & Drives	30,305	10,465
1-85RKL	Clovis	Retail/Service	Small Business Lighting	23,080	21,654
1-8977T	Carlsbad	Retail/Service	Small Business Lighting	16,086	11,488
1-8CGRT	Eunice	Industrial	Motors & Drives	15,639	12,330
1-808JG	Hobbs	Office	Small Business Lighting	14,056	11,205
1-7FED6	Hobbs	Government	Small Business Lighting	8,332	9,856
1-87M12	Roswell	Retail/Service	Small Business Lighting	7,396	8,102
1-7XL12	Hobbs	Retail/Service	Lighting	4,631	7,446
1-7XWD4	Hobbs	Retail/Service	Cooling	3,678	0
1-88GRJ	Artesia	Retail/Service	Small Business Lighting	2,981	4,590
1-824DK	Hobbs	Office	Small Business Lighting	2,859	3,381
			Total:	10,070,720	11,957,168

5.5.1.3 Program-Level Gross Realization

Using the realization rates presented in Table 5-22, ADM extrapolated results from sampled sites to non-sampled sites in developing program-level gross savings estimates. Table 5-24 presents results by stratum.

Table 5-24 BCP Program-Level Gross Realization by Stratum

Stratum	*# Sites*	*Expected kWh Savings*	*Realized kWh Savings*	*kWh Gross Realization Rate*	*Expected kW Savings*	*Realized kW Savings*	*kW Gross Realization Rate*
5	8	8,867,155	10,679,822	120%	1,360.5	1,448.3	106%
4	27	2,923,197	3,172,383	109%	637.8	602.9	96%
3	53	1,803,796	1,792,802	99%	467.6	471.2	101%
2	80	1,063,673	916,199	86%	294.5	277.5	94%
1	101	336,490	366,645	109%	111.7	89.5	80%
Total	218	14,994,311	16,927,851	113%	2,872	2,884	100%

ADM then subdivided savings by program. This was done by summing the savings by program category after applying stratum-level realization rates. These results are presented in Table 5-25 below.

Table 5-25 Gross Realization by Program

Program	# Sites	Expected kWh Savings	Realized kWh Savings	kWh Gross Realization Rate	Expected kW Savings	Realized kW Savings	kW Gross Realization Rate
Business Lighting	8	1,891,656	1,814,638	96%	436.3	399.0	96%
Business Cooling	27	799,665	791,230	99%	245.0	289.3	118%
Business Custom	53	629,507	662,908	105%	26.3	26.3	100%
Business Motors & Drives	80	8,347,683	10,275,397	123%	1,242.3	1,304.2	105%
Small Business Lighting	101	3,325,800	3,383,678	102%	922.1	870.4	94%
Total	218	14,994,311	16,927,851	113%	2,872	2,889.3	100%

5.5.1 Business Comprehensive Net Savings Estimates

ADM estimated net savings for all SPS business programs via detailed participant surveying of a representative sample of decision makers from each program. These questionnaires were used to provide estimates of free-ridership, with a separate estimate developed for each measure category. The subsections to follow will present ADM's NTGR estimates by measure category for each program component, and the associated net savings.

ADM used SPS tracking data on measure details by site in order to aggregate gross savings by measure category within each stratum in the population. NTGR for each measure type was then applied to the verified ex post savings within each stratum in order to develop net realization estimates. In Table 5-26 below, verified gross savings by measure category are summarized in order to prepare for application of program-specific NTGRs. *Table 5-27* then presents similar results for verified gross kW savings.

Table 5-26 Stratum-Level Verified Gross kWh Savings by Program

Program	Stratum 5 Verified Gross kWh Savings	Stratum 4 Verified Gross kWh Savings	Stratum 3 Verified Gross kWh Savings	Stratum 2 Verified Gross kWh Savings	Stratum 1 Verified Gross kWh Savings
Business Lighting	1,049,216	473,009	191,088	67,876	33,449
Business Cooling	372,701	148,436	174,289	68,682	27,122
Business Custom	237,680	425,228	-	-	-
Business Motors & Drives	9,020,225	449,394	592,537	202,227	11,014

Small Business Lighting	-	1,676,315	834,887	577,414	295,061
Total	10,679,822	3,172,383	1,792,801	916,199	366,646

Table 5-27 Stratum-Level Verified Gross kW Savings by Program

Measure Category	Stratum 5 Verified Gross kW Savings	Stratum 4 Verified Gross kW Savings	Stratum 3 Verified Gross kW Savings	Stratum 2 Verified Gross kW Savings	Stratum 1 Verified Gross kW Savings
Business Lighting	222.4	92.8	53.8	21.5	8.4
Business Cooling	72.9	49.8	112.4	42.6	11.5
Business Custom	26.3	-	-	-	-
Business Motors & Drives	1,126.6	59.3	81.9	34.3	2.2
Small Business Lighting	-	400.9	223.1	179.1	67.3
Total	1,448.3	602.9	471.2	277.5	89.5

With verified savings compiled by stratum and by measure, ADM then applies measure-category NTGRs to estimate program net savings. These are summarized in Table 5-28 and Table 5-29 below.

Table 5-28 Verified Net kWh Savings by Program

Program	NTGR	Stratum 5 Verified Net kWh Savings	Stratum 4 Verified Net kWh Savings	Stratum 3 Verified Net kWh Savings	Stratum 2 Verified Net kWh Savings	Stratum 1 Verified Net kWh Savings
Business Lighting	68.7%	720,811	324,957	131,278	46,630	22,980
Business Cooling	89.5%	333,567	132,851	155,989	61,470	24,274
Business Custom	70.2%	116,851	298,510	-	-	-
Business Motors & Drives	95.8%	8,641,376	430,520	567,651	193,733	10,551
Small Business Lighting	99.4%	-	1,666,257	829,878	573,950	293,290
Total	92.0%	9,812,605	2,853,095	1,684,796	875,783	351,095

Table 5-29 Verified Net kW Savings by Program

Program	NTGR	Stratum 5 Verified Net kW Savings	Stratum 4 Verified Net kW Savings	Stratum 3 Verified Net kW Savings	Stratum 2 Verified Net kW Savings	Stratum 1 Verified Net kW Savings
Business Lighting	68.7%	152.8	63.8	37.0	14.8	5.8
Business Cooling	89.5%	65.3	44.6	100.6	38.1	10.3
Business Custom	70.2%	18.5	-	-	-	-
Business Motors & Drives	95.8%	1,079.3	56.8	78.4	32.8	2.1
Small Business Lighting	99.4%	-	398.5	221.8	178.0	66.9
Total	92.0%	1,315.9	563.7	437.8	263.7	85.1

After evaluating the program components, ADM compiled net savings to provide an overall net realization rate. These results are summarized in Table 5-30 below.

Table 5-30 SPS Business Portfolio Net Realization Summary

Component	Peak Demand Reduction (kW)	Annual Energy Savings (kWh)	Lifetime Energy Savings (kWh)	Net Realization

	Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	*Ex Ante*	*Ex Post*	*Rate*
Business Lighting	349.0	274.1	1,513,325	1,246,656	22,699,872	18,699,845	82%
Business Cooling	230.3	258.9	679,715	708,151	10,195,725	10,622,264	89%
Business Custom	22.9	18.5	629,507	465,361	6,572,053	5,584,338	74%
Business Motors & Drives	1,080.8	1,249.5	7,762,484	9,843,831	145,249,684	177,188,952	127%
Small Business Lighting	876.0	865.2	3,159,510	3,363,376	47,392,650	50,450,634	106%
Total	2,559	2,666.2	13,744,541	15,627,375	232,109,984	262,546,033	113%

6. Process Findings

This section will present results of ADM's process evaluation of the SPS DSM Portfolio, as well as summarize program recommendations.

6.1 Home Lighting & Recycling

ADM surveyed 120 participants in the evaluation effort for the 2011 Home Lighting & Recycling Program (HLRP). These surveys were focused on collecting data for development of impact evaluation parameters, but they were also leveraged to collect data useful for the process evaluation effort. Data collected via participant surveying is used in evaluating:

- Advertising effectiveness and customer awareness of the program;
- Customers' reasons for their lighting purchase;
- Non-participant behavior;
- Customer satisfaction with various program factors;
- Expected customer behavioral changes with the pending changes in lighting standards; and
- Recommendations for program improvement.

The HLRP is implemented by Wisconsin Energy Efficiency Corporation (WEEC). The program is focused on providing point-of-sale instant discounts to qualifying CFLs. For larger retailers, this is accomplished via instant-markdown; the discount is incorporated seamlessly with the check-out process. For smaller retailers, setting up this sort of infrastructure is not cost-effective (due to lower sales volume). For these retailers, SPS allows for participation through paper coupons; the details of the sale are filled out at check-out, the customer receives the discount at the time of sale, and the coupons are then sent to EFI for processing and reimbursement. The HLRP offers online sales and provides direct distribution of CFLs.

6.1.1 RLP Process Evaluation Activities

The process evaluation of the RRP included an array of activities, detailed in the subsections to follow.

Database Review

ADM completed a review of the tracking data for the HLRP in a series of steps, including:

- Summary data for markdown CFLs;
- Summary data for coupon CFLs; and

- Supporting documentation for implementer invoices.

Coupon Participant Survey

ADM conducted surveys with a sample of 120 coupon participants. Coupon participants fill out cards with their name and phone number along with the quantity and wattages of CFLs at the time of purchase.

6.1.2 Customer Awareness

By and large, customers were aware not of the available discount on CFLs offered through SPS. Table 6-1below presents the survey results of customer awareness of the SPS program.

Table 6-1 Timing of Learning of SPS Discount for CFLs

Question	*Yes*	*No*	*Don't Know*
Did you know about the available discount on CFLs prior to entering the store that day?	33%	61%	7%

From this it can be inferred that a large number of participants learn about the available discount in-store. Respondents were asked to list how they learned of the program. The sources of customer awareness are summarized in Figure 6-1 below.

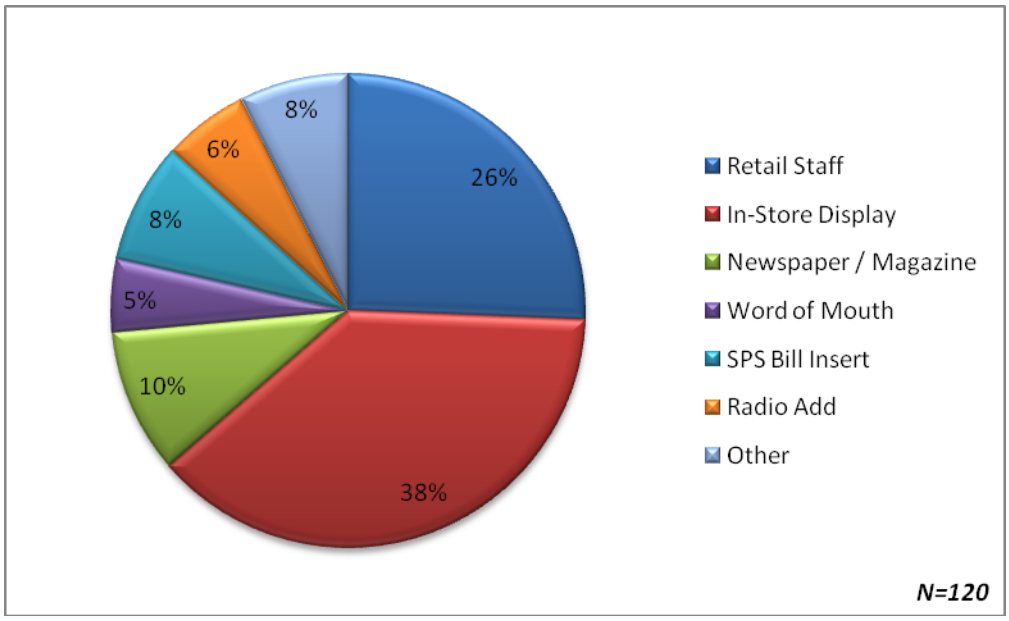


Figure 6-1 HLRP Sources of Customer Awareness

26% learned of the program form retailer staff, and 38% learned of it from an in-store display. With a total of 64% having learned of the program from such sources, this corresponds with the value of 61% that stated they did not know of the program before entering the store that day.

6.1.3 Customer Sentiment to CFLs

As for customer satisfaction with CFLs, ADM asked customers to rate their satisfaction with the quality of lighting and with the energy savings observed after installation of CFLs. The results of this are summarized in Table 6-2 below.

Table 6-2 Customer Satisfaction with CFLs

Component	Very Satisfied	Somewhat Satisfied	Neutral	Someone Dissatisfied	Very Dissatisfied	Don't Know
Quality of Lighting From CFLs	48%	22%	20%	4%	6%	0%
Energy Savings From CFLs?	39%	8%	8%	1%	3%	41%
Amount of the Discount	66%	13%	12%	2%	1%	8%
The Selection of Qualifying Products	57%	16%	12%	5%	3%	8%
Over Satisfaction with the Program	66%	22%	6%	3%	3%	1%

What is revealed in this is that customers are by and large satisfied with the lighting but do not observe noticeable energy savings on their bill. Lighting does make up a small portion of residential load and as such the marginal gain from CFLs may not appear significant to them. The reduction observed may not appear greater in magnitude than their typical month-to-month fluctuations.

6.1.4 Customer Purchase Habits

Additionally, ADM surveyed respondents regarding their strategy for replacing incandescent lighting in their home. Table 6-3 below presents a summary of customer behavior regarding how they are replacing lighting in their home.

Table 6-3 CFL Replacement Strategies

Question	Actively Replacing	Replacing on Burnout	Applying Both Strategies
What is your replacement strategy for lighting in your home? Are you actively replacing incandescent lighting with CFLs or are you waiting until your incandescent bulbs burn out?	58%	38%	4%

The large volume of customers replacing on burnout corresponds with the location of installation data, in how many CFLs are installed in low-traffic areas. Rooms with low use often have increased switching, which can sharply decrease the EUL of lighting. Additionally, ADM inquired as to what type of lighting the installed CFLs were replacing, summarized in Table 6-4 below.

Table 6-4 Type of Lighting Replaced by CFLs

Question	*Incandescent*	*Burnt-Out CFLs*	*Neither*	*Mix of Both*	*Don't Know*
What type of lighting did the CFLs replace?	78%	11%	3%	3%	4%

Of the 78% of respondents replacing incandescent lamps, 61% replaced lighting that was still operating, having been motivated by potential energy savings to switch early.

6.1.5 Response to SPS Rebate

In addition to the questions specifically addressing NTGR displayed in Section 5.4.3, ADM delved deeper into the customer decision-making process and how it was affected by the available SPS rebate for CFLs. Customers were asked if the rebate had allowed them to purchase more CFLs than they otherwise would have. 42% of respondents indicated that they purchased more CFLs than they otherwise would have, with these respondents indicating an average increase of 7.2 CFLs over what they would have purchased absent a rebate. Figure 6-2 displays the distribution of customers by pre-existing and purchased CFL quantity.

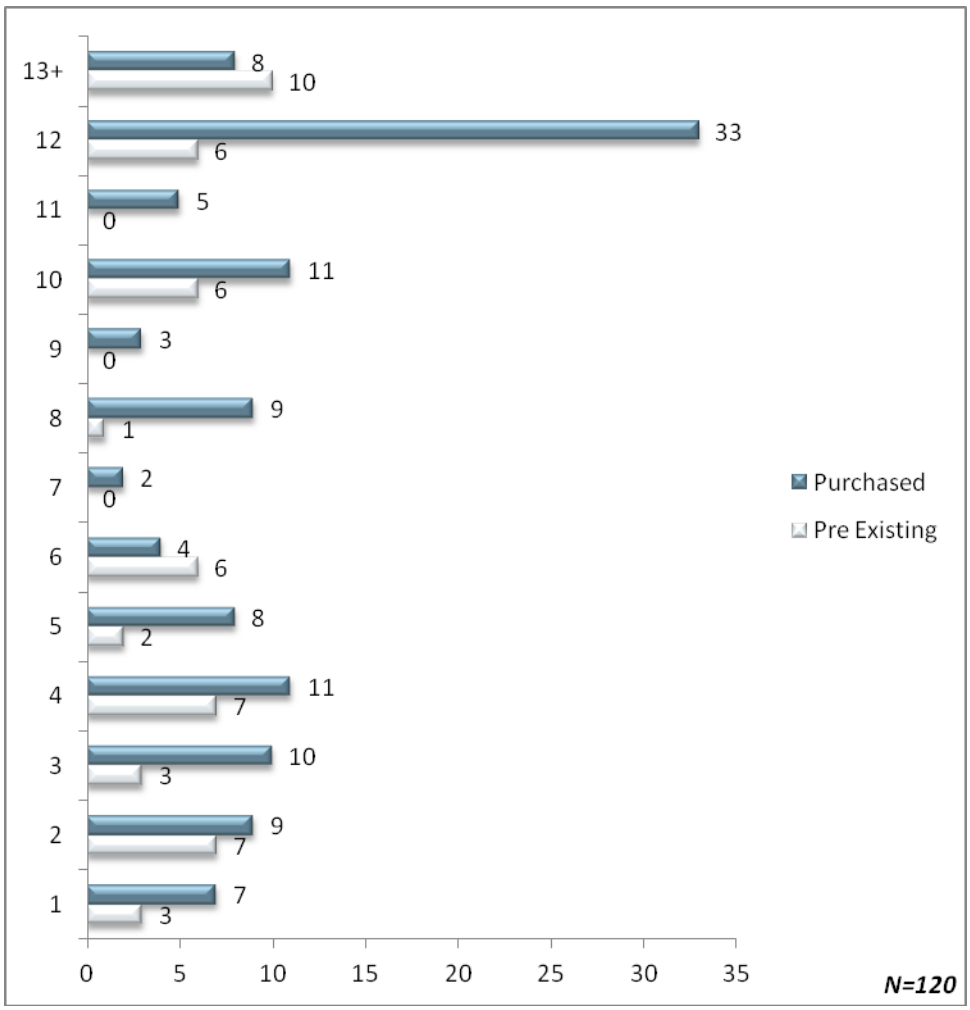


Figure 6-2 Pre-Existing & Purchased CFLs

After having participated in the program and purchased SPS-discounted CFLs, 13% of participants then purchased CFLs that were not rebated through the program. Of these 24%, an average of 3 CFLs had since been purchased that were not rebated. Reasons for purchasing CFLs that were not rebated included the program not covering the specific type desired, and the customer happening to be in a non-participating retailer and not wanting to make a separate trip for the rebate. With the reasons given, the purchase of CFLs not rebated through the program is a likely indicator of free-ridership, as their behavior demonstrates that the rebate was not significant to the decision-making process.

6.1.6 Response to Distribution Program

One channel that SPS used to distribute CFLs was through pizza deliveries. Customers could receive a two-pack of CFLs along with their pizza free of charge. ADM interviewed one of the two pizza chain owners who distributed free compact fluorescent lamps to customers that ordered pizzas for SPS.

The owner of the got involved in the program after being contacted by another franchise owner in the area. His involvement in the program began with a meeting with an SPS executive at which the program was explained. SPS provided him with fliers to glue to the top of pizza boxes that described the program and a banner to hang in front of the store. SPS also put a flier in their customers' monthly bill that had the phone numbers of participating locations and described the giveaway. The owner stated that the program was going well and that it provides free advertising. He stated that his employees like the program because they find distributing the lamps easy to do and that giving customers the CFLs helps with their tips.

Customers typically find out about the free lamps from the fliers on the pizza boxes, the store banner, or when they receive the lamps with the pizza delivery. They are not informed about the program when they order. Customers are generally aware of the program now because many regularly order pizza from the location. The frequency at which some customers have received bulbs suggests that this distribution channel may be in a state of diminishing returns for energy savings. The owner stated that customers like the program and only one customer raised concerns about the possibility that the bulbs might be dangerous to his dogs or children. Overall, it has been a successful channel for direct distribution.

6.2 Residential Home Energy Services Program

The 2011 Residential Home Energy Services Program (HESP) offers a range of home efficiency improvements to participants, including:

- Duct Sealing;
- Infiltration Control;
- Ceiling, Wall, and Floor Insulation;
- Central Air Conditioning Replacement; and
- Radiant Barriers.

In evaluating the HESP, ADM surveyed a total of 300 participants who had eligible weatherization measures completed at their home. Twenty-five of these participants participated in on-site visits where ADM conducted blower door testing and duct blasting to verify post-retrofit measurements of Duct Leakage and Infiltration CFM@50 Pascals.

Areas of interest in the survey effort included:

- Customer awareness of the program and discount;
- Respondents' reasons for participating in the program;
- Adequacy of the information provided to participants;
- Contractors' concerns and importance in the program;
- Changes in respondent behavior as a result of the program;

- Participant satisfaction with various program factors;
- Contractor satisfaction with various program factors; and
- Recommendations for program improvement.

6.2.1 Customer Awareness

Survey respondents were asked questions that helped ADM determine their level of program awareness. The 300 respondents whose homes were weatherized were first asked about their knowledge of the discount on weatherization improvements offered by SPS. A total of 70% of respondents indicated awareness of the discount. Participants that had indicated awareness of the discount were further questioned about the way that they had learned about the program discount. Figure 6-3 below summarizes the different ways that survey respondents learned about HESP. Note that the total percentage of responses adds up to more than 100% because some respondents indicated more than one source of information regarding the program. Responses in the "Other" category include radio advertising, flyers left under house door, previous experience with the program, and employee of SPS.

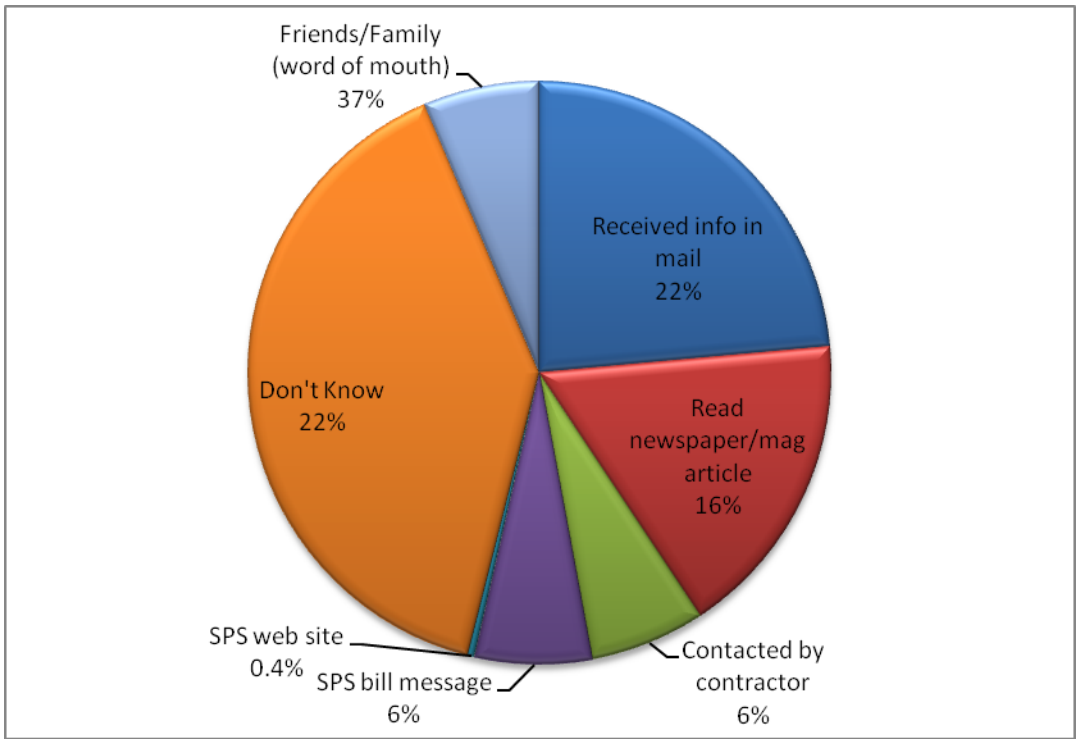


Figure 6-3 Sources of Awareness of HESP

As shown in Figure 6-3, most respondents learned of the program through print media or word of mouth, with these two sources indicated by 75% of respondents. This is corroborated by interviews with participating SPS contractors, who indicate that a large volume of the work they receive through the program stems from personal referrals from

prior clients. In a sense, this suggests that the HESP has hit a "critical mass" of awareness, in that current participation induces further participation through personal networks. As such, the success of the program is likely sustainable in coming program years.

SPS reached a very small percentage of survey respondents via direct methods of advertisement such as bill messages or the SPS website. Only 6% of respondents indicated learning about the program through bill messages and 0.4% of respondents indicated learning about the program through the SPS website. This suggests that SPS's direct methods of program advertisement for RHESP are not effective in reaching program participants. However, the marketing efforts by SPS trade allies have sufficiently countered this, as participation in the HESP is very high.

6.2.2 Reasons for Participation in RHESP

In order to better understand the effects of RHESP, ADM asked survey respondents about their motivations for weatherizing their homes through the program in 2011. Figure 6-4 shows the breakdown of reasons for respondents' participation in RHESP. Note that the percentages can add up to more than 100% because some respondents indicated more than one reason for participating in RHESP.

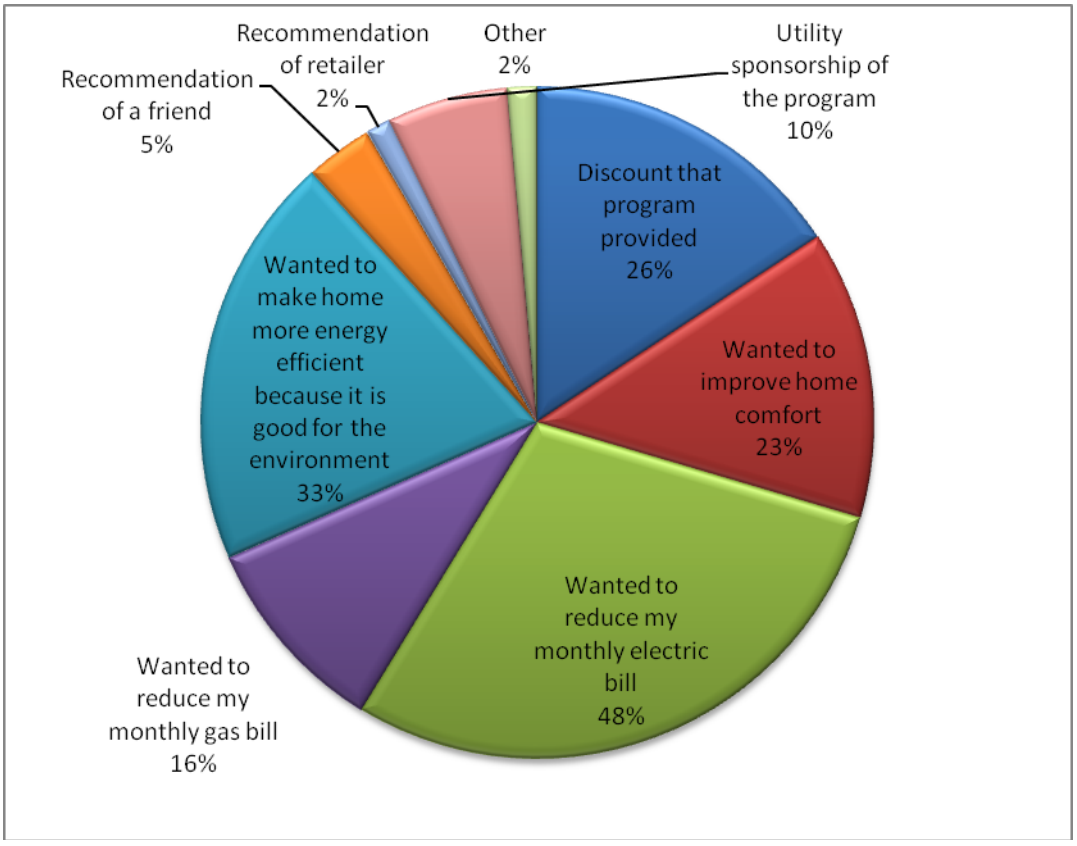


Figure 6-4 Reasons Respondents Participated in RHESP in 2011

ADM then asked survey respondents specifically about the importance of the discount on weatherization improvements. Table 6-5 summarizes respondents' views on the importance of the discount for weatherization services.

Table 6-5 Importance of Discount to Respondents

Question	Very Important	Somewhat Important	Only Slightly Important	Not Important At All	Don't Know
How important was SPS's discount for weatherization services in your decision-making?	72%	12%	4%	6%	6%

Analysis of this data shows that respondents consider the discount to be a very important factor in their decisions to participate in RHESP. Specifically, a total of 84% of respondents found the discount to be important, with most of those respondents holding it to be very important. Overall, the data suggests that respondents participated in the program in a large part due to financial considerations, making it an important part of the program.

6.2.3 Adequacy of Information Provided to Participants

Program participants were questioned about the importance of information provided to them about RHESP. Information was provided to participants from both SPS and the contractors performing the work in participants' homes. Table 6-6 provides a summary of the importance of information provided by SPS and contractors to survey respondents.

Table 6-6 Importance of Information Provided

Question	Party Providing Information	Very Important	Somewhat Important	Only Slightly Important	Not Important At All	Don't Know
How important in your decision was information, advice and /or recommendations?	SPS	52%	21%	6%	11%	10%
	Contractor	64%	20%	7%	6%	3%

Survey respondents seemed to value information provided by contractors slightly more than that provided by SPS. A total of 84% of respondents found information provided by

their contractors to be important, while 73% of respondents valued information offered by SPS.

While these numbers summarize the importance of information provided by SPS and contractors, respondents' satisfaction with the type of information provided also matters. Table 6-7 summarizes the satisfaction of survey respondents with the information provided by SPS and the contractors.

Table 6-7 Satisfaction with Information Provided

Question	*Party Providing Information*	*Very Satisfied*	*Somewhat Satisfied*	*Neutral*	*Somewhat Dissatisfied*	*Very Dissatisfied*	*Don't Know*
Please rate your satisfaction with the information provided.	SPS	54%	15%	11%	4%	3%	13%
	Contractor	68%	18%	8%	2%	3%	1%

Satisfaction with the information provided by SPS and contractors yielded similar results to respondents' rating of the importance of the information. ADM asked each dissatisfied respondent about their reasons for dissatisfaction with the information provided. For respondents dissatisfied with the information provided by SPS, many stated that SPS did not offer any information. This response is identical to the responses received for the 2011 program year as well. One customer stated they were unaware that the program was run by SPS due to no information provided by them.

As for dissatisfaction with the information provided by contractors, most respondents that indicated dissatisfaction in this regard said that the contractor did not provide any information. A majority of dissatisfied respondents claimed that the work to be done to their home was not explained by the contractor. A few respondents said that a small amount of information was available from the contractor, but that the information was unclear or did not go into detail about how much energy would be saved from these measures installed.

In general, survey respondents considered the information provided by contractors to be more satisfactory than the information provided by SPS. This may be due in part to the fact that contractors performing the work can provided more substantial information with regards to the work being performed in the house. At SPS's point of contact with participants, information provided is likely more general information about the program as a whole, as opposed to the customer-specific information that the contractor is in a position to provide.

In addition to the former considerations, program participants already seem somewhat exposed to information about the program when they first learn about it. With the high significance of program discovery through recommendations, the people recommending the program are likely offering important information before respondents even make first contact with SPS. One situation that supports this idea comes from the large amount of

respondents that claimed their neighbor or friends offered the most information about the RHESP. This may decrease respondents' satisfaction with and view of importance of the information provided by SPS. Overall, though, a majority of respondents seem mostly satisfied with and value the information provided by SPS and contractors.

6.2.4 Contractors Concerns and Importance to RHESP

Program participants were asked about the process of choosing the contractors that performed the weatherization at respondents' residences. Contractors were also surveyed in order to check the consistency of residential participants' responses. Figure 6-5 summarizes survey results concerning the way respondents chose their contractors. Note that the percentages add up to more than 100% because some respondents indicated more than one way of choosing their contractor.

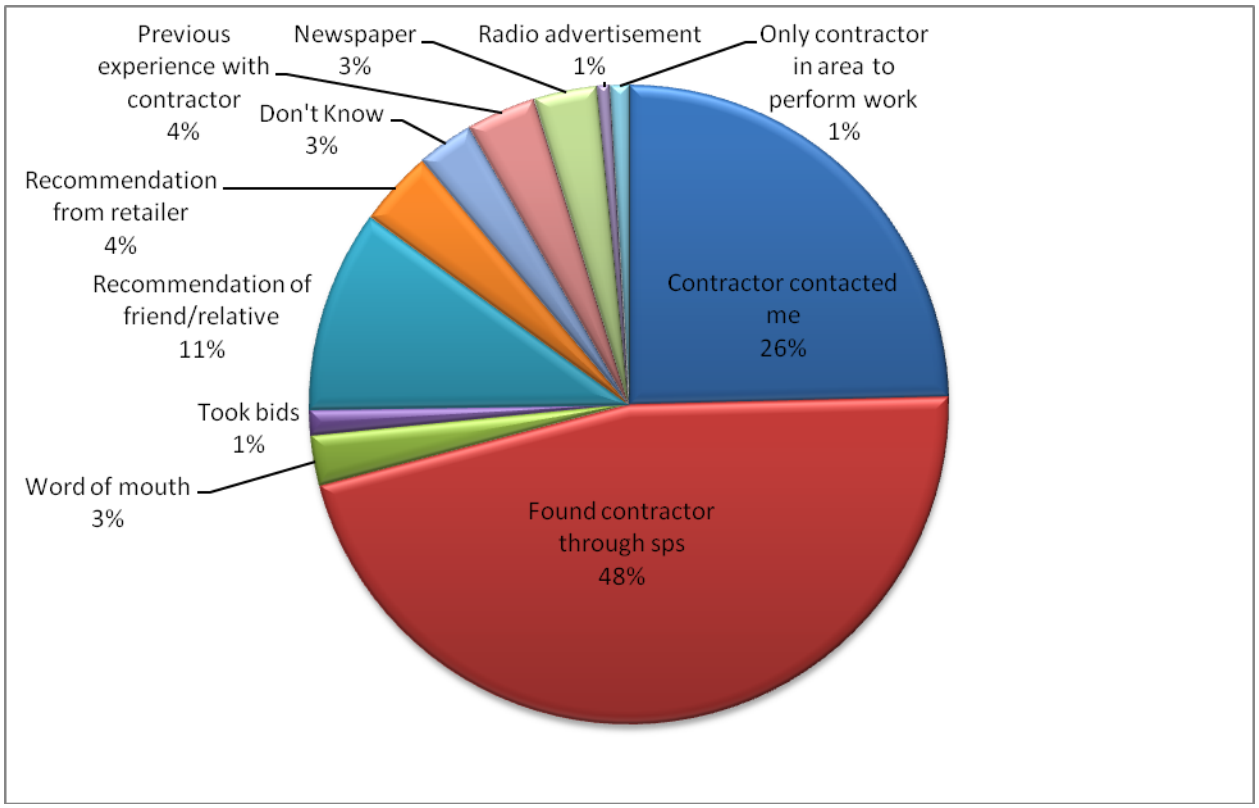


Figure 6-5 Choosing Contractors to Perform Work for RHESP in 2011

Survey respondents that had their house weatherized most often discovered contractors through calling SPS and setting it up, finding a list of contractors through the SPS website, or receiving the SPS flyer sent in the mail, making up 48% of respondents. Another 3% of respondents chose their contractors by calling the number in the newspaper ad that was listed with the advertisement about the RHESP.

A total of 26% of respondents were contacted first by the contractor. Looking at this category in more depth, contractors were asked about their methods of advertisement. Responses included TV ads, newspapers, flyers, door to door and word of mouth

advertisement methods. Contractors reported finding that word of mouth and flyers were the most effective marketing methods. This finding is consistent with the large percentage of respondents that claim they learned about the program through recommendations of friend and relatives.

Contractors were also asked about the level of customer awareness before contact. Responses from contractors varied from large to small percentages of customer awareness prior to contact. One contractor with a high percentage of customer awareness prior to contact said that respondents most commonly learned about the program by word of mouth from their prior customers. Other contractors said that customers discovered the program through other contractors or the internet.

As for the ways that contractors had discovered the program, they reported either being contacted by an SPS Representative or another contractor. Prior to participation in the program, none of the contractors had performed duct sealing or infiltration control in New Mexico residences, as the contractors lacked the training and certification for duct blaster and blower door testing. Contractors report having gone through the SPS courses specifically to participate in RHESP. Program participation has, for the most part, affected the types of equipment or services that contractors offer and many plan to be more active in the program over the next year. This is like due in part to the fact that all contractors reported having an increase in business since participating in RHESP.

6.2.5 Changes in Participant Behavior as a Result of the Program

Program participants were asked about changes in their behavior after participating in RHESP. 59% of respondents indicated having changed their behavior towards being more energy efficient since participating in the program. Changes made are listed below:

- 17% of respondents installed CFLs in their home;
- 14% of respondents installed all new windows or doors;
- 27% of respondents lowered their thermostat temperature;
- 8% of respondents installed attic or wall insulation;
- 7% of respondents purchased new appliances;
- 14% of respondents are more aware of turning off the lights and appliances when not in use; and
- 11% of respondents installed weather-stripping around their windows.

6.2.6 Participant Satisfaction with RHESP

Program participants were surveyed about their satisfaction with various program factors including home comfort, energy savings, quality of work performed, information provided about the program, and overall program experience. Survey respondents' satisfaction with the information provided by SPS and the contractors was already

discussed in Section 6.2.3. The satisfaction of survey participants is summarized in Table 6-8 below.

Table 6-8 Participant Satisfaction with RHESP

Question	Very Satisfied	Somewhat Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Don't Know
Improvement in Home Comfort	50%	26%	19%	1%	2%	2%
Savings on Utility Bills	34%	22%	27%	5%	4%	8%
Quality of Contractor's Work	68%	18%	10%	1%	2%	1%
Overall Program Experience	67%	20%	10%	1%	1%	1%

When any survey respondents indicated dissatisfaction with a particular factor of RHESP, ADM inquired further about the reason for dissatisfaction. Some survey respondents indicated dissatisfaction with different factors of the program including lack of improvement in the comfort of their home, the lack of savings on utility bills, and the poor quality of the contractor's work.

Only 3% of respondents indicated dissatisfaction with the improvement of comfort in their homes. Most respondents that were dissatisfied indicated that they did not feel any improvement in the comfort in their homes. This may not indicate an actual dissatisfaction with the comfort level in the home because these respondents are only saying that there was no improvement. Two respondents that indicated dissatisfaction with the improvement in comfort in the home complained about the small amount of work that the contractor did when he came to the home.

Respondents with weatherized homes were asked about their satisfaction with the savings on their utility bills. A total of 9% of these respondents indicated dissatisfaction with this program factor. Most complaints about the savings on utility bills were due to the fact that these respondents had not noticed any savings. One participant responded that his energy bill had "sky-rocketed" since the weatherization improvement had been completed at his home.

Concerning the quality of work performed by contractors on weatherized homes, 3% of respondents expressed dissatisfaction. Issues with this factor varied from one respondent to the next. A couple respondents complained that contractors seemed rushed with the job. Others said the contractors skipped important areas, made messes while performing the work, and that the work seemed unimportant to them. Two respondents stated that a contractor damaged their door and window.

Some respondents indicated dissatisfaction with the program overall. The main issue raised in this regard focused on the respondents having not benefited from the program. One respondent also stated that the work completed was cheaply done and that the stripping for the windows had to be redone.

6.3 Business Comprehensive Program

This chapter presents the results of the process evaluation of the Business Comprehensive Program[5]. The process evaluation focuses on aspects of program policies and organization, as well as the program delivery framework.

The process chapter begins with a discussion of the overall progress of the program and potential for meeting its goals. The chapter also includes discussion relating to certain issues that are critical to the future success of the program. This discussion is followed by an analysis of strategic planning and process recommendations, and concludes by highlighting key findings from the surveys of trade allies and customer participants.

6.3.1 Overall Program Success

During the interviews conducted to support this evaluation, there were repeated discussions about the level of program progress-to-date. Time is required to successfully develop commercial rebate programs. In 2011, the SPS business program offerings seem to hit a "critical mass" of awareness through various marketing channels, providing for higher participation rates than expected in several channels. This success was most marked in SPS' industrial sector, who participated in far greater numbers than anticipated in the Business Motors & Drives component. Additionally, the Small Business Lighting component has performed above expectations, with the third party implementer reaching SPS' small commercial customers quite successfully. Business Cooling met its gross savings goal for the first time since program inception. Business Lighting fell short of participant goals, however. There may be some saturation in lighting for the larger customers in SPS territory; the amount of businesses that qualify as "large" is limited, and thus keeping consistent participation is problematic. Despite this, 2011 was a "high watermark" year for SPS business offerings.

As demonstrated in Table 6-9 below, participation has climbed across almost all segments. The only exception is Business Lighting, which in 2009 saw several of SPS' largest customers participate in whole-facility lighting retrofits. The SPS portfolio is distinguished in the low percentage of savings provided by lighting. In many business rebate programs, it is not uncommon to see lighting account for 70% or more of expected savings. In 2011, lighting accounted for only 35% of expected savings for

[5] "Business Comprehensive" is an aggregation of Business Lighting, Business Cooling, Business Custom, Business Motors & Drives, and Small Business Lighting programs.

SPS. This diversity of participation will help ensure consistent savings from the portfolio in coming program years.

Table 6-9 Business Program Expected kWh Savings by Year

Program	Program Year		
	2009	2010	2011
Business Lighting	3,536,871	1,094,577	1,891,656
Business Cooling	32,932	449,141	799,665
Business Custom	-	165,846	629,507
Business Motors & Drives	337,643	443,888	8,347,683
Small Business Lighting	370,995	1,480,114	3,325,800
Total kWh Savings	4,278,441	3,633,596	14,994,311

6.3.1 Program Tracking Database Review

Throughout the evaluation effort, tracking data were provided and continually updated by SPS. These data were used for recording and analyzing participant information, as well as for contacting participants for either surveying or auditing purposes. ADM found issues with the available tracking data, most notably that the master spreadsheet did not include a project contact. Project documentation for a specific site would include a name, phone number, and email (where available), the master spreadsheet would not. This is problematic in attempting to develop larger survey databases, as it would require requesting much larger amounts of applications just to compile participant information. Additionally, the tracking data does not list the incremental cost associated with the project. ADM calculated these values, but that effort incurs extra time and expense.

6.3.1 Business Comprehensive Rebates Customer Profile

Table *6-10* presents the average, median and range of the incentives for firms participating in retrofit measures. The average total incentive was about $4,110 while the median was close to $1,800.

Table 6-10 Average and Median Incentive for Retrofit Customers

Type of incentive	Average	Median	Range
Custom Incentive	$5,589	$5,927	$1,895 - $9,720
Prescriptive Incentive	$4,092	$1,791	$8- $140,000
Total Incentive	$7,962	$2,334	$85- $87,230

The Business Portfolio had 269 participating facilities in 2011. Figure 6-6 presents the distribution of participants by facility type.

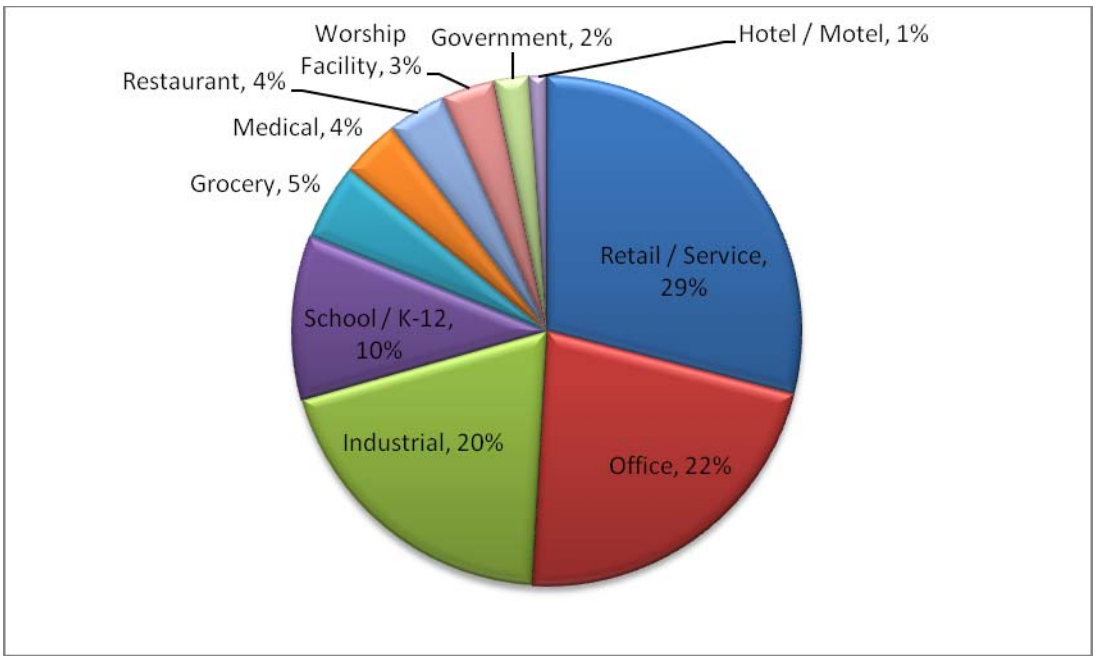


Figure 6-6 Business Portfolio Distribution of Participants by Facility Type

The distribution of savings did not match the distribution of facilities, in that Retail/Service facilities were typically low savers. In many cases, however, a retail chain would be responsible for the retrofitting of several locations, and in aggregate these facilities accounted for a sizable amount of savings. Figure 6-7 summarizes the distribution of expected savings by facility type.

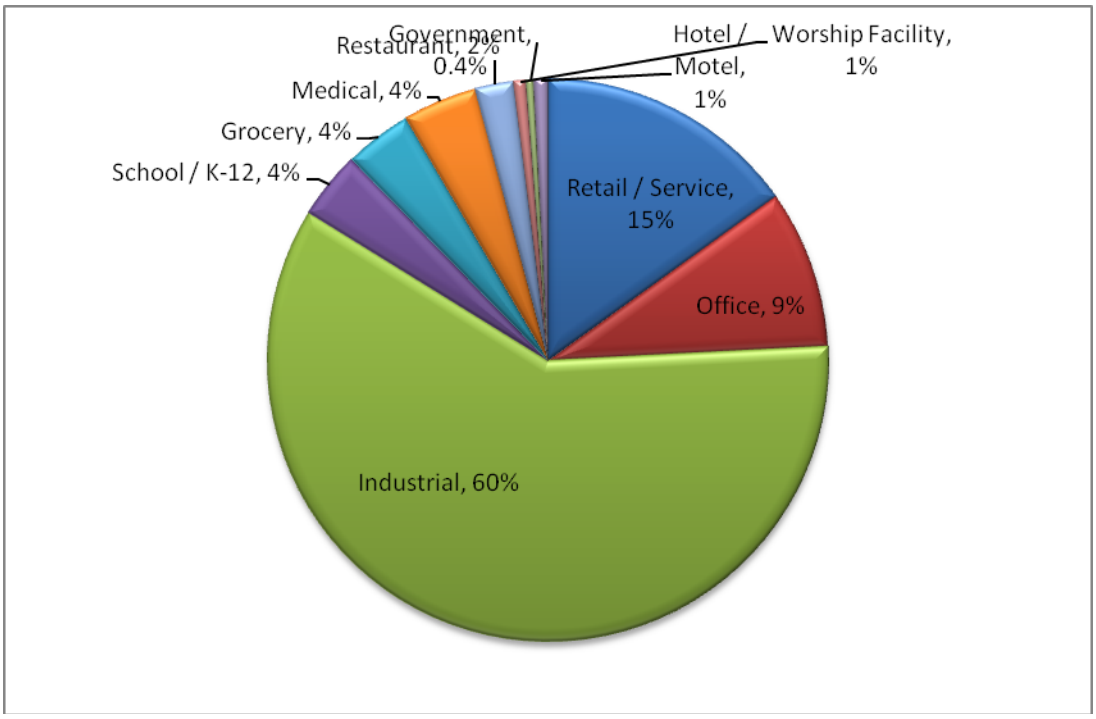


Figure 6-7 Retrofit Rebated Distribution of Expected Savings by Facility Type

6.3.2 Customer Outcomes

SPS utilizes multiple marketing strategies to make customers aware of its programs. The program partners with trade allies such as lighting contractors, motor vendors, HVAC companies, engineering firms and others who promote programs with their customers. SPS has a website where customers can learn about various measures and obtain forms. Additionally, SPS began funding "Business Education", which covers a range of channels such as direct business marketing and the funding of site audits for larger customers.

A survey was conducted to collect data about customer decision-making, preferences, and perspective of the Commercial Comprehensive Program. In total, 2 decision makers responded to the survey, representing 79 facilities. Because some decision makers represent more than one facility, such as with retail chains, responses for each of the 79 locations will be considered individually for the purposes of aggregation.

6.3.2.1 How Customers Learn About the Program

Table 6-11 displays the customer responses to how they learned about the program. The percentages are the percentages of respondents. A large volume of respondents indicated either word of mouth or a rebate consultant. Rebate consultants accounted for much of the retail participation in 2011, outside of the small business respondents. Word of mouth is most prevalent among the industrial sector, particularly the oil industry. Facility managers in this industry communicate often and as such this information is disseminated informally.

Table 6-11 How Customer Decision Makers Learned about the Program

	Percent of Respondents
An equipment vendor or building contractor	4%
A SPS representative mentioned it	9%
Friends or colleagues (i.e., word of mouth)	48%
An architect, engineer or energy consultant	8%
The SPS website	5%
SPS Brochure	3%
Rebate Consultant	23%
N	79

* Customer could make multiple responses. The percentages are based on the number of respondents rather than the number of responses. Thus, the total exceeds 100%.

An important question is when respondents learned about the program. As shown in

Table *6-12*, 14% of the customers learned about the program before they planned equipment replacements, and 43% learned about it during planning equipment replacement. 43% respondents indicated that they had learned about the program after the equipment had been specified and/or installed.

Table 6-12 When Customer Decision Makers Learned about the Program

When did you learn of the Commercial Comprehensive Program?	Percent of Respondents
Before planning for replacing the equipment began	14%
During your planning to replace the equipment	43%
Once equipment had been specified but not yet installed	43%
After equipment was installed	0%
Don't know	0%
N	79

ADM then Cross-tabulated whether the respondent had plans to install equipment before participating in the program, with the outcome displayed in Table 6-13. Entries that have "-" indicate that there were no answers possible to qualify for that category.

Table 6-13 When Customer Decision Maker Learned about the Program, by Whether There Were Plans to Install Equipment

Had Plans to Install Measure Before Participating	Before Planning For Replacing the Equipment Began	During Your Planning to Replace the Equipment	Once Equipment Had Been Specified But Not Yet Installed	After Equipment Was Installed	Don't Know
Yes	7%	39%	54%	-	-
No	44%	56%	0%	-	-

6.3.2.2 Customer's Attitudes, Behaviors and Decision Making with Respect to Energy Efficiency

Customers were asked about the importance of energy efficiency in facility operational planning as compared with other factors. As shown in Table 6-14, 82% of the customer respondents reported that compared to other factors energy efficiency was a very important factor in planning their operations.

Table 6-14 Importance of Energy Efficiency Compared to Other Factors

Importance	Percent of Respondents
Very important	83%
Somewhat important	16%
Only slightly important	1%
Not important at all	0%
N	79

Respondents were given a list of factors, shown in Table 6-15, and asked how important each of the factors was in their decision to participate. The highest percentage of customer respondents rated past experience with energy efficient

equipment as “very important” (47%), followed by the incentive payment from SPS (92%),

Table 6-15 Percent Rating Factors Influencing the Decision to Participate

Energy Efficiency Decision Making Factor	*Very Important*	*Somewhat Important*	*Only Slightly Important*	*Not Important At All*	*Don’t Know*	*N*
Incentive payments from SPS	92%	6%	1%	0%	0%	79
Past experience with energy efficient equipment	47%	50%	1%	0%	2%	79
Organization’s policies	22%	29%	1%	46%	1%	79
Advice and/or recommendations received from SPS	27%	23%	5%	44%	1%	79
Advice and/or recommendations received from Contractor	31%	10%	0%	59%	0%	79

The importance of energy efficiency and the importance of incentive payments as rated by the customer were examined by the amount of the customer’s gross realized savings for projects rebated through the Business Portfolio. Table 6-16**Error! Reference source not found.** displays the results. For the custom measures respondents with either a very large or relatively small amount of realized gross kWh savings placed the most importance on incentive payments from SPS. Because the customers with the highest realized savings are among SPS’ larger customers, they have the most potential for program participation and incentive achievement. Conversely, customers with smaller savings may rely more on custom incentives due to the comparably small benefits of non-incentivized equipment installation. In addition, the participants with lower kWh savings were more likely to state that energy efficiency is a very important factor in the planning process. These trends also appear to hold true for the customers receiving prescriptive incentives. For both prescriptive and custom measures, the greatest percentage of responses indicating high importance of incentives comes from the smallest kWh savings group. In the prescriptive project respondents, the least likely to place a high importance on SPS incentive payments was the group with gross realized savings between 30,536 kWh and 61,339 kWh. Overall, the groups with the largest percentage saying the incentive was very important were those with the lowest expected savings.

Table 6-16 Custom Incentive Project Decision Maker Attitudes toward Energy Efficiency and Program Incentives, by Customer Gross Savings

Group Number	Realized Gross kWh Savings	Number of Respondents	Percent stating that energy efficiency as a factor in facility operational planning is "very important"	Percent stating that incentive payments from SPS are "very important" for decision making regarding energy efficiency improvements
5	> 230,000	5	60%	100%
4	55,000 – 230,000	7	71%	100%
3	23,000 – 55,000	19	84%	95%
2	7,000- 23,000	22	82%	95%
1	< 7,000	25	88%	84%
All Respondents		37	83%	92%

6.3.2.3 Where Decision Makers get Their Information

Respondents were asked whom they rely on for information about energy efficient equipment, materials and design features. Respondents could provide multiple responses and the percentages are percentages of firms, and so the total shown in Table 6-17 does not equal 100%.

Table 6-17 Who Respondents Rely on for Information

Information Source	Percent of Respondents
Equipment vendors or building contractors	67%
An architect, engineer or energy consultant	36%
Friends and colleagues	18%
Trade journals or magazines	26%
Brochures or advertisements	35%
Trade associations or business groups you belong to	19%
Trade Shows	12%
The SPS website	35%
A SPS Account Representative	41%
A SPS Energy Specialist	23%
Other	4%
N	79

* Customer could make multiple responses. The percentages are based on the number of respondents rather than the number of responses. Thus, the total exceeds 100%.

6.3.2.4 Prior Experience with Efficient Equipment

The respondents were asked whether they had purchased or installed energy efficient equipment before participating in the program, with 58% of the respondents indicating having done so. Respondents were also asked how often they try to purchase and install energy efficient equipment. 71% of the respondents said that they always do this and another 25% said that they usually do this. Because the percentage of

respondents that now report always purchasing efficient equipment is higher than the percentage that purchased it before the program, the data reinforces the idea that the program has influenced customers to make more energy efficient purchasing decisions.

6.3.2.5 Satisfaction with the Program

Respondents were asked about their levels of satisfaction with selected aspects of the program on a scale of 1 to 5 where 1 is very dissatisfied and 5 is very satisfied. Table 6-18 shows the results. The table is organized by items that had the highest percentage of very satisfied ratings. Respondents reported the greatest satisfaction with the information provided by the SPS representative and with the overall program experience. This was followed closely by the performance of the installed equipment, and then quality of the work conducted by the contractor. This ranking is quite consistent with rankings of equipment and contractors in other programs.

Table 6-18 Customer Decision Maker Satisfaction with Selected Elements Program Experience

Element of Program Experience	***Percent of Respondents***						
	Very Dissatisfied	***Somewhat Dissatisfied***	***Neither Satisfied nor Dissatisfied***	***Somewhat Satisfied***	***Very Satisfied***	***Don't Know***	***N***
Performance of the equipment installed	0%	0%	0%	13%	86%	1%	135
Overall program experience	0%	0%	0%	7%	93%	0%	138
Information provided by SPS Account Representative	0%	0%	0%	12%	87%	1%	121
Quality of the work conducted by your contractor	0%	0%	0%	12%	70%	18%	130
Incentive amount	0%	0%	0%	13%	86%	1%	136
The effort required for the application process	0%	0%	0%	12%	69%	19%	132
The elapsed time until you received the incentive	0%	0%	0%	13%	84%	3%	132
Savings on your monthly bill	0%	0%	8%	8%	78%	6%	133
Information provided by your contractor	0%	0%	4%	12%	65%	19%	115

7. Appendix A: Site Reports

This appendix contains the site reports for evaluation of the SPS 2011 Business Portfolio.

Project Number 1-89GKW
Program Business Lighting

Project Background

The participant is a large retail facility that received incentives from SPS for implementing energy efficient lighting as part of a new construction project. On-site, ADM verified the participant had installed:

- (610) 6-lamp T8, with a baseline of 400W Metal Halide fixtures on the sales floor; and
- (3,825) 28W T8 lamps, with a baseline of 32W T8 lamps on the sales floor; and
- (26) 320W Metal Halide fixtures, with a baseline of 400W Metal Halide fixtures in the Garden Center.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated based upon metered runtime data. ADM did not monitor this particular facility, but in a prior-year evaluation monitoring was conducted at another new construction retail facility by the same company that has the same operating parameters. The metered data from that project was applied in evaluating savings from this facility's high efficiency lighting. We applied stipulated Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. Peak Coincident Factor (PCF) was determined through on-site monitoring. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	***CA DEER 2008 Space Type***	***Annual Hours***	***HCEF***	***HCDF***	***PCF***
Large Single Story Retail	Sales Area	4,992	1.348	1.109	1.00
Large Single Story Retail	Garden Center	4,080	1.00	1.00	0.00

Savings Calculations

Using values from the table above, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} \quad kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
400W MH to 4' 6L T8	610	610	458	182	4,992	4,992	1,057,257	931,805	1.109	88%
400W MH to 320W PS MH	26	26	458	349	4,080	4,080	17,707	11,563	1.000	65%
4' 1L T8 to 4' 1L T8 28W	3825	3825	31	26	4,992	4,992	79,078	105,849	1.109	134%
						Total	**1,154,042**	**1,049,216**		**91%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
400W MH to 4' 6L T8	610	610	458	182	0.88	0.88	217.38	199.70	1.35	92%
400W MH to 320W PS MH	26	26	458	349	0.00	0.00	3.64	0.00	1.00	0%
4' 1L T8 to 4' 1L T8 28W	3825	3825	31	26	0.88	0.88	16.26	22.69	1.35	140%
						Total	**237.28**	**222.39**		**94%**

Results

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
400W MH to 4' 6L T8	931,805	199.70	88%	92%
4' 1L T8 to 4' 1L T8 28W	11,563	0.00	65%	0%
400W MH to 320W PS MH	105,849	22.69	134%	140%
Total	**1,049,216**	**222.39**	**91%**	**94%**

Project Number 1-808JG
Program Business Lighting

Project Background

The participant is a small retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (27) 4' 4-lamp T8 fixtures, replacing 8' 2-lamp and 4' 4-lamp T12 fixtures in the office and corridor; and
- (18) 3-lamp low-wattage T8 fixtures, replacing 3-lamp T12 fixtures in the conference room

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using facility specific hours of 3,650, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

Space Type	*Annual Hours*	*HCEF*	*HCDF*	*PCF*
Small Office	3,650	1.097	1.313	0.81
Small Office- Corridor	3,650	1.097	1.313	0.81

Savings Calculations

Using deemed values from the table above ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	13	13	188	118	3,650	3,650	4,563	3,643	1.097	80%
4' 4L T12 to 4' 4L T8	5	5	188	118	3,650	3,650	1,755	1,401	1.097	80%
8' 2L T12 to 4' 4L T8	9	9	173	118	3,650	3,650	1,722	1,982	1.097	115%
4' 3L T12 to 4' 3L T8	18	18	151	93	3,650	3,650	6,016	4,180	1.097	69%
						Total	**14,056**	**11,205**		**80%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	13	13	188	118	.81	.81	0.71	0.97	1.313	137%
4' 4L T12 to 4' 4L T8	5	5	188	118	.81	.81	0.27	0.37	1.313	137%
8' 2L T12 to 4' 4L T8	9	9	173	118	.81	.81	0.28	0.53	1.313	188%
4' 3L T12 to 4' 3L T8	18	18	151	93	.81	.81	1.03	1.11	1.313	108%
						Total	**2.28**	**2.98**		**130%**

Results

The kWh realization rate for SPS-1-808JG is 100%. The kW realization exceeded ex ante estimates due to a higher PCF calculated from ADM monitoring data.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 4L T12 to 4' 4L T8	3,643	0.97	80%	137%
4' 4L T12 to 4' 4L T8	1,401	0.37	80%	137%
8' 2L T12 to 4' 4L T8	1,982	0.53	115%	188%
4' 3L T12 to 4' 3L T8	4,180	1.11	69%	108%
Total	**11,205**	**2.98**	**80%**	**130%**

Project Number 1-7XL12
Program Business Lighting

Project Background

The participant is a small retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (400) 32W Watt T8 lamps, replacing 32W T8 lamps on the sales floor

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and PNM peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	***CA DEER 2008 Space Type***	***Annual Hours – Non-CFLs***	***Annual Hours – CFLs***	***HCEF***	***HCDF***	***PCF***
Small Retail	Sales Area	3,378	4,013	1.101	1.335	.88

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures

HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 1L T8 to 4' 1L T8 28W	400	400	31	26	3,378	3,378	4,631	7,446	1.102	161%
						Total	**4,631**	**7,446**		**161%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 1L T8 to 4' 1L T8 28W	400	400	31	26	.88	.88	1.70	2.35	1.335	138%
						Total	**1.70**	**2.35**	**-**	**138%**

Results

The kWh realization rate for SPS-1-7XL12 is 129%. kWh savings were increased due to higher HCEF values determined by ADM and an increase in operating hours. SPS had used 3,068 hours for retail. By CA DEER 2008 guidelines, annual hours of use for small retail sales floor lighting is 3,378.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 1L T8 to 4' 1L T8 28W	7,446	2.35	161%	138%
Total	**7,446**	**2.35**	**161%**	**138%**

Project Number 1-7YZVT
Program Business Cooling

Project Background

The participant is a hospital that received incentives from SPS for installing a new energy efficient chiller. On-site, ADM verified the participant installed:

- (1) 750-Ton VFD equipped centrifugal chiller.

The facilities new chiller replaced three older chillers which consisted of (1) 300 ton and (2) 200 ton chillers. These chillers were at the end of their expected useful life, therefore according to SPS's 2010 Tech Assumptions a centrifugal chiller above 300 tons must have a minimum rated efficiency of 0.58 kW/ton and is not required to have a VFD installed on the chiller's compressor. This minimum efficiency is consistent with the ASHRAE 90.1-2006 standards which require an operating COP of 6.10.

M&V Methodology

ADM verified the installation of the York Max-E Centrifugal chiller. During the site visit, ADM interviewed site contacts to determine operating set points of the facility and what control strategies were currently being used. Name plate data was also collected for all essential HVAC related equipment including; pumps, air handlers, boilers, cooling towers, and the new chiller.

Savings Calculations

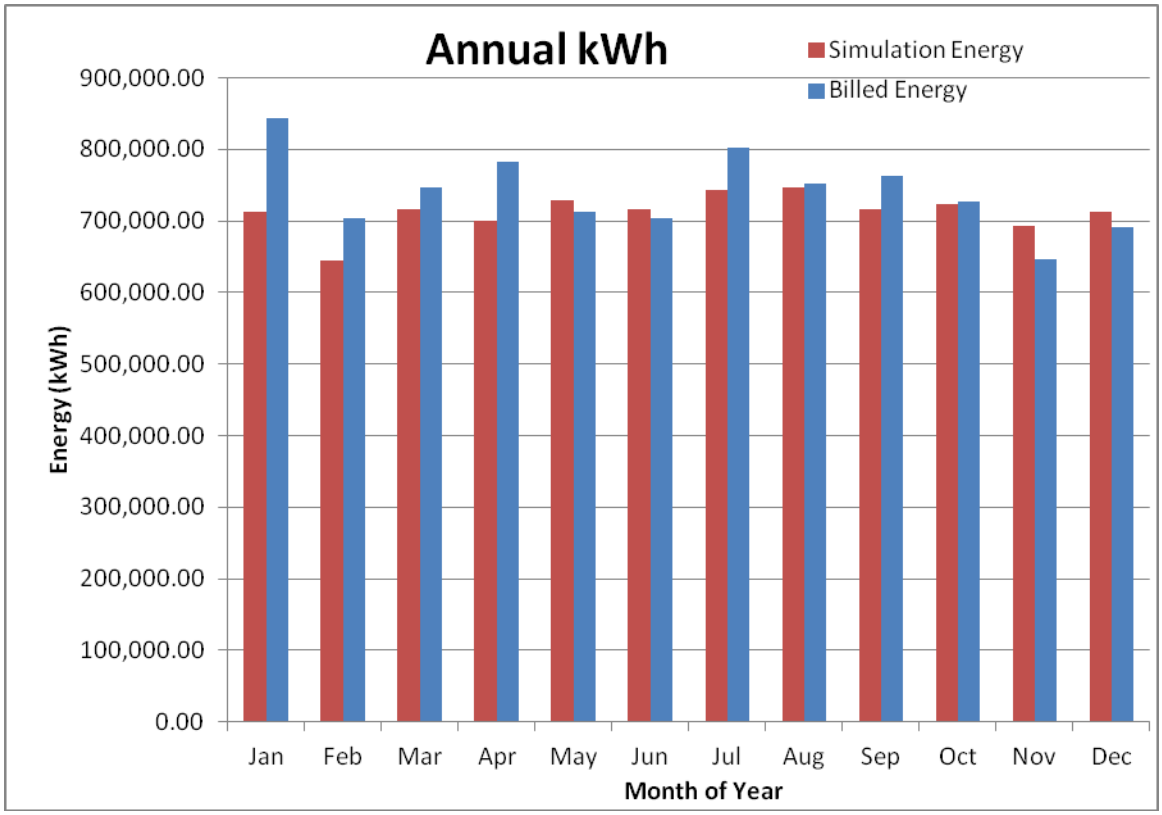
Calibrated simulations were used to calculate the total savings due to the installation of the new chiller. eQuest was used to compile a building simulation model, which properly reflects the typical operation of the hospital. The as-built model was calibrated using monthly billing data, actual weather, building characteristics, operating schedules and operational set points obtained during ADM's site visit.

Once the model was calibrated to within 10% of monthly billing, the weather file was changed to TMY2 in order to properly reflect a typical operating year. A parametric run was then used to change the chiller's performance characteristics to that of a minimally compliant chiller with a rate efficiency of 0.58 kW/ton. The kWh savings for the installation of the chiller was calculated by subtracting the as-built building energy consumption from that of the parametric run's consumption.

HVAC Retrofit kWh Savings by End-Use

End Use	Baseline	As-Built	Savings
Lights	2,033,323	2,033,323	0
Misc. Equipment	1,919,772	1,919,772	0
Cooling	1,616,168	1,248,242	367,926
Heat Rejection	89,383	86,234	3,149
Pumps	1,114,526	1,112,897	1,629
Fans	2,153,953	2,153,953	0
Total	8,927,124	8,554,423	372,701

eQuest Monthly kWh Calibration



Results

Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
750 Ton Chiller	372,701	72.94	97%	334%
Total	372,701	72.94	97%	334%

The high kW realization rate can be attributed to the implementer using a deemed saving approach for calculating the chiller retrofit energy savings. This method assumes

that the pre and post chillers are at full load, which not the case at this facility. Due to the chiller being oversized it operates at a much better part load efficiency than was anticipated.

Project Number 1-89H11
Program Business Cooling

Project Background

The participant is a retail facility that received incentives from SPS for implementing energy efficient HVAC systems in a new construction project. The facility installed new high efficiency Roof Top Units (RTUs). On-site, ADM verified the participant installed:

- (8) 15-Ton RTUs with an EER of 12,
- (8) 10-Ton RTUs with an EER of 12,
- (4) 3-Ton RTUs with an EER of 14.5, and
- (1) 4-Ton RTU with an EER of 14.5.

M&V Methodology

ADM verified the installation of all RTU's and concluded that the rebated RTUs matched those that were installed. The Equivalent Full Load Hours value was obtained from SPS's 2011 Tech Assumptions which was stated to be 1,681 hours for a retail type facility. ADM reviewed this value via simulation of archetypical buildings with Roswell NM TMY weather data and determined the value to be reasonable.

Deemed Savings Parameters

Building Type	***EFLH***
Retail	1,681

Savings Calculations

Using values from the table above, ADM calculated HVAC savings as follows:

Parameters for Calculation of kWh Savings for HVAC Retrofits

#Units	Quantity of Rebated HVAC Units
Cap	Unit Capacity (Measured in Tons)
$SEER_{base}$	Baseline SEER
$SEER_{Post}$	Installed SEER
EFLH	Equivalent Full Load Hours (Encompassing both heating and cooling hours in cases of heat pumps)

Following this, ADM calculated peak kW savings. Peak savings for RTU retrofits are calculated using the following equation:

Parameters for Calculation of kW reduction for HVAC Retrofits

#Units	Quantity of Rebated HVAC Units
Cap	Unit Capacity (Measured in Tons)
$SEER_{base}$	Baseline SEER
$SEER_{Post}$	Installed SEER
CF	Coincidence factor.

HVAC Retrofit kWh Savings Calculations

# of Units	Capacity	EFLH	SEER		*Expected kWh Savings*	*Realized kWh Savings*	Realization Rate
			Base	Post			
8	15	1,681	11.2	14.1	45,118	45,122	100%
8	10	1,681	11.9	14.1	21,502	21,502	100%
4	3	1,681	9.7	17.0	9,967	10,716	107%
1	4	1,681	9.7	17.0	3,322	3,572	97%
				Total	**79,909**	**80,913**	**101%**

HVAC Retrofit kW Savings Calculations

# of Units	Capacity	EFLH	EEER		*Expected kW Savings*	*Realized kW Savings*	Realization Rate
			Base	Post			
8	15	1,681	9.5	12.0	28.42	28.42	100%
8	10	1,681	10.1	12.0	13.55	13.54	100%
4	3	1,681	8.2	14.5	6.28	6.75	107%
1	4	1,681	8.2	14.5	2.33	2.25	97%
				Total	**50.57**	**50.97**	**101%**

Results

Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
15 Ton RTU	45,122	28.42	100%	100%
10 Ton RTU	21,502	13.54	100%	100%
3 Ton RTU	10,716	6.75	107%	107%
4 Ton RTU	3,572	2.25	97%	97%
Total	**80,913**	**50.97**	**101%**	**101%**

Project Number 1-7XWD4
Program Business Cooling

Project Background

The participant is a retail facility that received incentives from SPS for the purchase of a window evaporative cooler. On-site, ADM verified the participant purchased:

- (1) RWC35 Evaporative Window Cooler.

M&V Methodology

During the site verification it was determined that the facility purchased the claimed evaporative cooler, however it had not been installed. The site contact indicated that it was not to be installed until May 2012.

Savings Calculations

Savings calculations were not performed, as the facility has failed to install the evaporative window cooler, therefore the evaporative cooler is unable to produce energy savings.

Results

Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
RWC35 Evaporative Cooler	0	0	0%	0%
Total	**0**	**0**	**0%**	**0%**

No savings was attributed to the site as the measure has yet to be installed.

Project Number 1-8530C
Program Business Custom Efficiency

Project Background

The participant is a movie theater that received incentives from SPS for installing a load management system. On-site, ADM verified the participant installed:

- (13) Regen Energy EnviroGrid management controllers.

The EnviroGrid management controllers are designed to cycle RTUs in a manner to prevent all of the units from running at the same time. This is designed to reduce the 15 minute peak kW demand of the facility, and does not produce a kWh savings.

M&V Methodology

ADM verified the installation of the EnviroGrid controllers, and interviewed site contacts about the pre and post install operation. The original project application claims the baseline RTUs ran 24/7, while the EnviroGrid controllers only allow the systems to operate from 12 p.m. to 12 a.m.. ADM inquired about this claim, and was informed that the facility was never conditioned 24/7. The facility manage assured that every day the thermostats for each unit were manually turned on and off at the beginning and end of business hours.

Savings Calculations

In order to prove that the facility is not conditioned 24/7 in the baseline case as claimed by the application, ADM performed a variable degree day regression analysis. A variable degree day regression creates multi-variable linear correlation between heating degree days, cooling degree days, and the facility's consumption for a given period. From the regression the flowing equation was derived:

$$kWh_{Month} = 55.08 \times CDD_{Month} + 15.78 \times HDD_{Month}$$

Parameters for Calculation of Monthly HVAC kWh Use

kWh_{Month}	Monthly HVAC Use
CDD_{Month}	Cooling Degree Days For a Given Month
HDD_{Month}	Heating Degree Days For a Given Month

Monthly kWh Use for HVAC (TMY3)

Month	CDD	HDD	kWH
January	4.94	530.65	8,644
February	20.86	431.32	7,954
March	71.77	230.90	7,597
April	131.47	130.43	9,300
May	238.16	17.48	13,395
June	371.80	2.47	20,519
July	427.10	0	23,526
August	414.84	0	22,851
September	232.27	8.63	12,930
October	127.10	78.94	8,246
November	17.80	314.83	5,948
December	4.29	427.90	6,988
		Total	147,897

The variable degree day regression analysis shows that for a typical year the facility's HVAC only consumes 147,897 kWh. The claimed savings by the implementer is 178,173 kWh, which is larger than the average annual use for the facility's HVAC system and proves the system did not operate 24/7 in the baseline case.

Results

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
EnviroGrid Controllers	0	0	0%	0%
Total	0	0	0%	0%

The 0% realization rate is due to the implementer claiming a reduction in fan savings for the installation of the EnviroGrid controllers. This was proven erroneous through interviews with site contacts and a variable degree day regression analysis. Therefore no savings have been attributed to the site.

Project Number 1-8CR7E
Program Business Motor & Drives

Project Background

The participant is a mineral mining facility that received incentives from SPS for the installation of Variable Frequency Drives (VFDs) on slurry pumps. On-site, ADM verified the participant installed:

- (4) VFDs on 50 Hp slurry pumps
- (2) VFDs on 60 Hp slurry pumps
- (4) VFDs on 75 Hp slurry pumps
- (4) VFDs on 100 Hp slurry pumps
- (1) VFD on a 125 Hp slurry pump
- (4) VFDs on 200 Hp slurry pumps
- (5) VFDs on 150 Hp slurry pumps.

M&V Methodology

ADM verified the installation of the VFDs during the field visit. During the on-site verification site contacts were interviewed, in order to determine typical operating profiles, and baseline control strategies.

ADM also installed monitoring equipment on a sample of the VFD controlled slurry pumps. During this period, kW was monitored using 5 minute intervals for approximately 3 weeks.

Savings Calculations

In order to calculate the energy savings for the installation of the VFDs, ADM used the data collected during the monitoring period. Using this data an average daily profile for each day of the week was determined for each monitored pump. Assuming that the GPM of the system would remain constant between the as-built and baseline system, pump affinity laws were used to determine corresponding flow rates for each hour of the profile mentioned above. Assuming that the baseline pump used trim valves to modulate flow causing the pump to ride the curve of its impeller, manufacturer curves were used to determine the resulting kW demand necessary to produce the corresponding flow rate.

The annual savings for the installation of the VFD is the difference between the baseline and as-built profiles extrapolated to a yearly interval. The following table shows the resulting savings for the VFDs that were monitored:

Normalized Savings from Monitored Pumps

HP	*kWh Savings*	*kWh/Hp*	*kW Reduction*	*kW/Hp*

60	108,648	1,811	12.99	0.22
100	119,613	1,196	14.45	0.14
Weighted Average	**–**	**1,427**	**–**	**0.17**

Using this data, ADM applied the weighted average savings to the unmonitored VFDs, while the monitored VFDs retained their monitored savings. The following table shows the calculated savings for all of the installed VFDs:

VFD kWh and kW Savings Calculations

Quantity	*Hp*	*Total Hp*	*Ex-Ante Savings*		*Ex-Post Savings*		*Realization Rates*	
			kWh	*kW*	*kWh*	*kW*	*kWh*	*kW*
4	50	200	191,043	30.48	285,327	34.31	149%	113%
2	60	120	132,168	18.19	217,296	25.98	164%	143%
4	75	300	329,034	45.29	427,990	51.46	130%	114%
4	100	400	438,711	60.38	478,453	57.81	109%	96%
1	125	125	124,009	18.87	178,329	21.44	144%	114%
4	200	800	787,059	119.76	1,141,306	137.22	145%	115%
5	150	750	740,949	112.75	1,069,974	128.65	144%	114%
		Total	**2,742,973**	**405.72**	**3,798,675**	**456.87**	**138%**	**113%**

ADM calculated peak kW savings based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays.

Results

Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
VFDs	2,742,973	405.72	3,798,675	456.87
Total	**2,742,973**	**405.72**	**3,798,675**	**456.87**

It was calculated that the installation of the VFDs decreases annual energy consumption by 3,798,675 kWh and a demand reduction of 456.87 kW resulting in a realization rate of 138%.

ADM attributes the high realization rate to SPS using a deemed savings approach for VFD savings. The assumption made by SPS assumes that the motor operates for 5,126 hours and the VFD reduces consumption by 33%. These assumptions do not properly reflect the system at hand as it was determined through monitoring data that on average the slurry pumps operate 8,321 hours.

Project Number	1-7XYHB, 1-7XYH5, 1-7YG9G, 1-82RNV, 1-82QA1, 1-8DL9F,1-871HB, 1-8F1GV, 1-871HH, 1-871H1, 1-871OB, 1-8F1HH
Program	Business Motor & Drives

Project Background

The participant is a food manufacturing facility that received incentives from SPS for the installation of a large number of Variable Frequency Drives (VFDs) and premium efficiency motors. On-site, ADM verified the participant installed:

Variable Frequency Drives	*Premium Efficiency Motors*
• (1) 100 HP VFD	• (3) 75 HP Motors
• (15) 75 HP VFDs	• (1) 50 HP Motor
• (2) 60 HP VFDs	• (6) 30 HP Motors
• (1) 40 HP VFD	• (5) 20 HP Motors
• (25) 30 HP VFDs	• (30) 15 HP Motors
• (1) 25 HP VFD	• (47) 10 HP Motors
• (2) 20 HP VFDs	• (1) 7.5 Hp Motors
• (2) 15 HP VFDs	• (42) 5 HP Motors
• (2) 10 HP VFDs	• (6) 3 HP Motors
• (1) 5 HP VFD	• (28) 2 HP Motors
• (3) 3 HP VFDs	• (29) 1.5 HP Motors
	• (48) 1 HP Motors

M&V Methodology

ADM verified the installation of the VFDs and premium efficiency pumps during the field visit. During the on-site verification site contacts were interviewed, in order to determine typical operating profiles, and baseline control strategies which were determined to be constant speed.

ADM also installed monitoring equipment on a sample of the VFD controlled motors. During this period, kW was monitored using 5 minute intervals for approximately 6 weeks.

Savings Calculations

In order to calculate the energy savings for the installation of the VFDs, ADM used the data collected during the monitoring period. Using this data an average daily profile for each day of the week was determined for each monitored pump. Assuming that the GPM of the system would remain constant between the as-built and baseline system, pump affinity laws were used to determine corresponding flow rates for each hour of the profile mentioned above. Assuming that the baseline pump used trim valves to

modulate flow causing the pump to ride the curve of its impeller, manufacturer curves were used to determine the resulting kW demand necessary to produce the corresponding flow rate.

The annual savings for the installation of the VFD is the difference between the baseline and as-built profiles extrapolated to a yearly interval. The following table shows the resulting savings for the VFDs that were monitored:

Normalized Savings from Monitored Pumps

HP	Hours	kWh Savings	kWh/Hp	kW Reduction	kW/Hp
10	8,738	33,973	3,397	3.76	0.376
75	8,760	81,678	1,089	10.29	0.137
20	6,863	34,375	1,719	1.91	0.096
75	8,561	84,749	1,130	16.30	0.217
40	8,425	78,646	1,956	9.47	0.235
Weighted Average	**8,458**	**–**	**1,423**	**–**	**0.189**

Using this data, ADM applied the weighted average savings to the unmonitored VFDs, while the monitored VFDs retained their monitored savings. The following table shows the calculated savings for all of the installed VFDs:

VFD kWh and kW Savings Calculations

Quantity	Hp	Total Hp	Ex-Ante Savings		Ex-Post Savings		Realization Rates	
			kWh	kW	kWh	kW	kWh	kW
24	30	720	714,209	113.95	1,024,745	136.42	143%	120%
14	75	1,050	1,181,336	162.60	1,143,497	144.01	97%	89%
1	15	15	12,542	2.37	21,349	2.84	170%	120%
1	3	3	2,139	0.49	4,270	0.57	200%	115%
1	60	60	63,094	8.00	85,395	11.37	135%	142%
1	5	5	3,566	0.82	7,116	0.95	200%	115%
2	3	6	4,378	1.01	8,540	1.14	195%	112%
1	10	10	8,501	1.61	33,973	3.76	400%	234%
2	20	40	33,742	6.39	68,750	3.83	204%	60%
1	30	30	29,759	4.75	42,698	5.68	143%	120%
1	40	40	39,375	6.28	78,646	9.47	200%	151%
1	25	25	24,423	3.90	35,581	4.74	146%	122%
1	60	60	63,094	8.00	85,395	11.37	135%	142%
1	15	15	12,542	2.37	21,349	2.84	170%	120%
1	10	10	8,501	1.61	14,233	1.89	167%	118%
1	75	75	83,394	11.48	84,749	16.30	102%	142%
1	100	100	111,787	15.37	112,999	21.73	101%	141%
		Total	**2,396,383**	**351**	**2,873,285**	**379**	**120%**	**108%**

In order to calculate the savings from the installation of the premium efficiency motors, ADM used SPS's Deemed Savings Technical Assumptions informed by the hours of operations deduced from the monitoring data.

$$Annual\ kWh\ Savings = HP * LF * Conv * \left(\frac{1}{Eff_{base}} - \frac{1}{Eff_{post}}\right) * Hrs$$

Parameters for kWh Savings Calculation for Premium Efficiency Motors

Hp	Rated Horsepower of Installed Motor
LF	Motor Load Factor (.75)
Conv	Conversion Factor Between Horsepower and Kilowatts (.746)
Eff_{base}	Baseline Motor Efficiency from SPS's Deemed Savings Technical Assumptions
Eff_{post}	Installed Motor Efficiency
Hrs	Average Operating Hours of the Motor Determined from Monitoring

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Reduction = HP * LF * Conv * \left(\frac{1}{Eff_{base}} - \frac{1}{Eff_{post}}\right) * CF$$

Parameters for Peak Demand (kW) Savings Calculation for Premium Efficiency Motors

Hp	Rated Horsepower of Installed Motor
LF	Motor Load Factor (0.75)
Conv	Conversion Factor Between Horsepower and Kilowatts (0.746)
Eff_{base}	Baseline Motor Efficiency from SPS's Deemed Savings Technical Assumptions
Eff_{post}	Installed Motor Efficiency
CF	Coincidence Factor (0.78)

Motor Retrofit kWh Savings Calculations

End-Use	Quantity	HP	Efficiency		Hours	Expected kWh Savings	Realized kWh Savings	Realization Rate
			Base	Post				
Pump	7	10	86.3%	91.7%	8,458	11,013	22,603	205%
Other	10	10	86.3%	92.4%	8,458	12,579	36,200	288%
Fan	14	15	87.2%	92.4%	8,458	32,728	64,135	196%
Fan	2	5	83.2%	89.5%	8,458	2,154	4,004	186%
Fan	3	75	90.9%	94.5%	8,458	32,452	44,622	138%
Pump	1	50	89.9%	94.5%	8,458	7,406	12,811	173%
Pump	3	30	89.4%	93.6%	8,458	12,357	21,377	173%
Pump	1	30	89.4%	93.0%	8,458	3,553	6,147	173%
Fan	2	30	89.4%	93.6%	8,458	8,595	14,251	166%
Pump	7	15	87.2%	91.0%	8,458	11,594	23,794	205%
Pump	20	5	83.2%	90.2%	8,458	17,639	44,140	250%
Other	10	2	78.5%	88.5%	8,458	3,922	13,623	347%
Pump	7	2	78.5%	85.5%	8,458	2,761	6,910	250%
Other	6	15	87.2%	92.4%	8,458	9,551	27,486	288%
Pump	3	15	87.2%	91.0%	8,458	4,969	10,198	205%
Pump	2	20	88.1%	93.0%	8,458	5,516	11,320	205%
Pump	4	10	86.3%	91.7%	8,458	6,293	12,916	205%
Pump	20	10	86.3%	92.4%	8,458	35,276	72,400	205%
Pump	3	20	88.1%	91.0%	8,458	5,004	10,270	205%
Other	48	1	76.3%	87.5%	8,458	10,970	38,105	347%
Other	10	1.5	77.4%	88.5%	8,458	3,312	11,502	347%
Other	9	2	78.5%	88.5%	8,458	3,530	12,261	347%
Pump	1	3	80.6%	89.5%	8,458	700	1,752	250%
Pump	6	10	86.3%	91.7%	8,458	9,440	19,374	205%
Other	19	1.5	77.4%	88.5%	8,458	6,292	21,855	347%
Pump	2	2	78.5%	88.5%	8,458	1,089	2,725	250%
Pump	5	3	80.6%	88.5%	8,458	3,142	7,861	250%
Pump	20	5	83.2%	90.2%	8,458	17,639	44,140	250%
Pump	1	7.5	85.3%	91.0%	8,458	1,270	2,606	205%
					Total	**282,746**	**621,387**	**220%**

Motor Retrofit kW Savings Calculations

End-Use	Quantity	HP	Efficiency		CF	Expected kW Reduction	Realized kW Reduction	Realization Rate
			Base	Post				
Pump	7	10	86.3%	91.7%	0.78	2.09	2.08	100%
Other	10	10	86.3%	92.4%	0.78	3.34	3.34	100%
Fan	14	15	87.2%	92.4%	0.78	5.92	5.91	100%
Fan	2	5	83.2%	89.5%	0.78	0.37	0.37	100%
Fan	3	75	90.9%	94.5%	0.78	4.12	4.12	100%

Pump	1	50	89.9%	94.5%	0.78	1.18	1.18	100%
Pump	3	30	89.4%	93.6%	0.78	1.97	1.97	100%
Pump	1	30	89.4%	93.0%	0.78	0.57	0.57	100%
Fan	2	30	89.4%	93.6%	0.78	1.31	1.31	100%
Pump	7	15	87.2%	91.0%	0.78	2.19	2.19	100%
Pump	20	5	83.2%	90.2%	0.78	4.07	4.07	100%
Other	10	2	78.5%	88.5%	0.78	1.26	1.26	100%
Pump	7	2	78.5%	85.5%	0.78	0.64	0.64	100%
Other	6	15	87.2%	92.4%	0.78	2.54	2.53	100%
Pump	3	15	87.2%	91.0%	0.78	0.94	0.94	100%
Pump	2	20	88.1%	93.0%	0.78	1.04	1.04	100%
Pump	4	10	86.3%	91.7%	0.78	1.19	1.19	100%
Pump	20	10	86.3%	92.4%	0.78	6.68	6.68	100%
Pump	3	20	88.1%	91.0%	0.78	0.95	0.95	100%
Other	48	1	76.3%	87.5%	0.78	3.51	3.51	100%
Other	10	1.5	77.4%	88.5%	0.78	1.06	1.06	100%
Other	9	2	78.5%	88.5%	0.78	1.13	1.13	100%
Pump	1	3	80.6%	89.5%	0.78	0.16	0.16	100%
Pump	6	10	86.3%	91.7%	0.78	1.79	1.79	100%
Other	19	1.5	77.4%	88.5%	0.78	2.02	2.02	100%
Pump	2	2	78.5%	88.5%	0.78	0.25	0.25	100%
Pump	5	3	80.6%	88.5%	0.78	0.73	0.72	100%
Pump	20	5	83.2%	90.2%	0.78	4.07	4.07	100%
Pump	1	7.5	85.3%	91.0%	0.78	0.24	0.24	100%
					Total	**57.30***	**57.31**	**100%**

***Note: Claimed kW reduction in the application does not match the program database.**

Results

Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
VFDs	2,873,285	378.89	120%	108%
Premium Efficiency Motors	621,387	57.31	220%	100%
Total	**3,494,672**	**436.20**	**130%**	**107%**

It was calculated that the installation of the VFDs and premium efficiency motors, decreases annual energy consumption by 3,494,672 kWh and a demand reduction of 436.20 kW resulting in a realization rate of 130%.

ADM attributes the high realization rate to SPS using a deemed savings approach for VFD savings. The assumption made by SPS assumes that the motor operates for 5,126 hours and the VFD reduces consumption by 33%. These assumptions do not properly reflect the system at hand as it was determined through monitoring data that on average

the motors operate 8,453 hours. The high monitored hours is also the cause of high realization for the premium efficiency motors.

Project Number 1-87AUV
Program Business Motor & Drives

Project Background

The participant is an oil company that received incentives from SPS for the installation of Pump Off Controllers (POC) on above ground oil well pumps. On-site, ADM verified the participant installed:

- (2) POCs on 20 Hp pumps.
- (3) POCs on 25 Hp pumps.
- (3) POCs on 40 Hp pumps.
- (13) POCs on 50 Hp pumps.
- (2) POCs on 60 Hp pumps.
- (1) POC on a 75 Hp pump.

M&V Methodology

ADM verified the installation of the POCs on pumps used to extract oil from the ground. The POC is designed to allow the oil depth of the well to reach an optimum depth before allowing the pump to start. Once the pump has been engage the controller only allows pumping if the oil depth is above the optimum pumping depth and once the level falls below this depth the pump is shut off. The original control strategy involved the use of an adjustable timer that would simply turn the pump on and off based on the set position of the timer.

Savings Calculations

ADM used SPS's deemed POC calculator to determine the annual energy savings of the installed POCs. The calculator was developed as a joint venture between ADM and SPS, which is informed by extensive monitoring performed by ADM at an earlier date. The deemed calculator uses the following equation:

$$kWh_{savings} = \left(\frac{Hp \times .746 \times LF}{Eff \times Mech}\right) \times \left([8{,}760 \times \{8.366 + .956 \times Pump_{eff} \times TC \times 100\}] - [8{,}760 * TC]\right)$$

Parameters for kWh Savings Calculation of POC

$kWh_{Savings}$	Annual kWh Savings for the installation of a POC
Hp	Motor Horsepower
LF	Motor Load Factor
Eff	Motor Efficiency
Mech	Mechanical Efficiency of the pump jack.
$Pump_{eff}$	Volumetric pump efficiency
TC	Time Clock setting observed during the site visit

POC kWh Savings Calculations

Measure	Motor Hp	LF	Motor Eff	Mech Eff	Pump Eff	Time Clock	Hours		Expected kWh Savings	Realized kWh Savings	Realization Rate
							Base	Post			
Pump Off Controller	25	25%	88.9%	95%	46%	80%	7,008	3,815	17,629	17,629	100%
Pump Off Controller	40	25%	89.7%	95%	14%	22%	1,927	991	46,723	8,198	18%
Pump Off Controller	40	25%	89.7%	95%	22%	22%	1,927	1,138	42,031	6,907	16%
Pump Off Controller	75	25%	90.9%	95%	36%	50%	4,380	2,240	62,576	34,658	55%
Pump Off Controller	50	25%	89.9%	95%	41%	69%	6,044	3,102	38,524	32,127	83%
Pump Off Controller	60	25%	90.4%	95%	64%	80%	7,008	5,021	25,895	25,895	100%
Pump Off Controller	50	25%	89.9%	95%	49%	69%	6,044	3,564	32,672	27,079	83%
Pump Off Controller	20	25%	88.1%	95%	33%	63%	5,519	2,474	18,113	13,570	75%
Pump Off Controller	25	25%	88.9%	95%	25%	80%	7,008	2,408	25,396	25,396	100%
Pump Off Controller	50	25%	89.9%	95%	39%	69%	6,044	2,986	39,987	33,388	83%
Pump Off Controller	50	25%	89.9%	95%	80%	69%	6,044	5,356	9,995	7,521	75%
Pump Off Controller	50	25%	89.9%	95%	19%	69%	6,044	1,831	54,617	46,007	84%
Pump Off Controller	60	25%	90.4%	95%	30%	80%	7,008	2,743	55,575	55,575	100%
Pump Off Controller	50	25%	89.9%	95%	38%	69%	6,044	2,929	40,718	34,019	84%
Pump Off Controller	50	25%	89.9%	95%	31%	69%	6,044	2,524	45,839	38,436	84%
Pump Off Controller	50	25%	89.9%	95%	13%	69%	6,044	1,484	59,006	49,792	84%
Pump Off Controller	50	25%	89.9%	95%	13%	69%	6,044	1,484	59,006	49,792	84%
Pump Off Controller	50	25%	89.9%	95%	11%	69%	6,044	1,368	60,469	51,054	84%
Pump Off Controller	50	25%	89.9%	95%	10%	69%	6,044	1,311	61,200	51,685	84%
Pump Off Controller	40	25%	89.7%	95%	16%	22%	1,927	1,028	45,550	7,875	17%
Pump Off Controller	25	25%	88.9%	95%	21%	80%	7,008	2,140	26,876	2,687	100%
Pump Off Controller	20	25%	88.1%	95%	16%	63%	5,519	1,577	23,189	17,567	76%
Pump Off Controller	50	25%	89.9%	95%	10%	69%	6,044	1,311	61,200	51,685	84%
Pump Off Controller	50	25%	89.9%	95%	15%	69%	6,044	1,600	57,543	48,530	84%
								Total	**1,010,331**	**761,263**	**75%**

During the site verification, ADM performed a sample verification of the baseline time clock settings. Using the gathered information an average baseline time clock setting for each size motor controlled was derived and applied in the analysis.

Results

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
POCs	761,263	107.48	75%	83%
Total	**761,263**	**107.48**	**75%**	**83%**

It was calculated that the installation of the POCs, decreases annual energy consumption by 761,263 kWh and a demand reduction of 107.48 kW resulting in a realization rate of 75%.

ADM attributes the low realization rate to SPS assuming an average baseline time clock setting of 80% for all POCs installed.

Project Number 1-8E33M
Program Business Motor & Drives

Project Background

The participant is an oil company that received incentives from SPS for the installation of Pump Off Controllers (POC) on above ground oil well pumps. On-site, ADM verified the participant installed:

- (1) POC on a 30 Hp pump.
- (2) POC on 40 Hp pumps.
- (5) POC on 50 Hp pumps.
- (2) POC on 60 Hp pumps.
- (1) POC on a 75 Hp pump.

M&V Methodology

ADM verified the installation of the POCs on pumps used to extract oil from the ground. The POC is designed to allow the oil depth of the well to reach an optimum depth before allowing the pump to start. Once the pump has been engage the controller only allows pumping if the oil depth is above the optimum pumping depth and once the level falls below this depth the pump is shut off. The original control strategy involved the use of an adjustable timer that would simply turn the pump on and off based on the set position of the timer.

Savings Calculations

ADM used SPS's deemed POC calculator to determine the annual energy savings of the installed POCs. The calculator was developed as a joint venture between ADM and SPS, which is informed by extensive monitoring performed by ADM at an earlier date. The deemed calculator uses the following equation:

$$kWh_{Savings} = \left(\frac{Hp \times .746 \times LF}{Eff \times Mech}\right) \times \left([8{,}760 \times \{8{,}366 + .956 \times Pump_{eff} \times TC \times 100\}] - [8{,}760 * TC]\right)$$

Parameters for kWh Savings Calculation of POC

$kWh_{Savings}$	Annual kWh Savings for the installation of a POC
Hp	Motor Horsepower
LF	Motor Load Factor
Eff	Motor Efficiency
Mech	Mechanical Efficiency of the pump jack.
$Pump_{eff}$	Volumetric pump efficiency
TC	Time Clock setting observed during the site visit

POC kWh Savings Calculations

Measure	Motor Hp	LF	Motor Eff	Mech Eff	Pump Eff	Time Clock	Hours		Expected kWh Savings	Realized kWh Savings	Realization Rate
							Base	Post			
Pump Off Controller	50	25%	89.9%	95%	80%	69%	6,044	5,356	9,995	7,521	75%
Pump Off Controller	75	25%	90.9%	95%	80%	50%	4,380	4,083	14,828	4,816	32%
Pump Off Controller	50	25%	89.9%	95%	43%	69%	6,044	3,218	37,061	30,865	83%
Pump Off Controller	60	25%	90.4%	95%	50%	80%	7,008	4,083	38,116	38,116	100%
Pump Off Controller	40	25%	89.7%	95%	38%	22%	1,927	1,433	32,647	4,327	13%
Pump Off Controller	60	25%	90.4%	95%	59%	80%	7,008	4,686	30,260	30,260	100%
Pump Off Controller	40	25%	89.7%	95%	34%	22%	1,927	1,359	34,993	4,972	14%
Pump Off Controller	30	25%	89.4%	95%	28%	75%	6,570	2,492	28,981	26,868	93%
Pump Off Controller	50	25%	89.9%	95%	30%	69%	6,044	2,466	46,570	39,067	84%
Pump Off Controller	50	25%	89.9%	95%	18%	69%	6,044	1,773	55,348	46,638	84%
Pump Off Controller	50	25%	89.9%	95%	16%	69%	6,044	1,657	56,811	47,900	84%
								Total	**385,611**	**281,348**	**73%**

During the site verification, ADM performed a sample verification of the baseline time clock settings. Using the gathered information an average baseline time clock setting for each size motor controlled was derived and applied in the analysis.

Results

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
POCs	281,348	46.74	73%	86%
Total	**281,348**	**46.74**	**73%**	**86%**

It was calculated that the installation of the POCs, decreases annual energy consumption by 281,348 kWh and a demand reduction of 46.74 kW resulting in a realization rate of 73%. ADM attributes the low realization rate to SPS assuming an average baseline time clock setting of 80% for all POCs installed.

Project Number SPS-1-87RS1, SPS-1-882EL
Program Business Motor & Drives

Project Background

The participant is an oil company that received incentives from SPS for the installation of a Variable Frequency Drive (VFD) on a process pump and a Pump Off Controllers (POC) on an above ground oil well pumps. On-site, ADM verified the participant installed:

- (1) VFD on a 125 HP process pump.
- (1) POC on a 25 HP pump.

M&V Methodology

ADM verified the installation of a VFD on a 125 HP pump used to pump water back into the ground that is extracted during the oil production process. During the on-site verification, it was determined that the VFD's operation is controlled off of the water pressure of the system and is designed to maintain a constant pressure. Due to the pump and VFD being of new construction it was assumed that the baseline operation of the pump is constant speed and trim valves were used to modulate flow and pressure of the system.

ADM also verified the installation of a POC on a pump used to extract oil from the ground. The POC is designed to allow the oil depth of the well to reach an optimum depth before allowing the pump to start. Once the pump has been engage the controller only allows pumping if the oil depth is above the optimum pumping depth and once the level falls below this depth the pump is shut off. The original control strategy involved the use of an adjustable timer that would simply turn the pump on and off based on the set position of the timer.

Savings Calculations

ADM used monitoring data from a sister site with a similar water pumping system to calculate the annual energy savings of the VFD. Monitoring equipment was installed on the main electrical circuit serving the VFD, in which kW demand was monitored at 15 second intervals for approximately seven weeks.

Using this data, an average daily profile for each day of the week was able to be determined. Assuming that the GPM of the system would remain constant between the as-built and baseline system, pump affinity laws were used to determine corresponding flow rates for each hour of the profile mentioned above. Assuming that the baseline pump used trim valves to modulate flow causing the pump to ride the curve of its impeller, manufacturer curves were used to determine the resulting kW demand necessary to produce the corresponding flow rate.

The annual savings for the installation of the VFD is the difference between the baseline and as-built profiles extrapolated to a yearly interval.

ADM used SPS's deemed POC calculator to determine the annual energy savings of the installed POC. The calculator was developed as a joint venture between ADM and SPS, which is informed by extensive monitoring performed by ADM at an earlier date. The deemed calculator uses the following equation:

$$kWh_{Savings} = \left(\frac{Hp \times .746 \times LF}{Eff \times Mech}\right) \times \left([8{,}760 \times \{8.366 + .956 \times Pump_{eff} \times TC \times 100\}] - [8{,}760 * TC]\right)$$

Parameters for kWh Savings Calculation of POC

$kWh_{Savings}$	Annual kWh Savings for the installation of a POC
Hp	Motor Horsepower
LF	Motor Load Factor
Eff	Motor Efficiency
Mech	Mechanical Efficiency of the pump jack.
$Pump_{eff}$	Volumetric pump efficiency
TC	Time Clock setting observed during the site visit

POC kWh Savings Calculations

Measure	*Motor Hp*	*LF*	*Motor Eff*	*Mech Eff*	*Pump Eff*	*Time Clock*	*Hours*		*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
							Base	*Post*			
Pump Off Controller	25	25%	88.9%	95%	35%	42%	3,679	1,964	21,698	9,470	44%
								Total	**21,698**	**9,470**	**44%**

Results

Verified Gross Savings & Realization Rates

Measure	*Verified*			
	kWh Savings	*kW Savings*	*kWh Realization Rate*	*kW Realization Rate*
125 HP VFD	674,797	77.53	267%	202%
25 HP POC	9,470	1.80	44%	63%
Total	**684,267**	**79.33**	**249%**	**192%**

It was calculated that the installation of a VFD and POC, decreases annual energy consumption by 696,495 kWh and a demand reduction of 80.40 kW resulting in a realization rate of 254%.

ADM attributes the high realization rate to SPS using a deemed savings approach for VFD savings. The assumption made by SPS assumes that the motor operates for 5,126 hours and the VFD reduces consumption by 33%. These assumptions do not properly

reflect the system at hand as it was determined through monitoring data that the pump operates for 8,628 hours per year and has an average reduction of approximately 65%

Low realization rate for the POC can be attributed to SPS assuming an average baseline time clock setting of 80%. During the Site verification ADM discovered that the time clock setting was originally 42%, thus resulting in reduced period of operation.

Project Number 1-7WYWL
Program Business Motor & Drives

Project Background

The participant is an oil company that received incentives from SPS for the installation of a Variable Frequency Drive (VFD) on a process pump. On-site, ADM verified the participant installed:

- (1) VFD on a 125 HP process pump.

M&V Methodology

ADM verified the installation of a VFD on a 125 HP pump used to pump water back into the ground that is extracted during the oil production process. During the on-site verification, it was determined that the VFD's operation is controlled off of the water pressure of the system and is designed to maintain a constant pressure. Due to the pump and VFD being of new construction it was assumed that the baseline operation of the pump is constant speed and trim valves were used to modulate flow and pressure of the system.

Savings Calculations

ADM used monitoring data from a sister site with a similar water pumping system to calculate the annual energy savings of the VFD. Monitoring equipment was installed on the main electrical circuit serving the VFD, in which kW demand was monitored at 15 second intervals for approximately seven weeks.

Using this data, an average daily profile for each day of the week was able to be determined. Assuming that the GPM of the system would remain constant between the as-built and baseline system, pump affinity laws were used to determine corresponding flow rates for each hour of the profile mentioned above. Assuming that the baseline pump used trim valves to modulate flow causing the pump to ride the curve of its impeller, manufacturer curves were used to determine the resulting kW demand necessary to produce the corresponding flow rate.

The annual savings for the installation of the VFD is the difference between the baseline and as-built profiles extrapolated to a yearly interval.

Results

Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
125 HP VFD	337,398	38.77	270%	203%

Total	**337,398**	**38.77**	**270%**	**203%**

It was calculated that the installation of a VFD, decreases annual energy consumption by 337,398 kWh and a demand reduction of 38.77 kW resulting in a realization rate of 270%.

ADM attributes the high realization rate to SPS using a deemed savings approach for VFD savings. The assumption made by SPS assumes that the motor operates for 5,126 hours and the VFD reduces consumption by 33%. These assumptions do not properly reflect the system at hand as it was determined through monitoring data that the pump operates for 8,628 hours per year and has an average reduction of approximately 65%.

Project Number 1-8CGSZ
Program Business Motor & Drives

Project Background

The participant is an oil company that received incentives from SPS for the installation of a Pump Off Controller (POC) on a above ground oil well pump. On-site, ADM verified the participant installed:

- (1) POC on a 10 Hp pump.

M&V Methodology

ADM verified the installation of the POC on a 10 HP pump used to extract oil from the ground. The POC is designed to allow the oil depth of the well to reach an optimum depth before allowing the pump to start. Once the pump has been engage the controller only allows pumping if the oil depth is above the optimum pumping depth and once the level falls below this depth the pump is shut off. The original control strategy involved the use of an adjustable timer that would simply turn the pump on and off based on the set position of the timer.

Savings Calculations

ADM used SPS's deemed POC calculator to determine the annual energy savings of the installed POC. The calculator was developed as a joint venture between ADM and SPS, which is informed by extensive monitoring performed by ADM at an earlier date. The deemed calculator uses the following equation:

$$kWh_{savings} = \left(\frac{Hp \times .746 \times LF}{Eff \times Mech}\right) \times \left([8{,}760 \times \{8{,}366 + .956 \times Pump_{eff} \times TC \times 100\}] - [8{,}760 * TC]\right)$$

Parameters for kWh Savings Calculation of POC

$kWh_{Savings}$	Annual kWh Savings for the installation of a POC
Hp	Motor Horsepower
LF	Motor Load Factor
Eff	Motor Efficiency
Mech	Mechanical Efficiency of the pump jack.
$Pump_{eff}$	Volumetric pump efficiency
TC	Time Clock setting observed during the site visit

POC kWh Savings Calculations

Measure	Motor Hp	LF	Motor Eff	Mech Eff	Pump Eff	Time Clock	Hours		Expected kWh Savings	Realized kWh Savings	Realization Rate
							Base	Post			
Pump Off Controller	10	25%	86.3%	95%	25%	80%	7,008	2,408	30,305	10,465	35%
								Total	**15,639**	**10,465**	**35%**

Results

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
10 HP POC	10,465	1.32	35%	35%
Total	**10,465**	**1.32**	**35%**	**35%**

It was calculated that the installation of the POC, decreases annual energy consumption by 10,465 kWh and a demand reduction of 1.49 kW resulting in a realization rate of 35%.

ADM attributes the low realization rate to an incorrect horsepower being claimed in the application. The POC applications claimed that a 30 Hp horsepower pump was being controlled. During the site visit it was determine that the rebated pump was actually being served by a 10 Hp pump. This reduction in horsepower resulted in the low realization rate.

Project Number 1-8CGRT
Program Business Motor & Drives

Project Background

The participant is an oil company that received incentives from SPS for the installation of a Pump Off Controller (POC) on a above ground oil well pump. On-site, ADM verified the participant installed:

- (1) POC on a 40 Hp pump.

M&V Methodology

ADM verified the installation of the POC on a 40 HP pump used to extract oil from the ground. The POC is designed to allow the oil depth of the well to reach an optimum depth before allowing the pump to start. Once the pump has been engage the controller only allows pumping if the oil depth is above the optimum pumping depth and once the level falls below this depth the pump is shut off. The original control strategy involved the use of an adjustable timer that would simply turn the pump on and off based on the set position of the timer.

Savings Calculations

ADM used SPS's deemed POC calculator to determine the annual energy savings of the installed POC. The calculator was developed as a joint venture between ADM and SPS, which is informed by extensive monitoring performed by ADM at an earlier date. The deemed calculator uses the following equation:

$$kWh_{savings} = \left(\frac{Hp \times .746 \times LF}{Eff \times Mech}\right) \times \left([8{,}760 \times \{8{,}366 + .956 \times Pump_{eff} \times TC \times 100\}] - [8{,}760 * TC]\right)$$

Parameters for kWh Savings Calculation of POC

$kWh_{Savings}$	Annual kWh Savings for the installation of a POC
Hp	Motor Horsepower
LF	Motor Load Factor
Eff	Motor Efficiency
Mech	Mechanical Efficiency of the pump jack.
$Pump_{eff}$	Volumetric pump efficiency
TC	Time Clock setting observed during the site visit

POC kWh Savings Calculations

Measure	Motor Hp	LF	Motor Eff	Mech Eff	Pump Eff	Time Clock	Hours		Expected kWh Savings	Realized kWh Savings	Realization Rate
							Base	Post			
Pump Off Controller	40	25%	89.7%	95%	67%	68%	5,957	4,548	15,639	12,330	79%
								Total	**15,639**	**12,330**	**79%**

Results

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
40 HP POC	12,330	2.86	79%	101%
Total	**12,330**	**2.86**	**79%**	**101%**

It was calculated that the installation of the POC, decreases annual energy consumption by 12,330 kWh and a demand reduction of 2.07 kW resulting in a realization rate of 79%.

ADM attributes the low realization rate to SPS assuming an average baseline time clock setting of 80%. During the Site verification ADM discovered that the time clock setting was originally 68%, thus resulting in reduced period of operation.

Project Number 1-8C6GK
Program Small Business Lighting

Project Background

The participant is a Grocery facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (7) 2-lamp T8 fixtures, replacing 2-lamp T12 fixtures;
- (221) 2-lamp T8 fixtures, replacing 2-lamp HO T12 fixtures;
- (56) 3-lamp T8 fixtures, replacing 3-lamp T12 fixtures;
- (26) 4-lamp T8 fixtures, replacing 4-lamp T12 fixtures.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using confirmed annual operating hours of per year. Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) were determined using local weather data and SPS peak parameters. The values used in calculating savings are presented in the table below.

Deemed Savings Parameters

Space Type	*Annual Hours*	*HCEF*	*HCDF*	*PCF*
Grocery-Retail Sales Area	4,964	1.110	1.339	0.70

Savings Calculations

Using deemed values from the table above, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon an SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 2L T12 to 4' 2L T8 28W	7	7	94	48	4,964	4,964	1,732	1,774	1.110	102%
8' 2L T12HO to 8' 2L T8	221	221	257	109	4,964	4,964	197,002	180,197	1.110	91%
4' 3L T12 to 4' 3L T8 28W	56	56	151	72	4,964	4,964	17,203	24,373	1.110	142%
4' 4L T12 to 4' 4L T8 28W	26	26	188	96	4,964	4,964	9,385	13,178	1.110	140%
						Total	**225,322**	**219,523**		**97%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 2L T12 to 4' 2L T8 28W	7	7	94	48	0.70	0.70	0.36	0.30	1.34	85%
8' 2L T12HO to 8' 2L T8	221	221	257	109	0.70	0.70	40.51	30.65	1.34	76%
4' 3L T12 to 4' 3L T8 28W	56	56	151	72	0.70	0.70	3.54	4.15	1.34	117%
4' 4L T12 to 4' 4L T8 28W	26	26	188	96	0.70	0.70	1.93	2.24	1.34	116%
						Total	**46.33**	**37.34**		**81%**

Results

The kWh realization rate for SPS-1-8C6GK is 97%. kWh calculations exceeded estimates due to errors in ex ante calculations. kW realization exceeded ex ante estimates due to a lower of Peak Coincident Factor used in calculating kW savings.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 2L T12 to 4' 2L T8 28W	1,774	0.30	102%	85%
8' 2L T12HO to 8' 2L T8	180,197	30.65	91%	76%
4' 3L T12 to 4' 3L T8 28W	24,373	4.15	142%	117%
4' 4L T12 to 4' 4L T8 28W	13,178	2.24	140%	116%
Total	**219,523**	**37.34**	**97%**	**81%**

Project Number SPS-1-8DO40, 1-832QD, 1-8DK4B, 1-8DK4K
Program Small Business

Project Background

The participant is a combination middle/high school that received incentives from SPS for implementing energy efficient lighting. A total of four applications were submitted, which covered the middle school, high school, gymnasium, and administration building. On-site, ADM verified the participant had installed:

- (50) 4' 2-lamp T8 fixtures, replacing 4' 2-lamp T12 fixtures in the administration building;
- (4) 18W CFLs, replacing 60W Incandescent in the administration building;
- (100) 4' 2-lamp T8 28W fixtures, replacing 4' 2-lamp T12 fixtures in the high school;
- (472) 4' 4-lamp T8 28W fixtures, replacing 4' 4-lamp T12 fixtures in the high school;
- (39) 68W CFLs, replacing 300W Incandescent in the high school;
- (48) 13W CFLs, replacing 60W Incandescent in the high school;
- (18) 18W CFLs, replacing 65W Incandescent in the high school;
- (7) LED exit signs, replacing 40W Incandescent exit signs in the high school;
- (14) 4' 4-lamp T8 28W fixtures, replacing 8' 2-lamp T12 fixtures in the high school;
- (75) 4' 2-lamp T8 28W fixtures, replacing 4' 2-lamp T12 fixtures in the middle school;
- (25) 4' 4-lamp T8 28W fixtures, replacing 4' 4-lamp T12 fixtures in the middle school;
- (20) 4' 4-lamp T8 28W fixtures, replacing 8' 2-lamp T12 fixtures in the middle school;
- (72) 18W CFLs, replacing 60W Incandescent in the middle school;
- (14) LED exit signs, replacing 40W Incandescent exit signs in the middle school;
- (6) 68W CFLs, replacing 300W Incandescent in the middle school;
- (18) 4' 6-lamp T5HO fixtures, replacing 400W metal halides in the middle school gymnasium; and
- (72) 4' 6-lamp T5 fixtures, replacing 750W Incandescent in the high school gymnasium.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	***CA DEER 2008 Space Type***	***Annual Hours – Non-CFLs***	***Annual Hours – CFLs***	***HCEF***	***HCDF***	***PCF***
Secondary School	Classroom	2,445	2,608	1.067	1.344	0.42
	Office	2,323	2,452	1.067	1.344	0.42
	Gymnasium	2,366	2,532	1.067	1.344	0.42

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 2L T12 to 4' 2L T8 28W	50	50	86	48	2,323	2,323	9,097	4,709	1.067	52%
60W Inc. to 18W CFL	4	4	60	20	2,452	2,452	641	419	1.067	65%
4' 2L T12 to 4' 2L T8 28W	100	100	86	48	2,445	2,445	11,017	9,913	1.067	90%
4' 4L T12 to 4' 4L T8 28W	472	472	172	96	2,445	2,445	80,032	93,583	1.067	117%
300W Inc. to 68W CFL	39	39	300	70	2,608	2,608	20,890	24,961	1.067	119%
60W Inc. to 13W CFL	48	48	60	15	2,608	2,608	5,209	6,011	1.067	115%
65W Inc. to 18W CFL	18	18	65	20	2,608	2,608	1,953	2,254	1.067	115%
40W Inc. Exit to 2W LED Exit	7	7	40	2	8,760	8,760	614	2,486	1.067	405%
8' 2L T12 to 4' 4L T8 28W	14	14	158	96	2,445	2,445	1,501	2,264	1.067	151%
4' 2L T12 to 4' 2L T8 28W	75	75	86	48	2,445	2,445	8,411	7,435	1.067	88%
4' 4L T12 to 4' 4L T8 28W	25	25	172	96	2,445	2,445	4,337	4,957	1.067	114%
8' 2L T12 to 4' 4L T8 28W	20	20	158	96	2,445	2,445	2,223	3,235	1.067	146%
400W MH to 4' 6L T5HO	18	18	458	351	2,366	2,366	4,156	4,862	1.067	117%
60W Inc. to 18W CFL	72	72	60	20	2,608	2,608	6,982	8,014	1.067	115%
40W Inc. Exit to 2W LED Exit	14	14	40	2	8,760	8,760	1,228	4,973	1.067	405%
300W Inc. to 68W CFL	6	6	300	70	2,608	2,608	3,214	3,840	1.067	119%
750W Inc. to 4' 6L T5 EE	72	72	750	297	2,366	2,366	42,182	82,339	1.067	195%
						Total	**203,687**	**266,256**		**131%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 2L T12 to 4' 2L T8 28W	50	50	86	48	0.42	0.42	2.48	1.07	1.344	43%
60W Inc. to 18W CFL	4	4	60	20	0.42	0.42	0.17	0.09	1.344	52%
4' 2L T12 to 4' 2L T8 28W	100	100	86	48	0.42	0.42	4.63	2.14	1.344	46%
4' 4L T12 to 4' 4L T8 28W	472	472	172	96	0.42	0.42	33.66	20.24	1.344	60%
300W Inc. to 68W CFL	39	39	300	70	0.42	0.42	8.79	5.06	1.344	58%
60W Inc. to 13W CFL	48	48	60	15	0.42	0.42	2.19	1.22	1.344	56%
65W Inc. to 18W CFL	18	18	65	20	0.42	0.42	0.82	0.46	1.344	56%
40W Inc. Exit to 2W LED Exit	7	7	40	2	1.00	1.00	0.26	0.36	1.344	139%
8' 2L T12 to 4' 4L T8 28W	14	14	158	96	0.42	0.42	0.63	0.49	1.344	78%
4' 2L T12 to 4' 2L T8 28W	75	75	86	48	0.42	0.42	3.54	1.61	1.344	45%
4' 4L T12 to 4' 4L T8 28W	25	25	172	96	0.42	0.42	1.82	1.07	1.344	59%
8' 2L T12 to 4' 4L T8 28W	20	20	158	96	0.42	0.42	0.93	0.70	1.344	75%
400W MH to 4' 6L T5HO	18	18	458	351	0.42	0.42	1.75	1.09	1.344	62%
60W Inc. to 18W CFL	72	72	60	20	0.42	0.42	2.94	1.63	1.344	55%
40W Inc. Exit to 2W LED Exit	14	14	40	2	1.00	1.00	0.52	0.71	1.344	138%
300W Inc. to 68W CFL	6	6	300	70	0.42	0.42	1.35	0.78	1.344	58%
750W Inc. to 4' 6L T5 EE	72	72	750	297	0.42	0.42	17.74	18.41	1.344	104%
						Total	**84.21**	**57.13**		**68%**

Results

The kWh realization rate for SPS-1-8DO40, 1-832QD, 1-8DK4B, 1-8DK4K is 131%. kWh savings were increased due to higher operating hours being reported per CA DEER 2008 guidelines, as compared to those used by the implementer. The low kW

realization rate can be attributed to the implementer assuming a high coincidence factor than used by ADM, which was developed through monitoring for similar schools in the territory

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 2L T12 to 4' 2L T8 28W	4,709	1.07	52%	43%
60W Inc. to 18W CFL	419	0.09	65%	52%
4' 2L T12 to 4' 2L T8 28W	9,913	2.14	90%	46%
4' 4L T12 to 4' 4L T8 28W	93,583	20.24	117%	60%
300W Inc. to 68W CFL	24,961	5.06	119%	58%
60W Inc. to 13W CFL	6,011	1.22	115%	56%
65W Inc. to 18W CFL	2,254	0.46	115%	56%
40W Inc. Exit to 2W LED Exit	2,486	0.36	405%	139%
8' 2L T12 to 4' 4L T8 28W	2,264	0.49	151%	78%
4' 2L T12 to 4' 2L T8 28W	7,435	1.61	88%	45%
4' 4L T12 to 4' 4L T8 28W	4,957	1.07	114%	59%
8' 2L T12 to 4' 4L T8 28W	3,235	0.70	146%	75%
400W MH to 4' 6L T5HO	4,862	1.09	117%	62%
60W Inc. to 18W CFL	8,014	1.63	115%	55%
40W Inc. Exit to 2W LED Exit	4,973	0.71	405%	138%
300W Inc. to 68W CFL	3,840	0.78	119%	58%
750W Inc. to 4' 6L T5 EE	82,339	18.41	195%	104%
Total	**266,256**	**57.13**	**131%**	**68%**

Project Number 1-7ZCUR
Program Small Business Lighting

Project Background

The participant is a medium office facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (58) 14 Watt CFLs, replacing 85 Watt Incandescent bulbs in stairways, conference rooms, offices, entries and hallways;
- (318) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures in a foyer, offices, hallways, and a file room;
- (98) 4' 3-lamp T8 fixtures, replacing 4' 3-lamp T12 fixtures in offices, a conference room, a break room, and a reception area;
- (78) 4' 2-lamp T8 fixtures, replacing 4' 2-lamp T12 fixtures in hallways, a break room, and offices;
- (27) 4' 1-lamp T8 fixtures, replacing 4' 1-lamp T12 fixtures in offices;
- (2) 8' 2-lamp T8 fixtures, replacing 8' 2-lamp T12 fixtures in offices; and
- Installation of (3) 2 Watt LED Exit signs.

M&V Methodology

Through an on-site visit, ADM determined that some fixtures listed on the application were not installed. These fixtures include (52) 14 Watt CFLs and (73) 4' 1-lamp T8 fixtures. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours – Non-CFLs*	*Annual Hours – CFLs*	*HCEF*	*HCDF*	*PCF*
Large Office	Office (Open)	3,100	2,641	1.111	1.303	0.81
Large Office	Corridor	2,641	3,860	1.111	1.303	0.81
Large Office	Lobby	2,692	3,860	1.111	1.303	0.81
Large Office	Conference Room	2,692	1,647	1.111	1.303	0.81

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
85W Inc. to 14W CFL	7	7	85	14	3,100	3,100	2,582	1,712	1.111	66%
85W Inc. to 15W CFL	26	26	85	15	3,860	3,860	9,589	7,808	1.111	81%
85W Inc. to 15W CFL	17	17	85	16	3,860	3,860	6,269	5,032	1.111	80%
85W Inc. to 15W CFL	8	8	85	17	1,647	1,647	2,950	996	1.111	34%
4' 4L T12 to 4' 4L T8 28W	281	281	172	96	2,641	2,641	63,599	62,683	1.111	99%
4' 4L T12 to 4' 4L T8 28W	18	18	172	96	2,692	2,692	4,074	4,093	1.111	100%
4' 4L T12 to 4' 4L T8 28W	10	10	172	96	2,641	2,641	2,263	2,231	1.111	99%
4' 4L T12 to 4' 4L T8 28W	9	9	172	96	2,692	2,692	2,037	2,046	1.111	100%
4' 3L T12 to 4' 3L T8 28W	96	96	136	72	2,641	2,641	20,688	18,034	1.111	87%
4' 2L T12 to 4' 2L T8 28W	49	49	86	48	2,641	2,641	5,639	5,465	1.111	97%
4' 2L T12 to 4' 2L T8 28W	29	29	86	48	2,641	2,641	3,337	3,235	1.111	97%
4' 1L T12 to 4' 1L T8 28W	27	27	50	26	2,641	2,641	4,743	1,902	1.111	40%
8' 2L T12 to 4' 2L T8	2	2	158	71	2,641	2,641	267	511	1.111	191%
40W Inc. Exit to 2W LED Exit	3	3	40	2	8,760	8,760	435	1,110	1.111	255%
						Total	**128,472**	**116,857**		**91%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
85W Inc. to 14W CFL	7	7	85	14	.81	.81	0.70	0.52	1	75%
85W Inc. to 15W CFL	26	26	85	15	.81	.81	2.61	1.92	1	74%
85W Inc. to 15W CFL	17	17	85	16	.81	.81	1.71	1.24	1	73%
85W Inc. to 15W CFL	8	8	85	17	.81	.81	0.80	0.57	1	72%
4' 4L T12 to 4' 4L T8 28W	281	281	172	96	.81	.81	17.30	22.54	1	130%
4' 4L T12 to 4' 4L T8 28W	18	18	172	96	.81	.81	1.11	1.44	1	130%
4' 4L T12 to 4' 4L T8 28W	10	10	172	96	.81	.81	0.62	0.80	1	130%
4' 4L T12 to 4' 4L T8 28W	9	9	172	96	.81	.81	0.55	0.72	1	130%
4' 3L T12 to 4' 3L T8 28W	96	96	136	72	.81	.81	5.63	6.49	1	115%
4' 2L T12 to 4' 2L T8 28W	49	49	86	48	.81	.81	1.53	1.97	1	128%
4' 2L T12 to 4' 2L T8 28W	29	29	86	48	.81	.81	0.91	1.16	1	128%
4' 1L T12 to 4' 1L T8 28W	27	27	50	26	.81	.81	1.29	0.68	1	53%
8' 2L T12 to 4' 2L T8	2	2	158	71	.81	.81	0.07	0.18	1	252%
40W Inc. Exit to 2W LED Exit	3	3	40	2	.81	.81	0.12	0.12	1	102%
						Total	**34.96**	**40.37**		**115%**

Results

The kWh realization rate for SPS-1-7ZCUR is 90%. kWh savings for 1-lamp T8 and 14 Watt CFLs were reduced due to fewer lighting found on site than claimed in the application.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
85W Inc. to 14W CFL	1,712	0.52	66%	75%
85W Inc. to 15W CFL	7,808	1.92	81%	74%
85W Inc. to 15W CFL	5,032	1.24	80%	73%
85W Inc. to 15W CFL	996	0.57	34%	72%
4' 4L T12 to 4' 4L T8 28W	62,683	22.54	99%	130%
4' 4L T12 to 4' 4L T8 28W	4,093	1.44	100%	130%
4' 4L T12 to 4' 4L T8 28W	2,231	0.80	99%	130%
4' 4L T12 to 4' 4L T8 28W	2,046	0.72	100%	130%
4' 3L T12 to 4' 3L T8 28W	18,034	6.49	87%	115%
4' 2L T12 to 4' 2L T8 28W	5,465	1.97	97%	128%
4' 2L T12 to 4' 2L T8 28W	3,235	1.16	97%	128%
4' 1L T12 to 4' 1L T8 28W	1,902	0.68	40%	53%
8' 2L T12 to 4' 2L T8	511	0.18	191%	252%
40W Inc. Exit to 2W LED Exit	1,110	0.12	255%	102%
Total	**116,857**	**40.37**	**91%**	**115%**

Project Number 1-7YVU3
Program Small Business Lighting

Project Background

The participant is a medium retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (10) 4' 1-lamp T8 fixtures, replacing 4' 1-lamp T12 fixtures;
- (12) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures;
- (254) 8' 2-lamp T8 fixtures, replacing 8' 2-lamp T12 fixtures;
- (15) 8' 1-lamp T8 fixtures, replacing 8' 1-lamp T12 fixtures;
- (17) 4' 4-lamp T5 HO fixtures, replacing 400 Watt metal halide fixtures; and
- (18) 26 Watt CFLs, replacing 75 Incandescent lamps.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours – Non-CFLs*	*Annual Hours – CFLs*	*HCEF*	*HCDF*	*PCF*
Small Retail	Sales Area	3,378	4,013	1.102	1.335	0.88

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 1L T12 to 4' 1L T8	10	10	46	32	3,378	3,378	424	521	1.102	123%
4' 4L T12 to 4' 4L T8	12	12	172	112	3,378	3,378	2,426	2,680	1.102	110%
8' 2L T12 to 8' 2L T8	254	254	158	109	3,378	3,378	30,275	46,335	1.102	153%
8' 1L T12 to 8' 1L T8	15	15	100	58	3,378	3,378	2,155	2,345	1.102	109%
400W MH to 4' 4L T5HO	17	17	458	234	3,378	3,378	12,968	14,177	1.102	109%
75W Inc. to 27W CFL	18	18	75	27	3,378	3,378	3,004	3,217	1.102	107%
						Total	**51,252**	**69,275**		**135%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 1L T12 to 4' 1L T8	10	10	46	32	.88	.88	0.16	0.16	1.335	105%
4' 4L T12 to 4' 4L T8	12	12	172	112	.88	.88	0.89	0.85	1.335	95%
8' 2L T12 to 8' 2L T8	254	254	158	109	.88	.88	11.11	14.62	1.335	132%
8' 1L T12 to 8' 1L T8	15	15	100	58	.88	.88	0.79	0.74	1.335	94%
400W MH to 4' 4L T5HO	17	17	458	234	.88	.88	4.76	4.47	1.335	94%
75W Inc. to 27W CFL	18	18	75	27	.88	.88	1.10	1.01	1.335	92%
						Total	**18.82**	**21.86**		**116%**

Results

The kWh realization rate for SPS-1-7YVU3 is 135%. kWh savings were increased due to an overestimation of annual lighting usage, per CA DEER 2008 deemed values.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 1L T12 to 4' 1L T8	521	0.16	123%	105%
4' 4L T12 to 4' 4L T8	2,680	0.85	110%	95%
8' 2L T12 to 8' 2L T8	46,335	14.62	153%	132%
8' 1L T12 to 8' 1L T8	2,345	0.74	109%	94%
400W MH to 4' 4L T5HO	14,177	4.47	109%	94%
75W Inc. to 27W CFL	3,217	1.01	107%	92%
Total	**69,275**	**21.86**	**135%**	**116%**

Project Number 1-7ILKW
Program Small Business Lighting

Project Background

The participant is a large retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (42) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures with (9) in the aerobics area, (4) in massage rooms, (6) in a TV room, and (23) throughout the facility;
- (41) 8' 2-lamp T8 fixtures, replacing (3) 8' 2-lamp T12 fixtures in the pool area, and (38) fixtures throughout the facility;
- (30) 14 Watt CFL fixtures, replacing 60 Watt Incandescent fixtures throughout the facility; and
- Installation of 3 LED Exit signs.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	***CA DEER 2008 Space Type***	***Annual Hours – Non-CFLs***	***Annual Hours – CFLs***	***HCEF***	***HCDF***	***PCF***
Small	Sales Area	3,378	4,013	1.102	1.335	0.88
24-Hour Retail	Sales Are	8,760	8,760	1.102	1.335	1.0

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	19	19	172	112	3,378	3,378	10,308	4,244	1.102	41%
4' 4L T12 to 4' 4L T8	23	23	172	112	8,760	8,760	12,478	13,323	1.102	107%
8' 2L T12 to 8' 2L T8	3	3	158	109	3,378	3,378	960	547	1.102	57%
8' 2L T12 to 8' 2L T8	38	38	158	109	8,760	8,760	12,156	17,976	1.102	148%
60W Inc. to 15W CFL	30	30	60	15	8,760	8,760	12,613	13,033	1.102	103%
40W Inc. Exit to 2W LED Exit	3	3	40	2	8,760	8,760	1,042	1,101	1.102	106%
						Total	**49,557**	**50,225**		**101%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	19	19	172	112	0.88	0.88	1.41	1.34	1.335	95%
4' 4L T12 to 4' 4L T8	23	23	172	112	1.00	1.00	1.71	1.84	1.335	108%
8' 2L T12 to 8' 2L T8	3	3	158	109	0.88	0.88	0.13	0.17	1.335	132%
8' 2L T12 to 8' 2L T8	38	38	158	109	1.00	1.00	1.66	2.49	1.335	149%
60W Inc. to 15W CFL	30	30	60	15	1.00	1.00	1.73	1.80	1.335	104%
40W Inc. Exit to 2W LED Exit	3	3	40	2	1.00	1.00	0.14	0.15	1.335	106%
						Total	**6.78**	**7.79**		**115%**

Results

The kWh realization rate for SPS-1-7ILKW is 105%. kWh savings closely matched ex-ante estimates.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 4L T12 to 4' 4L T8	4,244	1.34	41%	95%
4' 4L T12 to 4' 4L T8	13,323	1.84	107%	108%
8' 2L T12 to 8' 2L T8	547	0.17	57%	132%
8' 2L T12 to 8' 2L T8	17,976	2.49	148%	149%
60W Inc. to 15W CFL	13,033	1.80	103%	104%
40W Inc. Exit to 2W LED Exit	1,101	0.15	106%	106%
Total	**50,225**	**7.79**	**101%**	**115%**

Project Number 1-7YXDU
Program Small Business Lighting

Project Background

The participant is a medium office facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (116) 4' 4-lamp T8 fixtures, replacing (112) 4' 4-lamp T12 fixtures in private offices and (4) 8' 2-lamp T12 fixtures in a conference room;
- (464) 28W T8 lamps, replacing 32W T8 lamps in corridors;
- (14) 14 Watt CFL fixtures, replacing (12) 60 Watt Incandescent fixtures in an auditorium and (2) in an IT room; and
- Installation of 3 LED Exit signs.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	***CA DEER 2008 Space Type***	***Annual Hours – Non-CFLs***	***Annual Hours – CFLs***	***HCEF***	***HCDF***	***PCF***
Large Office	Office (Executive/Private)	2,641	3,100	1.111	1.303	.81
	Corridors	2,641	3,860	1.111	1.303	.81
	Office (Open)	2,641	3,100	1.111	1.303	.81
	Conference Room	2,692	1,647	1.111	1.303	.81
	Mechanical/Electrical Room	2,692	1,647	1.111	1.303	.81

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8 28W	112	112	172	96	2,641	2,641	25,349	24,984	1.111	99%
4' 1L T8 to 4' 1L T8 28W	464	464	31	26	2,641	2,641	6,227	6,810	1.111	109%
8' 2L T12 to 4' 4L T8 28W	4	4	158	96	2,692	2,692	494	742	1.111	150%
60W Inc. to 15W CFL	12	12	60	15	3,100	3,100	2,104	1,860	1.111	88%
40W Inc. Exit to 2W LED Exit	3	3	40	2	8,760	8,760	435	1,110	1.111	255%
60W Inc. to 15W CFL	2	2	60	15	8,760	8,760	351	876	1.111	250%
						Total	**34,960**	**36,382**		**104%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8 28W	112	112	172	96	.81	.81	8.84	7.88	1.303	89%
4' 1L T8 to 4' 1L T8 28W	464	464	31	26	.81	.81	2.17	2.15	1.303	99%
8' 2L T12 to 4' 4L T8 28W	4	4	158	96	.81	.81	0.17	0.23	1.303	133%
60W Inc. to 15W CFL	12	12	60	15	.81	.81	0.74	0.44	1.303	60%
40W Inc. Exit to 2W LED Exit	3	3	40	2	.81	.81	0.15	0.15	1.303	98%
60W Inc. to 15W CFL	2	2	60	15	.81	.81	0.12	0.12	1.303	96%
						Total	**12.20**	**10.96**		**90%**

Results

Savings closely match ex ante estimates. The kWh realization rate for SPS-1-7YXDU is 104%.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 4L T12 to 4' 4L T8 28W	24,984	7.88	99%	89%
4' 1L T8 to 4' 1L T8 28W	6,810	2.15	109%	99%
8' 2L T12 to 4' 4L T8 28W	742	0.23	150%	133%
60W Inc. to 15W CFL	1,860	0.44	88%	60%
40W Inc. Exit to 2W LED Exit	1,110	0.15	255%	98%
60W Inc. to 15W CFL	876	0.12	250%	96%
Total	**36,382**	**10.96**	**104%**	**90%**

Project Number 86DQN
Program Small Business Lighting

Project Background

The participant is a small retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (40) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures in the retail sales area; and
- (3) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures in the storage area; and
- (2) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures in the restroom.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours*	*HCEF*	*HCDF*	*PCF*
Small Retail	Sales Area	8,760	1.102	1.335	1.00
Small Retail	Storage	2,753	1.102	1.335	0.88
Small Office	Restrooms	2,594	1.097	1.313	0.81

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} \quad kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	40	40	172	118	8,760	8,760	21,701	20,853	1.102	96%
4' 4L T12 to 4' 4L T8	3	3	172	118	2,753	2,753	827	492	1.102	59%
4' 4L T12 to 4' 4L T8	2	2	172	118	2,594	2,594	552	307	1.097	56%
						Total	**23,080**	**21,652**		**94%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	40	40	172	118	1.00	1.00	0.19	2.88	1.335	97%

4' 4L T12 to 4' 4L T8	3	3	172	118	0.88	0.88	1.78	0.19	1.335	168%
4' 4L T12 to 4' 4L T8	2	2	172	118	0.81	0.81	1.19	0.11	1.313	152%
						Total	**3.16**	**3.19**		**101%%**

Results

The kWh realization rate for SPS-1-86DQN is 94%. kWh savings for 2-lamp T8 Retrofits were reduced due to lower operating hours in the space types receiving this fixture, as per CA DEER 2008 guidelines.

Verified Gross Savings & Realization Rates

Measure	***Verified***			
	kWh Savings	***kW Savings***	***kWh Realization Rate***	***kW Realization Rate***
4' 4L T12 to 4' 4L T8	20,853	2.88	96%	97%
4' 4L T12 to 4' 4L T8	492	0.19	59%	168%
4' 4L T12 to 4' 4L T8	307	0.11	56%	152%
Total	**21,652**	**3.19**	**94%**	**101%%**

Project Number 8977T
Program Small Business Lighting

Project Background

The participant is a small retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (24) 4' 2-lamp T8 fixtures, replacing 4' 2-lamp T12 fixtures in the sales area;
- (11) 4'2-lamp T8 fixtures, replacing 4' 2-lamp T12 fixtures in the office;
- (7) 4' 2-lamp T8 fixtures, replacing 4' 2-lamp T12 fixtures in the corridor;
- (4) 4' 2-lamp T8 fixtures, replacing 4' 2-lamp T12 fixtures in the restrooms; and
- (27) 16 Watt CFLs, replacing 60 Watt Incandescent fixtures in the sales area;

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours*	*HCEF*	*HCDF*	*PCF*
Small Retail	Sales Area	3,378	1.102	1.335	0.88
Small Retail	Sales Area (CFL)	4,013	1.102	1.335	0.88
Small Office	Office	2,594	1.097	1.313	0.88
Small Office	Corridor	2,594	1.097	1.313	0.88
Small Office	Restrooms	2,594	1.097	1.313	0.88

Savings Calculations

Using deemed values from the table above, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 2L T12 to 4' 2L T8 28W	23	23	94	48	3,378	3,378		3,939	1.102	
4' 2L T12 to 4' 2L T8 28W	11	11	94	48	2,594	2,594		1,440	1.097	
4' 2L T12 to 4' 2L T8 28W	7	7	94	48	2,594	2,594		916	1.097	
4' 2L T12 to 4' 2L T8 28W	4	4	94	48	2,594	2,594		524	1.097	
60W Inc. to 16W CFL 2D	24	24	60	16	4,013	4,013		4,670	1.102	
						Total	**16,086**	**11,488**		**71%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 2L T12 to 4' 2L T8 28W	23	23	94	48	.88	.88		1.24	1.335	
4' 2L T12 to 4' 2L T8 28W	11	11	94	48	.88	.88		0.58	1.313	
4' 2L T12 to 4' 2L T8 28W	7	7	94	48	.88	.88		0.37	1.313	
4' 2L T12 to 4' 2L T8 28W	4	4	94	48	.88	.88		0.21	1.313	
60W Inc. to 16W CFL 2D	24	24	60	16	.88	.88		1.24	1.335	
						Total	**5.91**	**3.65**		**62%**

Results

The kWh realization rate for SPS-1-8977T is 71%. kWh savings for the lighting retrofit were decreased due

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 2L T12 to 4' 2L T8 28W	3,939	1.24		
4' 2L T12 to 4' 2L T8 28W	1,440	0.58		
4' 2L T12 to 4' 2L T8 28W	916	0.37		
4' 2L T12 to 4' 2L T8 28W	524	0.21		
60W Inc. to 16W CFL 2D	4,670	1.24		
Total	**11,488**	**3.65**	**71%**	**62%**

Project Number 1-7FED6
Program Small Business Lighting

Project Background

The participant is a small fire station that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (21) 8' 2-lamp T8 fixtures, replacing 8' 2-lamp T12 fixtures in the truck bay area;
- (30) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures in offices, a day room, a bunk room, and a tool and laundry room; and
- (1) 4' 2-lamp T8 fixture, replacing a 4' 2-lamp T12 fixture in a restroom.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	***CA DEER 2008 Space Type***	***Annual Hours – Non-CFLs***	***Annual Hours – CFLs***	***HCEF***	***HCDF***	***PCF***
Light Industrial	Comm / Ind Work Area (Unconditioned)	3,068	2,613	1.00	1.00	0.93
Small Office	Office (Executive/Private)	2,594	3,066	1.097	1.313	0.69

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} \quad kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

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Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
8' 2L T12 to 8' 2L T8	17	17	158	109	3,068	3,068	1,781	2,556	1.000	143%
4' 4L T12 to 4' 4L T8	4	4	172	112	8,760	8,760	419	2,102	1.000	502%
4' 4L T12 to 4' 4L T8	30	30	172	112	2,594	2,594	6,042	5,121	1.097	85%
4' 2L T12 to 4' 2L T8	1	1	86	59	2,594	2,594	90	77	1.097	85%
						Total	**8,332**	**9,856**		**118%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
8' 2L T12 to 8' 2L T8	17	17	158	109	.93	.93	0.40	0.77	1.000	192%
4' 4L T12 to 4' 4L T8	4	4	172	112	1	1	0.10	0.24	1.000	253%
4' 4L T12 to 4' 4L T8	30	30	172	112	.69	.69	1.37	1.63	1.313	119%
4' 2L T12 to 4' 2L T8	1	1	86	59	.69	.69	0.02	0.02	1.313	122%
						Total	**1.89**	**2.67**		**141%**

Results

The kWh realization rate for SPS-1-7FED6 is 118%. kWh savings for (4) of the 8' 2-lamp T8 fixtures as they were found to operate in a part of the facility that required 24/7 lighting for operational safety. The savings were increased enough due to this change in hours such that a lower number of 4' 4-lamp T8s (30 instead of 34) did not negatively affect overall savings.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
8' 2L T12 to 8' 2L T8	2,556	0.77	143%	192%
4' 4L T12 to 4' 4L T8	2,102	0.24	502%	253%
4' 4L T12 to 4' 4L T8	5,121	1.63	85%	119%
4' 2L T12 to 4' 2L T8	77	0.02	85%	122%
Total	**9,856**	**2.67**	**118%**	**141%**

Project Number 1-87M12
Program Small Business Lighting

Project Background

The participant is a small retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (36) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures on the sales floor; and
- (1) 8' 2-lamp T8 fixture, replacing a 8' 2-lamp T12 fixture in the storage area.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours – Non-CFLs*	*Annual Hours – CFLs*	*HCEF*	*HCDF*	*PCF*
Small Retail	Sales Area	3,378	4,013	1.102	1.335	.88
	Storage (Conditioned)	2,753	2,550	1.102	1.335	.88

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	36	36	172	112	3,378	3,378	7,277	8,041	1.102	111%
8' 2L T12 to 8' 2L T8 HLO	1	1	158	138	2,753	2,753	119	61	1.102	51%
						Total	**7,396**	**8,102**		**110%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	36	36	172	112	.88	.88	2.67	2.54	1.335	95%
8' 2L T12 to 8' 2L T8 HLO	1	1	158	138	.88	.88	0.04	0.02	1.335	53%
						Total	**2.72**	**2.56**		**94%**

Results

The kWh realization rate for SPS-1-87M12 is 110%. kWh savings were increased due to higher operating hours in the space types receiving this fixture, as per CA DEER 2008 guidelines.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 4L T12 to 4' 4L T8	8,041	2.54	111%	95%
8' 2L T12 to 8' 2L T8 HLO	61	0.02	51%	53%
Total	**8,102**	**2.56**	**110%**	**94%**

Project Number 1-88GRJ
Program Small Business Lighting

Project Background

The participant is a small retail facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (24) 8' 2-lamp T8 fixtures, replacing 8' 2-lamp T12 fixtures on the sales floor; and
- (1) 4' 4-lamp T8 fixture, replacing a 4' 4-lamp T12 fixture in the storage area.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours – Non-CFLs*	*Annual Hours – CFLs*	*HCEF*	*HCDF*	*PCF*
Small Retail	Sales Area	3,378	4,013	1.102	1.335	.88
	Storage (Conditioned)	2,753	2,550	1.102	1.335	.88

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
8' 2L T12 to 8' 2L T8	24	24	158	109	3,378	3,378	2,779	4,378	1.102	158%
4' 4L T12 to 4' 4L T8	1	1	188	118	2,753	2,753	202	212	1.102	105%
						Total	**2,981**	**4,590**		**154%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
8' 2L T12 to 8' 2L T8	24	24	158	109	.88	.88	1.02	1.38	1.335	135%
4' 4L T12 to 4' 4L T8	1	1	188	118	.88	.88	0.07	0.08	1.335	111%
						Total	**1.09**	**1.46**		**134%**

Results

The kWh realization rate for SPS-1-88GRJ is 154%. kWh savings were increased due to higher operating hours in the space types receiving this fixture, as per CA DEER 2008 guidelines. kW realization were similarly increased.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
8' 2L T12 to 8' 2L T8	4,378	1.38	158%	135%
4' 4L T12 to 4' 4L T8	212	0.08	105%	111%
Total	**4,590**	**1.46**	**154%**	**134%**

Project Number 1-824DK
Program Small Business Lighting

Project Background

The participant is a small light industrial facility that received incentives from SPS for implementing energy efficient lighting. On-site, ADM verified the participant had installed:

- (5) 4' 4-lamp T8 fixtures, replacing 4' 4-lamp T12 fixtures in the shop area; and
- (14) 4' 4-lamp T8 fixtures, replacing 8' 2-lamp T12 fixtures in the office area.

M&V Methodology

ADM confirmed installation of all fixtures listed in the project application. Savings were then calculated using CA DEER 2008 deemed values by space type for hours of use, along with a stipulated Peak Coincident Factor (PCF), Heating Cooling Energy Factor (HCEF) and Heating Cooling Demand Factor (HCDF) determined using local weather data and SPS peak parameters. The deemed values used in calculating savings are presented in the table below.

Deemed Savings Parameters

CA DEER 2008 Building Type	*CA DEER 2008 Space Type*	*Annual Hours – Non-CFLs*	*Annual Hours – CFLs*	*HCEF*	*HCDF*	*PCF*
Light Industrial	Comm/Ind Work Area (Unonditioned)	3,068	2,613	1.000	1.000	0.93
Small Office	Office (Executive/Private)	2,594	3,066	1.000	1.000	0.69

The building has evaporative cooling and as such interactive factor are set to 1.0.

Savings Calculations

Using deemed values from the table above data, ADM calculated lighting savings as follows:

$$Annual\ kWh\ Savings = (kW_{base} * Hours_{base} - kW_{post} * Hours_{post}) * HCEF$$

Parameters for kWh Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kWpost	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
$Hours_{base}$	Annual Hours of Operation of Baseline Fixtures
$Hours_{post}$	Annual Hours of Operation of Installed Fixtures
HCEF	Heating/Cooling Energy Interactive Factor

Following this, ADM calculated peak kW savings. This is based upon a SPS-defined peak of 3:00 – 6:00 PM during summer weekdays. Peak kW savings are calculated as:

$$Peak\ kW\ Savings = (kW_{base} - kW_{post}) * HCDF * PCF$$

Parameters for Peak Demand (kW) Savings Calculation of Lighting Retrofit Measures

kW_{base}	Total Baseline fixtures x $W/Fixture_{base}$ / 1000 W/kW
kW_{post}	Total Installed fixtures x $W/Fixture_{post}$ / 1000 W/kW
PCF	Peak Coincident Factor, % Time During the Peak Period in Which Lighting is Operating
HCDF	Heating Cooling Demand Interactive Factor

.

Lighting Retrofit kWh Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours		Expected kWh Savings	Realized kWh Savings	HCEF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	5	5	188	112	3,068	3,068	1,132	1,166	1.000	103%
8' 2L T12 to 4' 4L T8	14	14	173	112	2,594	2,594	1,727	2,215	1.000	128%
						Total	**2,859**	**3,381**		**118%**

Lighting Retrofit kW Savings Calculations

Measure	Quantity (Fixtures)		Wattage		PCF		Expected kW Savings	Realized kW Savings	HCDF	Realization Rate
	Base	Post	Base	Post	Base	Post				
4' 4L T12 to 4' 4L T8	5	5	188	112	.93	.93	0.31	0.35	1.000	115%
8' 2L T12 to 4' 4L T8	14	14	173	112	.69	.69	0.47	0.59	1.000	125%
						Total	**0.78**	**0.94**		**121%**

Results

The kWh realization rate for SPS-1-824DK is 118%. kWh savings were increased due to higher operating hours in the space types receiving this fixture, as per CA DEER 2008 guidelines. kW realization were similarly increased.

Verified Gross Savings & Realization Rates

Measure	Verified			
	kWh Savings	kW Savings	kWh Realization Rate	kW Realization Rate
4' 4L T12 to 4' 4L T8	1,166	0.35	103%	115%
8' 2L T12 to 4' 4L T8	2,215	0.59	128%	125%
Total	**3,381**	**0.94**	**118%**	**121%**

8. Appendix B: Survey Forms

This appendix contains the survey forms used in evaluating the 2011 SPS DSM Portfolio.

SPS
2011 Home Lighting Program
Participant Survey Questionnaire

ID No. _____

Customer Name: _____

Date of interview: _____

Date data entered _____

Hello. My name is _____ with _____, and I am calling on behalf of SPS. I am conducting a brief survey regarding Southwestern Public Service's Home Lighting Program. Our records show that you purchased compact fluorescent bulbs (CFLs) that were discounted by Southwestern Public Service at, <INSERT RETAILER NAME>. We would like to get some feedback about the program. May I ask you a few questions?

Q-1 We have it in our records that you purchased [x] CFL bulbs that day. Of the CFL bulbs you had purchased that day, about how many have you installed? [IF CUSTOMER SEEMS UNSURE, PROBE, "What would be your best guess?", ETC]

- ❑ Quantity _____
- ❑ Don't Know [DON'T READ]

Q-1a (If some are left) When do you plan on installing the remaining bulbs? Would you say… [READ RESPONSES. STOP WHEN CUSTOMER INDICATES A TIMEFRAME]

- ❑ Within the next 3 months
- ❑ 3 to 6 months from now
- ❑ 6 to 12 months from now
- ❑ More than a year from now
- ❑ Never
- ❑ Don't Know [DON'T READ]

Q-2 Where in your home did you install the CFLs? [DON'T READ. PROMPT ONLY IF NECESSARY.]

Room	***# Bulbs***
Living room	
Kitchen	

Family Room / Den	
Dining Room	
Entry/Hallway	
Bedroom	
Bathroom	
Garage	
Outdoors	
Closet	
Office	
Other	

AFTER CUSTOMER INDICATES ROOMS, PROMPT ON EACH ROOM: "How many did you install in (room indicated)? STOP INDICATING ROOMS WHEN THE NUMBER GIVEN EQUALS TOTAL SHOWN IN TRACKING DATA.

Q-3 What type of bulb did the CFLs replace? (IF NECESSARY: Did they replace incandescent bulbs? Other CFLs?)

- ❑ CFLs
- ❑ Incandescent bulbs [ASK Q-3a]
- ❑ Neither – Bulbs went in to new fixture
- ❑ Both [ASK Q-3a]
- ❑ Don't Know [DON'T READ]

Q3a. Were the incandescent bulbs still operating when you removed them or were they burnt out?

- ❑ All Operating
- ❑ Some Operating
- ❑ All Burnt Out
- ❑ Don't Know [DON'T READ]

Q-4 What is your replacement strategy for lighting in your home? Are you actively replacing incandescent lighting with CFLs or are you waiting until your incandescent bulbs burn out?

- ❑ Actively Replacing
- ❑ Replacing on Burn-Out
- ❑ Other [SPECIFY]
- ❑ Don't Know [DON'T READ]

Q5 Added. Have you installed and then later removed a CFL from the inside or outside of your own home?

- ❑ Yes,

Q5a: What was your reason for doing this?

_____

_____
_____

- ❑ No
- ❑ Don't Know [DON'T READ]

IF COUNTY = "Curry", "Roosevelt, "Eddy", or "Quay", ASK Q-6. ELSE SKIP TO Q-7

Q-6 Were the CFLs installed in a residence in New Mexico or Texas?

- ❑ New Mexico
- ❑ Texas
- ❑ Other [SPECIFY]
- ❑ Don't Know [DON'T READ]

Q-7 Did you know about the available discount on CFLs prior to entering the store that day?

- ❑ Yes
- ❑ No
- ❑ Don't Know [DON'T READ]

Q-8 Did you plan on purchasing CFLs prior to entering the store that day?

- ❑ Yes
- ❑ No
- ❑ Don't Know [DON'T READ]

Q-9 How did you become aware of SPS' discount for CFLs? [DON'T READ. CHECK ALL INDICATED]

- ❑ From Retail Staff
- ❑ In-Store Display
- ❑ Newspaper magazine or article
- ❑ Newspaper advertisement
- ❑ Friend or relative / Word of mouth
- ❑ SPS website
- ❑ Other web site
- ❑ TV advertisement
- ❑ SPS bill insert
- ❑ Radio advertisement
- ❑ Retailer
- ❑ Other [SPECIFY] _____

Q-10 Prior to the new bulbs, how many CFLs did you have in your home? Where were they installed? [RECORD NUMBERS BY ROOM TYPE AS CUSTOMER LISTS THEM]

Room	***# Bulbs***
Living room	

Kitchen	
Family Room / Den	
Dining Room	
Entry/Hallway	
Bedroom	
Bathroom	
Garage	
Outdoors	
Closet	
Office	
Other	

Q10a. Prior to purchasing the new bulbs, how many CFLs were you storing in your home? These could be bulbs not installed in sockets anywhere in your home.

- ❑ Quantity _____
- ❑ Don't Know [DON'T READ]

Q-11 If the CFLs were not discounted through the SPS program, how likely is it that you would have purchased CFLs anyway?

- ❑ Definitely would have purchased
- ❑ Probably would have purchased
- ❑ Probably would not have purchased
- ❑ Definitely would not have purchased

Q-12 After learning of SPS' discount, did you purchase more CFLs than you otherwise would have? How many more?

- ❑ Yes: Quantity _____
- ❑ No
- ❑ Don't Know [DON'T READ]

Q-13 After learning of SPS' discount, have you since purchased additional CFLs? IF YES: How many?

- ❑ Yes: Quantity _____ [ASK Q-13]
- ❑ No [SKIP TO Q-14]
- ❑ Don't Know [DON'T READ] [SKIP TO Q-14]

Q-14 After learning of SPS' discount, have you since purchased any CFLs that weren't discounted through the program? IF YES: How many?

- ❑ Yes: Quantity _____ [ASK Q-13]
- ❑ No [SKIP TO Q-14]
- ❑ Don't Know [DON'T READ] [SKIP TO Q-14]

Q-14a What motivated you to purchase these CFLs?

VERBATIM
RESPONSE:_____
_____
_____
_____

Q-15 Would you have purchased as many CFLs as you did that day if they cost twice as much per bulb?

- ❑ Yes:
- ❑ No: Q-14a: How many CFLs would you have purchased?
  Quantity _____
- ❑ Don't Know [DON'T READ]

Q-16 On a scale of 1 – 5, with "1" meaning "very dissatisfied" and "5" meaning "very satisfied", how satisfied were you with:
[ASK IN RANDOM ORDER, WITH ITEM (E) ALWAYS LAST]

	1 Very Dissatisfied	*2*	*3*	*4*	*5 Very Satisfied*	*Don't know or no answer*
A. The quality of lighting from your CFLs	❑	❑	❑	❑	❑	❑
B. The energy savings from CFLs	❑	❑	❑	❑	❑	❑
C. The amount of the discount	❑	❑	❑	❑	❑	❑
D. The selection of qualifying products	❑	❑	❑	❑	❑	❑
E. Overall satisfaction with the program	❑	❑	❑	❑	❑	❑

IF ANY ITEM <3, ASK Q15. OTHERWISE SKIP TO Q-16]

Q-17 Why were you dissatisfied with [COMPONENT SCORED < 3]? [ENTER VERBATIM RESPONSE]

Q-18.1 Added. How many incandescent, or regular light bulbs, have you bought since purchasing the CFLs through the discount ?

Quantity _____
❑ Don't Know [DON'T READ]

Q-19 Do you have any specific comments or suggestions you would like me to relay to SPS about the Home Lighting Program?

- ❑ Yes

VERBATIM RESPONSE:_____
_____
_____

- ❑ No

That concludes my questions. Thank you for your participation in this survey. Have a great day/evening.

Southwestern Public Service Company
Residential Home Energy Services Program
Verification & Net-to-Gross Survey Questionnaire

ID No. _____

Customer Name: _____

Date of interview: _____

Date data entered _____

.....

Hello, my name is _____. I am calling on behalf of Southwestern Public Service Company (SPS), your electric service provider.

May I please speak to _____ *(Contact Person)?*

Address: _____ ZIP: _____

Phone: ( ) _____

Interviewer: If contact person is not available, schedule a callback. If interview is successfully completed, confirm mailing address above for interviewee.

If contact person is available:

Hello, my name is _____. I am calling from ADM Associates, Inc. on behalf of Southwestern Public Service Company (SPS). Through the Residential Home Energy Services Program, contractors provided discounted installation of insulation and weatherization improvements. Because you received energy efficiency improvements through the program, we would appreciate your taking about 4-5 minutes to answer some questions about your participation in the program. The information you provide will help SPS to improve the program.

Did you have a contractor weatherize your home in 2011?

- ❑ No. Thank you for your time in assisting with this survey.
- ❑ Yes. *Continue interview with this person.*

Q1. Were you aware that the cost of weatherization improvements was discounted through an SPS program?

- o Yes (ask Q1A)
- o No (Skip to Q2)
- o Don't know

Q.1A How did you first hear about SPS's Residential Home Energy Services Program and the available discounted installation of weatherization improvements?

(DO NOT READ. Check all mentioned. Prompt only if necessary.)

- o Received information in mail
- o Read newspaper or magazine article
- o Was contacted by a contractor
- o SPS bill message
- o SPS web site
- o Other *(Specify)* _____
- o Don't know (*DO NOT READ)*

Q.2 How did you choose the contractor you used to weatherize your home?

(DO NOT READ. Check all mentioned. Prompt only if necessary.)

- o Contractor contacted me first
- o Found contractor through SPS web site or by calling SPS
- o Word of mouth
- o Took competitive bids
- o Recommendation of friend/relative
- o Recommendation from a retailer
- o Other *(Specify)* _____
- o Don't know (*DO NOT READ)*

Q.3 Did you have specific plans to weatherize your home <u>before</u> you talked with anyone about the Residential Home Energy Services Program?

- o Yes
- o No
- o Don't know

Q.4 What factors motivated you to weatherize your home through the program in 2011?

(DO NOT READ. Check all mentioned. Prompt only if necessary.)

- o Discount that program provided
- o Wanted to improve home comfort
- o Wanted to reduce my monthly electric bill
- o Wanted to reduce my monthly gas bill

- o Wanted to make my home more energy efficient because it is good for environment
- o Recommendation of a friend/relative
- o Recommendation of retailer/dealer
- o Utility sponsorship of the program
- o Other (Describe: _____)
- o Don't know

Q.5 When did you become aware of the discount SPS offered for home weatherization services?

- o Before deciding to weatherize my home
- o After already deciding to weatherize my home
- o Same time as made decision to weatherize my home
- o Don't know

Q.6 In your decision to weatherize your home, how important was information, advice and / or recommendations from your contractor?

- o Very important
- o Somewhat important
- o Only slightly important
- o Not important at all
- o Don't Know

Q.7 How important in your decision was information, advice and / or recommendations from SPS?

- o Very important
- o Somewhat important
- o Only slightly important
- o Not important at all
- o Don't Know

Q.8 How important was SPS' discounted for weatherization services in your decision-making?

- o Very important
- o Somewhat important
- o Only slightly important
- o Not important at all
- o Don't Know

Q.9 If the weatherization improvements for your home were not discounted through the SPS Home Energy Services program, how likely would you have had similar work performed anyway?

- o Definitely would not have weatherized
- o Probably would not have weatherized
- o Probably would have weatherized
- o Definitely would have weatherized

- o Don't know (DON'T READ)

Q.10 Would you have been able to purchase the weatherization improvements if the discounts offered through the program were not available?

- o Yes
- o No
- o Don't know (DON'T READ)

Q.11 If SPS had not paid a portion of the installation cost, would you have had similar work performed on your home <u>within one year of when it was installed</u>?

- o Yes
- o No
- o Don't know (DON'T READ)

Q.12 After participating in the Home Energy Services Program, have you since taken any extra steps to save energy at home?

- o Yes (Ask Q12A)
- o No (Skip to Q13)

12A. What have you done to reduce energy use in your home?

Record Open-Ended Response: _____
_____
_____
_____

Q.13 I'm going to read off some factors about the program, and for each of these factors, please rate it on a scale of 1-5, where 1 is "Very Dissatisfied" and 5 is "Very Satisfied":

a. The improvement in comfort in your home after weatherization

b. The savings on your utility bills

c. The quality of work by your contractor

d. The information provided by your contractor

e. Information provided by SPS

f. Overall program experience

For any area scored at less than 3:

Why were you dissatisfied with (component scored at less than 3)?

_____
_____

Q.14 Do you have any comments about the Home Energy Services Program, or any suggestions with regard to how it might be improved?

Comments (if any): _____
_____
_____
_____

Thank you for your help! SPS will use your feedback to improve its programs for its residential customers.

SPS
2011 Business Programs
Decision-Maker Survey Questionnaire

ID No. _____

Customer Name: _____

Date of interview: _____

Date data entered _____

.....

Hello, my name is _____ with _____. I am calling on behalf of SPS.
May I please speak to _____ *(Contact Person)?*

Title: _____ Company: _____

Address: _____ ZIP: _____

Phone: ( ) _____

Interviewer: If contact person is not available, schedule a callback.
If interview is successfully completed, confirm mailing address above for interviewee.
If contact person is available:

Hello, my name is _____ with _____. I am calling on behalf of the SPS <PROGRAM NAME> Program. Through this program, SPS has been working with customers and building owners to help them improve the energy efficiency of their operations. Because your company participated in the <PROGRAM> during 2011, we are interested in receiving feedback from you regarding your experience with the program.

SECTION ONE - INTERVIEWEE SCREENING

SCRN-Q.1 According to our records your company participated in the SPS <PROGRAM> for one or more projects in 2011 at the following facility:

(Name of facility _____

(Facility location) (some businesses have multiple locations and the rebate is place-based.)

You are shown as the contact person for that facility. Is that correct?
(If contact seems confused, ask if they remember participating in the SPS energy efficiency <PROGRAM> Program.
If necessary, describe program and distinguish from other programs.)

- ❑ Yes (GO TO SCRN-Q.2)
- ❑ No (GO TO SCRN-Q.2)

SCRN-Q.2 Some of our questions focus on your company's decision to participate in the program and on your decisions to purchase and install energy efficient equipment for your facility. Are you the best person to talk to?

- ❑ No. Is there someone else who would be better for us to contact?

Who is that?

Name: _____

Title: _____

Phone Number: _____

(You are finished with this person.)
Thank you very much for your time

- *(START SHEET FOR NEW CONTACT PERSON ABOVE)*

CALL THIS PERSON AND GO TO BEGINNING OF INTRODUCTION.

- ❑ Yes. "I am the best person to talk to". *Continue interview.*

*SCRN-Q.*3. Our records give the following as the address for the facility(s) where you installed equipment for which you received financial incentives through the energy efficiency program.

(Address(es) from cover sheet)

Is this/Are these address(es) correct?

- ❑ Yes
- ❑ No

If No: Could you please give us the correct address? (physical not mailing)

DECISION-MAKING (DM) QUESTIONS

DM-1 Compared to all other factors, how important is energy efficiency as a factor in planning your operations for this facility? (READ) Is it…

- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know

DM-2 What are the **sources** your organization relies on for **information** about energy efficient equipment, materials and design features? Please answer yes or no for each one. (READ EACH; YES, NO, OR DK FOR EACH)

- ❑ A SPS Account Representative
- ❑ The SPS website
- ❑ Bill or bill insert
- ❑ Brochures or advertisements
- ❑ Trade associations or business groups you belong to
- ❑ Trade journals or magazines
- ❑ Friends and colleagues
- ❑ Presentations by SPS representatives
- ❑ Trade shows
- ❑ An architect, engineer or energy consultant
- ❑ Equipment vendors
- ❑ Building Contractors
- ❑ SPS Trade Allies
- ❑ Any others IF YES: What other sources? _____

DM-2a. Which sources are your top three? (READ LIST AGAIN ONLY IF NEEDED TO PROMPT. OK IF FEWER THAN THREE)

DM-3. How did you learn of the SPS <PROGRAM>? (READ. MULTIPLE OKAY)

- ❑ Approached directly by SPS Staff or Representative of <PROGRAM> Program
- ❑ Received an information brochure on the <PROGRAM>
- ❑ A SPS representative mentioned it
- ❑ The SPS website
- ❑ Friends or colleagues (i.e., word of mouth)
- ❑ An architect, engineer or energy consultant
- ❑ An equipment vendor or building contractor
- ❑ Past experience with the program
- ❑ Or some other way (please explain) _____

DM-4 What would you say is the best way of reaching companies like yours with information about energy saving opportunities such as the <PROGRAM> (Don't Prompt. Multiple Response)?

- ❑ Visits from program reps/staff/vendors
- ❑ Bill or bill inserts
- ❑ Target owners / Upper management
- ❑ Email
- ❑ Direct Mail
- ❑ Phone
- ❑ Other _____
- ❑ Don't Know

DM-5 During your participation in the SPS <PROGRAM>, did you receive information about any OTHER SPS energy efficiency programs available to commercial and industrial customers?

- ❑ Yes
- ❑ No
- ❑ Don't Know

DM-5a. (If DM-5 ="YES")

What type of information did you receive?

[VERBATIM RESPONSE]

_____

_____

For each of the following, tell me if it is "very important," "somewhat important," "only slightly important," or "not important at all" for your decision making regarding energy efficiency improvements.

DM-6 Incentive payments from SPS?

- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know *(DON'T READ)*

DM-7 Past experience with energy efficient equipment?

- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know *(DON'T READ)*

DM-8 Your organization's policies?
- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know *(DON'T READ)*

DM-9 Advice and/or recommendations received from SPS?
- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know *(DON'T READ)*

DM-10. Advice and/or recommendations from equipment vendors?
- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know *(DON'T READ)*

DM-11 What **payback** *length of time* do you normally require in order to consider an energy investment cost effective?

_____ Years

DM-12 When you have to replace equipment at this facility, **how often** do you try to purchase and install **energy efficient equipment**? (READ) Would you say…
- ❑ Always
- ❑ Usually
- ❑ Sometimes
- ❑ Occasionally
- ❑ Never
- ❑ Don't know *(DON'T READ)*

DM-13. Before you knew about the <PROGRAM>, had you purchased and installed any energy efficient equipment at this facility?
- ❑ Yes [ASK DM-13A]
- ❑ No [SKIP TO DM-14]
- ❑ Don't know *(DON'T READ)*

[IF DM-13 = "YES"]

DM-13A What types of energy efficient equipment had you installed in your facility?

[VERBATIM RESPONSE]

_____

_____

DM-14. Has your organization purchased any energy efficient equipment in the last year for which you did **not** apply for a financial incentive through SPS? (IF RESPONDENT SAYS, "No" CLARIFY IF "No equipment purchased" OR IF "No, have applied for financial incentives.")

❑ Yes, Purchased energy efficient equipment but did not apply for financial incentive.

⬇

IF YES: DM-14a. Why didn't you apply for a financial incentive on that equipment?

(DO NOT READ LIST. PROMPT IF NECESSARY)

- ❑ Didn't know whether equipment qualified for financial incentives
- ❑ Didn't know about financial incentives until after equipment was purchased
- ❑ Didn't have time to complete paperwork for financial incentive application
- ❑ Paperwork for the financial incentive application was too complex
- ❑ Financial incentive wasn't enough to bother with
- ❑ Other 1 (Specify)_____
- ❑ Other 2 (Specify)_____

❑ No, Applied for financial incentives on all of the energy efficient equipment purchased.

- ❑ Has NOT purchased equipment
- ❑ Don't know (*DO NOT READ)*

FINANCIAL INCENTIVE QUESTIONS

I now have some questions about particular types of equipment for which you received financial incentives.

According to SPSs records, you received incentives for (insert Equipment/Measure____

FI-1. Before participating in the <PROGRAM>, had you installed any equipment or measure similar to [Rebated Equipment/Measure] at your facility?

- ❑ Yes
- ❑ No

FI-2. Did you have plans to install [Equipment/Measure] before participating in the program?

- ❑ No
- ❑ Yes

If Yes: FI-2a Would you have gone ahead with this planned installation even
if you had not participated in the program?

- ❑ Yes
- ❑ No

FI-3. Did you have previous experience with SPS energy efficiency programs prior to participating in the <PROGRAM>?

- ❑ Yes [ASK FI-3a]
- ❑ No [SKIP TO FI-4]

FI-3a How important was previous experience with the SPS energy efficiency programs in making your decision to install [Equipment/Measure]? Was it… (READ LIST)

- ❑ Very important
- ❑ Somewhat important
- ❑ Only slightly important
- ❑ Not important at all
- ❑ Don't know *(DON'T READ)*

FI-4. Would you have been financially able to install [Equipment/Measure] without the financial incentive from the <PROGRAM>?

- ❑ Yes
- ❑ No
- ❑ Don't know

FI-5. Did anyone from SPS recommend that you install [Equipment/Measure]?

- ❑ No
- ❑ Yes

If Yes: FI-5a

If the rebate program representative had not recommended installing [Equipment/Measure], how likely is it that you would have installed [Equipment/Measure] anyway? You… (READ LIST)

- ❑ Definitely would have installed
- ❑ Probably would have installed
- ❑ Probably would not have installed
- ❑ Definitely would not have installed
- ❑ Don't know *(DON'T READ)*

FI-6. If the **financial incentive** from the <PROGRAM> had not been available, how likely is it that you would have installed [Equipment/Measure] anyway? You… (READ LIST)

- ❑ Definitely would have installed
- ❑ Probably would have installed
- ❑ Probably would not have installed
- ❑ Definitely would not have installed
- ❑ Don't know *(DON'T READ)*

FI-7. If the rebate through <PROGRAM> were not available, would you have installed the…

- ❑ Same quantity of energy efficient equipment,
- ❑ A lower quantity, or
- ❑ No energy efficient equipment at all?

[IF FI-7 = "Lower Quantity"]: FI-7a: By percentage, how much lower?

FI-8. If the rebate program were not available, would you have installed …

- ❑ The same efficiency level,
- ❑ a lower energy efficiency level, but still above minimum code, or
- ❑ standard efficiency?

[IF FI-8 = "Lower efficiency level, but still above minimum code"]: FI-8a: By percentage, how much lower?

FI-9. Did the rebate program allow you to install sooner than you otherwise would have?

- ❑ Yes

  ⬇

  IF YES: FI-9a When would you otherwise have installed the equipment? (READ IF NEEDED)
  - ❑ In less than 6 months later
  - ❑ In 6-12 months later
  - ❑ In 1-2 years later
  - ❑ In 3-5 years later
  - ❑ In more than 5 years later
  - ❑ No, did not affect timing of purchase and installation

FI-10 When did you learn of the <PROGRAM>? (READ. ONE ONLY)

- ❑ Before planning for replacing the equipment began
- ❑ During your planning to replace the equipment
- ❑ Once equipment had been specified but not yet installed
- ❑ After equipment was installed
- ❑ Some other time (When? _____)
- ❑ Don't' Know *(Don't Read)*

PARTICIPATION PROCESS (PP) QUESTIONS

PP-1 How did you choose the contractor that performed the installation?

- ❑ No contractor / Self-install [GO TO PP-2]
- ❑ Knew from prior work [GO TO PP-1d]
- ❑ Contractor contacted us [GO TO PP-1d]f
- ❑ Bidding process [GO TO PP-1a]

PP-1a Did any of these contractors mention the rebate program?

- ❑ No [GO TO PP-1d]
- ❑ Yes [GO TO PP-1b]
- ❑ Don't know [GO TO PP-1d]

PP-1b Did you select a contractor that promoted the program?

- ❑ No [GO TO PP-1d]
- ❑ Yes [GO TO PP-1c]
- ❑ Don't know [GO TO PP-1d]

[IF PP-1b = “YES”]

PP-1c Did the promotion of the <PROGRAM> influence your decision on what vendor/contractor to use?

- ❑ No
- ❑ Yes
- ❑ Don't know

[IF PP-1b = “NO” OR “DON’T KNOW”]

PP-1d Did you tell the contractor about the program?

- ❑ No
- ❑ Yes
- ❑ Don't know

PP-2 Did the implementation go smoothly?

- ❑ No, Explain_____
- ❑ For the most part, Explain_____
- ❑ Yes
- ❑ Don't know

PP-3 Did the energy efficiency measure meet your expectation?

- ❑ No, Explain_____
- ❑ For the most part, Explain_____
- ❑ Yes
- ❑ Exceeded my expectations
- ❑ Don't know

PP-4 Do you feel you got a quality installation?
- ❑ No, Explain_____
- ❑ For the most part, Explain_____
- ❑ Yes
- ❑ Don't know

PP-5 Did the incentive agreement that you received meet your expectations?
- ❑ No, Explain_____
- ❑ Yes
- ❑ Don't know

PP-6 Did anyone from SPS come to your facility to do a pre-inspection?
- ❑ No [GO TO PP-7]
- ❑ Yes [GO TO PP-6a]
- ❑ Don't know [GO TO PP-7]

PP-6a Who performed the inspection?
PP-6b What did the pre-inspection consist of?
PP-6c Did anything change in the design as a result of the pre-inspection?
- ❑ No
- ❑ Yes, Explain_____
- ❑ Don't know

PP-7 Did anyone from SPS come to your facility to do a post-inspection?
- ❑ No [GO TO PP-8]
- ❑ Yes [GO TO PP-7a]
- ❑ Don't know [GO TO PP-8]

PP-7a Who performed the inspection?
PP-7b What did the post-inspection consist of?
PP-7c Did anything change in the incentive amount as a result of the post-inspection?
- ❑ No
- ❑ Yes, Explain_____
- ❑ Don't know

PP-8 Who completed the paperwork for the rebate process? Was it…
- ❑ Someone within firm
- ❑ The installing Vendor/Contractor
- ❑ Someone else (specify)_____
- ❑ Don't know

PP-9 Were there any issues getting the paperwork approved?
- ❑ No
- ❑ Yes, Explain_____
- ❑ Don't know

PP-10 Were there any issues receiving the incentive check?

- ❑ No
- ❑ Yes, Explain_____
- ❑ Don't know

PP-11 Was the incentive check the amount you expected?

- ❑ No, Explain_____
- ❑ Yes
- ❑ Don't know

OVERALL SATISFACTION (OS) QUESTIONS

OS-1 On a scale of 1 to 5, where "5" is very satisfied and "1" is very dissatisfied, and a 3 is neither satisfied nor dissatisfied, how would you rate your satisfaction with the following? (ROTATE. H ALWAYS LAST)

	1 Very Dissatisfied	*2*	*3*	*4*	*5 Very Satisfied*	*Don't know or no answer*
A. Performance of the equipment installed	❑	❑	❑	❑	❑	❑
B. Savings on your monthly bill	❑	❑	❑	❑	❑	❑
C. Incentive amount	❑	❑	❑	❑	❑	❑
D. The effort required for the application process	❑	❑	❑	❑	❑	❑
E. Information provided by your contractor	❑	❑	❑	❑	❑	❑
F. Quality of the work conducted by your contractor	❑	❑	❑	❑	❑	❑
G. Information provided by SPS Account Representative	❑	❑	❑	❑	❑	❑
H. Overall program experience	❑	❑	❑	❑	❑	❑
I. The elapsed time until you received the incentive	❑	❑	❑	❑	❑	❑

OS-2. *ASK FOR EACH IF ANSWERED 1 or 2 FOR ANY ASPECT IN QUESTION 28:*

Why were you not satisfied with the (ASPECT)? _____

_____

_____

OS-3. Has your experience with the <PROGRAM> led you to buy any energy efficient equipment for which you did not apply for a financial incentive?

- ❑ Yes

🡻

If Yes: OS-3a What type of equipment? _____

- ❑ No
- ❑ Don't know *(DON'T READ)*

OS-4. Given your experience with the <PROGRAM>, would you buy energy efficient equipment in the future even if financial incentives for such equipment were not being offered through the Program?

- ❑ Yes
- ❑ No
- ❑ Don't know *(DON'T READ)*

OS-5. After having participated in the <PROGRAM>, has your company's perspective on energy efficiency changed?

- ❑ Yes [ASK OS-5A]
- ❑ No [GO TO OS-6]
- ❑ Don't know *(DON'T READ)* [GO TO OS-6]

OS-5a. What has changed within the company regarding policies on energy efficiency improvements?

_____

_____

OS-6. That concludes my questions. Do you have any other comments that you would like me to relay to SPS about energy efficiency in commercial facilities or about their programs?

_____

_____

_____

_____

Thanks for your help!
SPS will use your ideas to improve
its programs for commercial customers.

9. Appendix C: Detailed TRC Tables

Table 9-1 Detailed TRC Table

Program	*Avoided Production Costs*	*Avoided Capacity Expansion Costs*	*Net Customer Investment*	*Administration Costs*
Home Energy Services	$2,778,264	$2,017,368	$1,576,005	$198,145
Home Lighting & Recycling	$4,903,152	$1,287,436	$457,801	$591,075
Evaporative Cooling	$295,638	$391,372	$7,237	$36,222
Low Income	$693,756	$332,087	-	$346,853
Refrigerator Recycling	$92,841	$43,461	-	$117,416
School Education Kits	$284,344	$17,794	-	$111,245
Electric Water Heating	$2,300	$872	$150	$3,250
Energy Feedback	-	-	-	$115,839
Business Lighting	$879,562	$405,044	$167,343	$136,068
Business Cooling	$499,626	$382,563	$267,551	$61,497
Business Custom	$313,363	$26,084	$43,012	$241,011
Business Motors & Drives	$6,945,183	$1,846,821	$1,076,521	$310,448
Small Business Lighting	$2,367,185	$1,269,378	$986,184	$729,936
Residential Saver's Switch	$1,770	$195,441	-	$495,088
Business Saver's Switch	$101	$15,763	$0	$215,272
Interruptible Credit Option	-	-	-	$1,975
Planning & Research	-	-	-	$657,314
Total:	$20,057,085	$8,231,484	$4,581,804	$4,368,654