Southwestern Public Service Company

2018 Energy Efficiency and Load Management Annual Report

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

May 15, 2019

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Glossary of Acronyms and Definition

Acronym/Defined Term	**Definition**
2018 Annual Report	SPS's 2018 Energy Efficiency and Load Management Annual Report
2017 Plan	SPS's 2017 Energy Efficiency and Load Management Plan
Commission	New Mexico Public Regulation Commission
DR	Demand Response
DSM	Demand-Side Management – refers to the energy efficiency and load management programs collectively
ECM	electronically commutated motor
EE	Energy Efficiency
EE/LM	Energy Efficiency and Load Management
EUEA	New Mexico Efficient Use of Energy Act, as amended (NMSA 1978 §§62-17-1 through 62-17-11)
Evaluator	Independent Program Evaluator, the third-party contractor that will conduct all measurement and verification of the programs
Evergreen	Evergreen Economics Inc., the third-party selected as the Independent Program Evaluator for the measurement and verification of all New Mexico utility energy efficiency and load management programs
GWh	gigawatt hour
HER	Home Energy Reports

Acronym/Defined Term	**Definition**
HVAC	Heating, Ventilation, and Air Conditioning
kW	Kilowatt
kWh	kilowatt-hour
LED	light emitting diode
M&V	Measurement and Verification
PY	Plan Year
Rule	Energy Efficiency Rule (17.7.2 NMAC)
SPS	Southwestern Public Service Company, a New Mexico corporation
Staff	Commission's Utility Division Staff
Stipulation	Settlement Agreement between the parties to Case No. 16-00110-UT
UCT	Utility Cost Test - the cost-effectiveness standard implemented on July 1, 2013, also known as the Program Administrator Test
Xcel Energy	Xcel Energy Inc.

Document Layout

Southwestern Public Service Company's, a New Mexico corporation, ("SPS") 2018 Energy Efficiency and Load Management ("EE/LM") Annual Report ("2018 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 required by 17.7.2.14 NMAC;
- Section III provides the program descriptions including an explanation of deviations from goal and changes during 2017, organized into the Residential, Business, and Planning & Research Segments;
- Section IV provides compliance requirements set forth in the Stipulation Agreement in Case No. 16-00110-UT;[1] and
- Appendix A provides the Measurement and Verification ("M&V") Report of SPS's 2018 program year prepared by Evergreen Economics Inc. ("Evergreen").

[1] *In the Matter of Southwestern Public Service Company's Energy Efficiency Compliance Application that Requests Authorization to: (1) per Approved Variance, continue its: (A) 2017 Energy Efficiency and Load Management Plan Programs for Plan Year ("PY") 2018; (B) 2017 Energy Savings Goal for Plan Year 2018; (C) Energy Efficiency Tariff Rider to Recover the Three Percent Funding Level for Plan Year 2018 and Reconciliation of 2016 Expenditures and collections; and (D) 2017 financial Incentive for Plan Year 2018 and Recover the incentive Through Its Energy Efficiency Tariff Rider; and (2) Recover the 2016 Reconciled Financial Incentive Through its Energy Efficiency Rider,* Case No. 17-00159-UT, Final Order Approving Certification of Stipulation (Dec. 13, 2017).

Section I. Executive Summary

Introduction

In accordance with the Efficient Use of Energy Act ("EUEA"), as amended by Senate Bill 418 (2007), House Bill 305 (2008), and House Bill 267 (2013), and the New Mexico Public Regulation Commission's ("Commission") Energy Efficiency ("EE") Rule (17.7.2 NMAC, "Rule"), SPS respectfully submits for Commission review its 2018 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, 17.7.2.8.A NMAC requires SPS to file with the Commission on May 15 of each year, a report on its energy efficiency and load management programs during the prior calendar year. The specific reporting requirements of the Rule are discussed in Section II.

Within this 2018 Annual Report, SPS provides the expenditures and savings results for nine EE/LM direct impact programs in the Residential Segment (including Low-Income) and Business Segment (including Large Customer). In addition, the 2018 Annual Report includes a summary of the Planning and Research Segment, which supports the direct impact programs. The M&V Report for SPS's 2018 savings is included as Appendix A.

Background

SPS filed its 2017 EE/LM Plan ("2017 Plan") on May 2, 2016 (Case No. 16-00110-UT). SPS, the Commission's Utility Division Staff ("Staff"), and the other parties to the case agreed to a stipulation ("Stipulation") or did not oppose the Stipulation, which was approved by the Commission on November 9, 2016. The Stipulation included the following revisions to the originally proposed 2017 Plan: review the potential for incremental participation in the Residential Energy Feedback program, removal of the Refrigerator Recycling program from the Residential Segment, removal of the Saver's Switch for Business program from the Business Segment, removal of the Consumer Education and C&I Benchmarking programs from the Indirect Segment, and reductions to several program budgets as part of the settlement agreement to reduce spending consistent with revised annual collections.

On January 25, 2017, the Commission issued notice of a rulemaking in Case No. 17-00010-UT which proposed new filing deadlines for utilities to submit annual applications under Section 17.7.2.8(A). The approved revisions to Section 17.7.2.8(A) would authorize SPS not to file an application in 2017, but instead file in 2018, for plan years 2019 and 2020.

On February 15, 2017, SPS filed its Motion for Variance, pursuant to 17.7.2.19 NMAC, which requested the Commission grant SPS a variance from Section 17.7.2.8(A) and (B) NMAC in order to allow SPS to submit a limited application for its EE/LM Plan Year ("PY") 2018 ("Limited Application") on July 1, 2017 plus file its 2016 Annual Report on July 1, 2017, rather than May 1, 2017 as was required by the EE Rule at that time. The Order Granting Variance was approved on March 1, 2017.

In accordance with the March 1 Order, on July 3, 2017, SPS filed its Application asking for an Order granting SPS's request to continue its Commission approved PY 2017 EE/LM programs for PY 2018 and authorize SPS to fund its 2018 EE/LM programs at three percent of customer bills (the "three percent funding level") in accordance with Section 62-17-6(A) of the EUEA and 17.7.2.8(C)(l) NMAC. Additionally, SPS requested to continue its Commission-approved 2017 energy savings goal for PY 2018, approve the continuation for PY 2018 of the incentive mechanism the Commission approved for PY 2017 and authorize recovery through SPS's EE Rider. SPS proposed no update or modifications to the EE/LM programs that were approved by the Commission through the Stipulation for PY 2017. The Commission approved SPS's request for continuation on December 13, 2017.

Summary of Results

In compliance with 17.7.2.14.C NMAC, Table 1 below shows SPS's program budget approved by the NMPRC goals, budgets, and Utility Cost Test ("UCT") ratios approved by the Commission on December 13, 2017.

In 2018, SPS achieved verified net electric savings of 7,539 kilowatts ("kW") and 42,841,455 kilowatt-hours ("kWh") at the customer, for a total cost of $11,000,297 (see Table 1 below.) This equals 129% of SPS's 2018 approved energy goal, while spending 112% of the approved budget. The portfolio was cost-effective with a UCT ratio of 2.32.

As shown in Table 1, most of the direct impact energy efficiency programs were cost-effective under the UCT. Three of the programs did not pass the UCT test in 2018. While each of the products listed below is discussed in more detail later in the Status Report, a summary of the primary reasons for individual programs falling below 1.0 on the UCT follows.

- Residential Cooling: The program received a low UCT in 2018 due to low participation in the program. Efficiency measures such as mini-split heat pumps, air conditioners, and conventional heat pumps launched in 2017, but the market has been slow in responding to the additional measures. In 2018, SPS relied on Heating, Ventilation, and Air Conditioning) ("HVAC") (contractors to promote customer rebates and help customers apply for the rebates. Contractor participation was lower than expected, so in 2019 SPS will also partner with HVAC distributors in order to distribute customer rebate forms and promote participation in the program.

- Interruptible Credit Option ("ICO"): ICO had no participants in 2018 and therefore achieved a UCT ratio of 0.0.

- Residential Saver's Switch: The program received a low UCT in 2018 due to a sizeable portion of installed devices being found to be either not working, not receiving over-the-air signals, or not connected to functioning air conditioning units. The program is slated to be closed down by year-end 2019. SPS works in good faith

to comply with the EUEA and to offer cost-effective EE/LM programs to all of its customers.

Table 1: Estimated and Actual Program Data for 2018

Program	2018 Estimated								2018 Reported and Verified							
	Participants	Budget	Peak Demand Savings (Customer kW)	Annual Energy Savings (Customer kWh)	Peak Demand Savings (Generator kW)	Annual Energy Savings (Generator kWh)	Utility Avoided Cost	Utility Cost Test	Participants	Expenditures	Peak Demand Savings (Net Customer kW)	Annual Energy Savings (Net Customer kWh)	Peak Demand Savings (Net Generator kW)	Annual Energy Savings (Net Generator kWh)	Utility Avoided Cost	Utility Cost Test
Residential Segment																
Residential Energy Feedback	18,090	$133,045	421	2,999,949	502	3,401,303	$ 157,051	1.18	37,438	$128,600	1,075	4,161,260	1,283	4,717,982	$ 265,923	2.07
Residential Cooling	250	$175,908	87	387,255	104	439,065	$ 311,058	1.77	58	$49,427	11	52,151	13	59,128	$ 39,033	0.79
Home Energy Services: Residential & Low Income	1,850	$2,634,220	657	5,541,450	784	6,282,823	$ 4,071,171	1.55	3,089	$3,796,983	1,148	12,782,862	1,370	14,493,041	$ 8,539,919	2.25
Home Lighting & Recycling	298,000	$2,094,918	1,365	10,117,471	1,629	11,471,055	$ 7,930,049	3.79	323,139	$1,893,165	1,302	9,588,220	1,554	10,870,997	$ 6,166,331	3.26
Residential Saver's Switch	4,203	$203,250	3,653	35,241	4,359	39,956	$ 290,158	1.43	4,360	$236,580	658	0	785	0	$ 133,031	0.56
School Education Kits	2,500	$163,417	25	850,672	30	964,480	$ 329,935	2.02	2,427	$151,213	35	1,006,950	42	1,141,667	$ 374,542	2.48
Smart Thermostat Pilot	3,440	$232,557	1,773	547,183	2,116	620,388	$ 206,685	0.89	528	$77,145	1,234	3,151	1,473	3,573	$ 249,592	3.24
Residential Segment Total	**328,333**	**$5,637,315**	**7,982**	**20,479,220**	**9,525**	**23,219,071**	**$ 13,296,107**	**2.36**	**371,039**	**$6,333,113**	**5,463**	**27,594,594**	**6,520**	**31,286,388**	**$ 15,768,370**	**2.49**
Business Segment																
Business Comprehensive	716	$3,570,861	1,953	12,764,348	2,180	13,829,197	$ 8,360,284	2.34	227	$4,355,924	2,076	15,246,861	2,317	16,518,809	$ 9,760,118	2.24
Interruptible Credit Option	2	$45,569	789	7,000	881	7,584	$ 73,060	1.60	0	$1,076	0	0	0	0	$ -	0.00
Business Segment Total	**718**	**$3,616,430**	**2,743**	**12,771,348**	**3,061**	**13,836,781**	**$ 8,433,344**	**2.33**	**227**	**$4,356,999**	**2,076**	**15,246,861**	**2,317**	**16,518,809**	**$ 9,760,118**	**2.24**
Planning & Research Segment																
Market Research		$90,000								$44,272						
Measurement & Verification		$12,000								$6,444						
Planning & Administration		$285,242								$159,699						
Product Development		$195,859								$99,769						
Planning & Research Segment Total		**$583,101**								**$310,185**						
2017 TOTAL	**329,051**	**$9,836,846**	**10,724**	**33,250,569**	**12,586**	**37,055,851**	**21,729,451**	**2.21**	**371,266**	**$11,000,297**	**7,539**	**42,841,455**	**8,836**	**47,805,197**	**25,528,488**	**2.32**

Table 2: Variance Comparison of 2018 Estimated and Reported/Verified Data

Program	2018 Estimated and Reported/Verified Variances							
	Participants	Expenditures	Peak Demand Savings (Net Customer kW)	Annual Energy Savings (Net Customer kWh)	Peak Demand Savings (Net Generator kW)	Annual Energy Savings (Net Generator kWh)	Utility Avoided Cost	Utility Cost Test
Residential Segment								
Residential Energy Feedback	207%	97%	256%	139%	256%	139%	169%	175%
Residential Cooling	23%	28%	12%	13%	12%	13%	13%	45%
Home Energy Services: Residential & Low Income	167%	144%	175%	231%	175%	231%	210%	146%
Home Lighting & Recycling	108%	90%	95%	95%	95%	95%	78%	86%
Residential Saver's Switch	104%	116%	18%	0%	18%	0%	46%	39%
School Education Kits	97%	93%	139%	118%	139%	118%	114%	123%
Smart Thermostat Pilot	15%	33%	70%	1%	70%	1%	121%	364%
Residential Segment Total	113%	112%	68%	135%	68%	135%	119%	106%
Business Segment								
Business Comprehensive	32%	122%	106%	119%	106%	119%	117%	96%
Interruptible Credit Option	0%	2%	0%	0%	0%	0%	0%	0%
Business Segment Total	32%	120%	76%	119%	76%	119%	116%	96%
Planning & Research Segment								
Market Research		49%						
Measurement & Verification		54%						
Planning & Administration		56%						
Product Development		51%						
Planning & Research Segment Total		53%						
2018 TOTAL	113%	112%	70%	129%	70%	129%	117%	105%

As shown in Tables 1 and 2 (above), SPS met, or came close to meeting, most of its program forecasts for 2018. While program performance varied, the reasons for which are discussed further in Section III of this report, the majority of programs were within 25% of their budgets. The Residential Energy Feedback, Home Energy Services, School Education Kits, and Business Comprehensive Programs far exceeded their savings forecasts.

Section II: 17.7.2.14 NMAC Reporting Requirements

17.7.2.14.C NMAC requires that annual reports include specific details on the programs offered during the report year. 17.7.2.14.C states:

C. Annual reports shall include the following for each measure and program:

(1) documentation of program expenditures;
(2) estimated and actual customer participation levels;
(3) estimated and actual energy savings;
(4) estimated and actual demand savings;
(5) estimated and actual monetary costs of the public utility;
(6) estimated and actual avoided monetary costs of the public utility;
(7) an evaluation of its cost-effectiveness; and
(8) an evaluation of the cost-effectiveness and pay-back periods of self-directed programs.

In addition, 17.7.2.14.D NMAC requires that the annual report also include:

(1) the most recent M&V report of the Independent Program Evaluator ("Evaluator"), which includes documentation, at both the portfolio and individual program levels, of expenditures, savings, and cost-effectiveness of all energy efficiency measures and programs and load management measures and programs, expenditures, savings, and cost-effectiveness of all self-direct programs, and all assumptions used by the Evaluator;
(2) a listing of each measure or program expenditure not covered by the independent M&V report and related justification as to why the evaluation was not performed;
(3) a comparison of estimated energy savings, demand savings, monetary costs, and avoided monetary costs to actual energy savings, demand savings, actual monetary costs, and avoided monetary costs for each of the utility's approved measure or programs by year;
(4) a listing of the number of program participants served for each of the utility's approved measures of programs by year;
(5) a listing of the calculated economic benefits for each of the utility's approved measures or programs by year;
(6) information on the number of customers applying for and participating in self-direct programs, the number of customers applying for and receiving exemptions, M&V of self-direct program targets, payback periods and achievements, customer expenditures on qualifying projects, oversight expenses incurred by the utility representative or administrator; and

(7) any other information required by the Commission.

The following table provides direction as to where the supporting data and narratives for each of these requirements can be found in this report.

Table 3: Location of Reporting Requirements

Reporting Requirement	Location in Annual Report
17.7.2.14.C(1)	Tables 1 & 2
17.7.2.14.C(2)	Tables 1 & 2
17.7.2.14.C(3)	Tables 1 & 2
17.7.2.14.C(4)	Tables 1 & 2
17.7.2.14.C(5)	Tables 1 & 2
17.7.2.14.C(6)	Tables 1 & 2
17.7.2.14.C(7)	Tables 1 & 2
17.7.2.14.C(8)	N/A
17.7.2.14.D(1)	Appendix A
17.7.2.14.D(2)	Appendix A and Section III
17.7.2.14.D(3)	Table 2
17.7.2.14.D(4)	Table 2
17.7.2.14.D(5)	Table 2
17.7.2.14.D(6)	N/A
17.7.2.14.D(7)	N/A

Section III: Segment and Program Descriptions

Residential Segment

SPS has approximately 89,500 customers in its Residential Segment in New Mexico. The service area is relatively rural, with only a few small cities, including Clovis, Roswell, Artesia, Carlsbad, Portales, and Hobbs.

In 2018, SPS offered seven residential programs with opportunities for all residential customers, including low-income customers, to participate. In total, SPS spent $6,333,113 on these programs and achieved 5,463 kW and 27,594,594 kWh net savings at the customer level.

Overall, the Residential Segment of programs was cost-effective with a UCT of 2.49. The segment achieved 135% of the annual kWh goal with significant contributions from the Home Lighting & Recycling and Home Energy Services programs. All of the programs under the Residential Segment are discussed in more detail below.

Residential Energy Feedback

The Residential Energy Feedback Program provides participating customers with different forms of feedback regarding their energy consumption. The feedback communication strategies and associated tips and tools result in a decrease in energy usage by encouraging changes in the behavior of participating customers. Furthermore, the program attempts to build a persistent increase in, or earlier adoption of, energy efficient technologies and energy efficient practices.

The program ended 2018 with 37,438 participants total in the control and recipient groups[2]. The program year began with 21,229 recipient participants and ended with 18,883, due to an annual attrition rate of 11%. Attrition occurs primarily for two reasons; customers who move out of their residence and those that choose to opt-out of the program. Participants consist of the Legacy Group, which entered the program in early 2012; a 2015 Refill Group that started receiving Home Energy Reports ("HER") in the summer of 2015; and a 2017 Refill Group that began receiving HERs in the summer of 2017. Participants receive their HER approximately once a quarter, however, the cadence varies based on the program design. Each report provides actionable energy saving tips and information on the customer's energy usage. For comparison purposes, the customer's energy consumption is benchmarked with that of 100 similar customers. Accessible through My Account, the My Energy online tool provides the same information that customers receive in the HER, with a more robust set of customization options and energy savings tools. These tools are available

[2] The recipient group receives paper or electronic Home Energy Reports while the control group does not. These groups are compared as a part of the randomized control trial to determine energy savings realized by the recipient group.

to all customers served by SPS, and in 2018 over 750 customers took advantage, compared to 500 in 2017.

Table 4: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Residential Energy Feedback	37,438	18,090	$ 128,600	$ 133,045	1,075	421	4,161,260	2,999,949	2.07

Deviations from Goal
The Residential Energy Feedback Program surpassed its estimated savings impact goals in 2018, and remains cost-effective under the UCT. Participants in the 2015 refill group continue to save a lower than expected amount of energy due to the statistical noise present when attempting to measure savings. Only nineteen customers elected to opt-out of the program, which is similar to the fifteen who chose to opt out in 2017, and significantly lower than the thirty-seven in 2016.

Changes in 2018
For 2018, SPS executed an RFP for a new Energy Feedback implementer and has selected a new implementer, which is expected to be announced in June 2019.

Residential Cooling
The Residential Cooling Program provides a cash rebate to electric customers who purchase and permanently install high-efficiency evaporative cooling, high efficiency air conditioners, air source heat pumps, mini-split heat pumps, or electronically commutated motors ("ECM") in air conditioning equipment for residential use in New Mexico

Table 5: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Residential Cooling	58	250	$ 49,427	$ 175,908	11	87	52,151	387,255	0.79

Deviations from Goal
In 2018, the Residential Cooling Program spent a little under 30% of its forecasted budget primarily due to lack of participation in the program. However, SPS continued to conduct outreach, including on-line media ads, bill inserts, and radio ads. Weaker than expected participation is likely attributable to the following issues:

- a low level of customer awareness about rebates and how to apply for them;
- the HVAC contractor community has been slow to recommend high efficiency equipment;

- Homeowner's Associations place restrictions on roof-mounted evaporative coolers;
- new home construction uses refrigerated air systems, which makes retrofitting for evaporative coolers costly and technically difficult;
- premium systems are not stocked by any retailers or contractors in the service territory; and
- introduction of the ECM rebates into the marketplace took some time due to the requirement that qualified contractors had to be informed of the rebates and how they worked.

In an effort to increase participation in 2019, SPS has begun to look into transitioning the program from a contractor-driven customer rebate offering to a distributor-driven customer rebate offering.

Changes in 2018
None.

Home Energy Services
The Home Energy Services Program provides incentives to energy efficiency service providers for the installation of a range of upgrades that save energy and reduce costs for existing households. Qualifying customers 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 and low-income homes. Additional objectives of the program are to:

- encourage private sector delivery of energy efficiency products and services;
- utilize a whole-house approach to efficiency upgrades; and
- significantly reduce barriers to participation by streamlining program procedures.

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

Table 6: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Home Energy Services: Residential & Low Income	3,089	1,850	$ 3,796,983	$ 2,634,220	1,148	657	12,782,862	5,541,450	2.25

Deviations from Goal
The Home Energy Services Program exceeded its energy savings goals for 2018. The program was also highly cost-effective. The Residential portion of the program also performed well, achieving savings of over 6 gigawatt hour ("GWh")at the customer level. SPS spent just over $1.9 million on the Low-Income portion of the program, which is approximately 18% of the total portfolio spend and in excess of the minimum requirement of 5%.

Changes in 2018
None.

Home Lighting and Recycling
The Home Lighting and Recycling Program helps customers save energy and money by offering energy efficient light emitting diode ("LED") bulbs at discounted prices at participating retailers. SPS works with retailers and manufacturers to buy down the prices of bulbs. LED bulbs receive a buy-down discount of up to $5, with buy-down amounts adjusted for market conditions and by bulb type. This provides a convenient and inexpensive way for customers to reduce their energy usage and impact on the environment while saving money.

SPS marketed 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. Some of the specific promotions included:

- SPS participated in many community events and implemented bulb giveaways at various events including the Eastern New Mexico State Fair, Light Up Artesia, and the Roswell Christmas Railway.
- SPS continued to partner with Domino's Pizza to deliver free energy-efficient bulbs 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 way to reach consumers.

Table 7: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Home Lighting & Recycling	323,139	298,000	$ 1,893,165	$2,094,918	1,302	1,365	9,588,220	10,117,471	3.26

Deviations from Goal
In 2018, the Home Lighting and Recycling Program achieved 95% its energy and demand savings goal. Budget savings were attributed to the continued reduction in the price of LED bulbs and the lower cost of buy-downs.

Changes in 2018
None.

Residential Saver's Switch
Residential Saver's Switch is a demand response ("DR") program that offers bill credits as an incentive for residential customers to allow SPS to control operation of customers' central air conditioners and electric water heaters on days when the SPS 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, SPS utilizes a cycling strategy 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 over-the-air control systems, the program is currently available only in the cities of Portales, Hobbs, Clovis, Roswell, Artesia, and Carlsbad.

The 2018 program year was the ninth operational year for the Saver's Switch program. In 2018, there were seven control events.

Table 8: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Residential Saver's Switch	4,360	4,203	$ 236,580	$ 203,250	658	3,653	0	35,241	0.56

Deviations from Goal
In 2018, the program received a low UCT and did not meet the forecasted savings goal due to a sizeable portion of installed devices being found to be either not working, not receiving over-the-air signals, or not connected to functioning air conditioning units.

Changes in 2018
None.

School Education Kits
The School Education Kits Program provides classroom and in-home activities that enable students and parents to install energy efficiency and water conservation products in their homes. The program is targeted at fifth grade students. A third-party contractor fully implemented the School Education Kits program, including recruiting and training teachers, providing all materials, and tracking participation by schools and teachers. Energy savings are based on the number of measures that are installed in the homes of the students. Students complete surveys to determine the measure installation rates.

Table 9: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
School Education Kits	2,427	2,500	$ 151,213	$ 163,417	35	25	1,006,950	850,672	2.48

Deviations from Goal
The program exceeded its kWh savings goal in 2018 while remaining under budget.

Changes in 2018
None.

Smart Thermostat Pilot
The Smart Thermostat Pilot is designed to evaluate if Wi-Fi connected communicating, smart thermostats can save residential customers energy by installing a smart thermostat device and connecting it to the manufacturer's cloud service. In addition to EE benefits, the Pilot also plans to evaluate DR capacity from smart thermostats in the residential market. SPS offers customers smart thermostats and installation at no cost.

Table 10: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Smart Thermostat Pilot	528	3,440	$ 77,145	$ 232,557	1,234	1,773	3,151	547,183	3.24

Deviations from Goal
The pilot did not reach the target goal of 1,385 DR Participants in 2018. New thermostat installations stopped at the end of 2016 and the pilot did not add any new participants in 2017 or most of 2018. Enrollments were reopened at the end of 2018 and sign-ups were received, however these installations were not completed until early 2019.

Changes in 2018
New customers were enrolled in the program in 2018 for the first time in two years and received thermostats installations in early 2019.

Business Segment

SPS's Business Segment in New Mexico consists of nearly 24,000 commercial, industrial, and agricultural customer premises. In 2018, SPS offered two business programs with opportunities for all commercial and industrial customers to participate.

In total, SPS spent $4,356,999 on these programs and achieved 2,076 kW and 15,246,861 kWh savings at the net customer level.

Overall, the Business Segment of programs was cost-effective with a UCT of 2.24. Achievements were 119% of the annual kWh goal. Both of the programs under the Business Segment are discussed in more detail below.

Business Comprehensive

The Business Comprehensive Program bundles traditional prescriptive and custom products in a way that is more easily understood by customers. Business Comprehensive encompasses the Recommissioning, Computer Efficiency, Cooling Efficiency, Custom Efficiency, Large Customer Self-Direct, Lighting Efficiency, and Motor & Drive Efficiency products. Customers can choose to participate in any or all of the individual program components.

Table 11: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Business Comprehensive	227	716	$ 4,355,924	$3,570,861	2,076	1,953	15,246,861	12,764,348	2.24

Deviations from Goal

The Business Comprehensive Program achieved 119% of its savings goal. The program saw increased participation in the oil and gas sector as a result of SPS's increased efforts to target the growing market within the service territory. Additionally, the Motors program saw higher than anticipated participation in the prescriptive Variable Frequency Drive measure, and several large custom Variable Frequency Drive projects were rebated in 2018.

Changes in 2018

Business Comprehensive Program added LED Type B Linear Replacement lamp rebates.

Interruptible Credit Option

The ICO Program was developed to offer significant savings opportunities to SPS 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.

Table 12: 2018 Program Achievements

Program	Actual Participants	Forecasted Participants	Actual Spend	Budgeted Spend	Peak Demand Savings kW (Net Customer)	Peak Demand Goal kW (Net Customer)	Annual Energy Savings kWh (Net Customer)	Energy Savings Goal kWh (Net Customer)	Utility Cost Test
Interruptible Credit Option	0	2	$ 1,076	$ 45,569	0	789	0	7,000	0.00

Deviations from Goal

The ICO Program did not have any participants during 2018. This program is best suited for SPS's largest customers, most of whom are in the oil and gas industries. Due to the

current economic conditions, most of these large customers have not seen a benefit to the program.

Changes in 2018
None.

Planning & Research Segment

The Planning and Research Segment consists of internal utility functions (not customer-facing), which support the direct impact programs. The overall purpose of the Planning and Research Segment is to:

- provide strategic direction for SPS's EE/LM programs;
- ensure regulatory compliance with energy efficiency legislation and rules;
- guide SPS internal policy issues related to energy efficiency;
- train SPS Marketing staff for compliance and cost-effectiveness;
- 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 to both customers and the system of SPS's energy efficiency portfolio;
- measure customer satisfaction with SPS's energy efficiency efforts; and
- develop new conservation and load management programs.

The segment includes EE/LM-related expenses for Demand Side Management ("DSM") Planning & Administration, Market Research, M&V, and Product Development. Each Planning and Research program is discussed below.

Planning & Administration
The Planning and Administration area manages all EE/LM regulatory filings (including this Annual 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 supports the DSM component of resource planning and provides planning and internal policy guidance to meet all EE/LM 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 Commission Staff.

Deviations from Goal
None.

Changes in 2018
None.

Market Research
The Market Research group spearheads energy efficiency-related research efforts that are used to inform SPS on EE/LM Strategy. In 2018, the Market Research group oversaw the SPS portion of several Xcel Energy Inc. ("Xcel Energy")-wide subscriptions such as SPS's E-Source Membership, and the Dun & Bradstreet list purchase.

Deviations from Goal
SPS spent less than the forecasted budget, due to lower than expected consulting costs.

Changes in 2018
Market Research worked with Wiese Research to conduct the Home Use Study in 2018 as well as a separate low income study. The Home Use Study provides research on customers in New Mexico concerning their actions taken to reduce energy consumption, and how energy is used in their homes. Another study launched in 2018 was the Xcel Energy Proprietary Relationship Study which provides more frequent feedback about customer attitudes and behaviors around energy.

Measurement & Verification
The M&V budget funds the internal staff from the Planning and Administration area who oversee M&V planning, data collection, 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.

17.7.2.14.D(1) NMAC requires that utilities submit the most recent M&V Report conducted by the approved Evaluator with its Annual Report. The 2018 M&V Report is provided as Appendix A of this document. In compliance with the reporting requirements, the 2018 M&V Report includes:

- expenditure documentation, at both the total portfolio and individual program levels;
- measured and verified savings;
- evaluation of cost-effectiveness of all of SPS's EE/LM 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; and

- measures are operating correctly and are expected to generate the predicted savings.

Deviations from Goal
SPS spent less than the forecasted indirect M&V budget which is primarily used for TRM updates and portfolio wide M&V activities. Although Evergreen revised the TRM in the fall of 2018, not all costs associated with the refresh were included in 2018 spend. Additional TRM costs will be shown in PY 2019's reporting.

Changes in 2018
None.

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

Deviations from Goal
SPS spent less than the forecasted budget due to lower than expected consulting costs.

Changes in 2018
In May, 2018, SPS hired Seventhwave (now called Slipstream) to recommend actions to optimize the New Mexico portfolio, including proposing new efficiency measures and program improvements for increased penetration of existing measures.

Section IV: 2018 Incentive Mechanism True-Up

In Case No. 16-00110-UT, SPS indicated that it would provide its annual reconciliation of plan year incentives in its annual report. The Commission authorized SPS to collect a baseline financial incentive of $668,905 in 2018. Interest was to be symmetrically applied to the over- or under-collected monthly balance, using the customer deposit interest rate. In 2018, SPS collected $877,073, compared to the baseline financial incentive of $668,905, resulting in interest of $1,468.46 owed to customers.

Next, SPS compared its baseline incentive to its Commission-approved earned incentive. SPS exceeded its 2018 achievement goal of 29.444 GWh by 13.397 GWh, resulting in an earned incentive of $699,399. When compared to the collected amount ($878,541.46, including interest), SPS needs to return $179,142.46 to customers related to the 2018 incentive.

Appendix A: Measurement & Verification Report:

SPS 2018 Program Year

Provided by Evergreen

Evaluation of the 2018 Southwestern Public Service Company's Energy Efficiency and Demand Response Programs

Final Report

April 19, 2019

Table of Contents

Executive Summary

This report presents the independent evaluation results for the Southwestern Public Service Company (SPS) energy efficiency and demand response programs for program year 2018 (PY2018).

The SPS programs and evaluation requirements were first established in 2005 by the New Mexico legislature's passage of the 2005 Efficient Use of Energy Act (EUEA).[1] The EUEA requires public utilities in New Mexico, in collaboration with other parties, to develop cost-effective programs that reduce energy demand and consumption. Utilities are required to submit their proposed portfolio of programs to the New Mexico Public Regulation Commission (NMPRC) for approval. As a part of its approval process, the NMPRC must find that the program portfolio is cost effective based on the Utility Cost Test (UCT).

An additional requirement of the EUEA is that each program must be evaluated at least once every three years. As part of the evaluation requirement, SPS must submit to the NMPRC a comprehensive evaluation report prepared by an independent program evaluator. As part of the reporting process, the evaluator must measure and verify energy and demand savings, determine program cost effectiveness, assess how well the programs are being implemented, and provide recommendations for program improvements as needed.

For PY2018, the following SPS programs were evaluated:

- Business Comprehensive
- Energy Feedback
- Home Energy Services
- Saver's Switch

For each of the evaluated programs, the evaluation team estimated realized gross and net impacts (kWh and kW) and calculated program cost effectiveness using the UCT.[2] Brief process evaluations were also conducted for the Business Comprehensive and Home Energy Services programs.

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[1] NMSA §§ 62-17-1 *et seq* (SB 644). Per the New Mexico Public Regulation Commission Rule Pursuant to the requirements of the EUEA, the NMPRC issued its most recent *Energy Efficiency Rule* (*17.7.2 NMAC*) effective September 26, 2017, that sets forth the NMPRC's policy and requirements for energy efficiency and load management programs. This Rule can be found online at http://164.64.110.134/parts/title17/17.007.0002.html

[2] The evaluation team consists of Evergreen Economics, EcoMetric, Demand Side Analytics, and Research & Polling.

The remaining programs that were not evaluated in 2018 are still summarized in this report. The accomplishments for the non-evaluated programs are reported using the following parameters:

- Gross impacts (kWh, kW) were calculated using the SPS *ex ante* values for annual savings;
- Net impacts were calculated from the gross impacts using the existing *ex ante* net-to-gross (NTG) ratio; and
- Cost effectiveness calculations were calculated using the *ex ante* net impact values and cost data as reported by SPS.

The analysis methods used for the evaluated PY2018 programs are summarized as follows:

Business Comprehensive. This program offers rebates to SPS's commercial customers for the installation of energy efficient equipment. The measures eligible for the Business Comprehensive program are primarily prescriptive in nature, but the program also includes custom projects. Gross impacts were estimated based on a review of the deemed savings values combined with engineering desk reviews of a statistically representative sample of projects covering a range of project sizes and major measure types. A subset of projects that received desk reviews were also visited on-site by an evaluation engineer. A phone survey of participating customers was used to verify installation and to collect information needed for a self-report analysis of free ridership to determine net impacts.

Energy Feedback. This program provides participating customers with information on their energy consumption by providing a comparison with a matched set of similar households. The feedback on energy use, combined with tips for reducing energy use, is designed to create sustained reductions in consumption. Net impacts were estimated using a billing regression and data from both the participants and control group customers.

Home Energy Services. This is a prescriptive program serving SPS's residential customers, including low-income households, and offers the following measures: ceiling insulation, duct sealing, air infiltration, central AC, air source heat pumps, programmable thermostats, LEDs, and low flow shower heads. Low-income customers can receive these measures at a reduced cost. The impact evaluation of the Home Energy Services program included desk reviews for a sample of projects, deemed savings reviews, and a participant survey. For the process evaluation, the participant survey was used to assess how well the program is operating and serving customers.

Saver's Switch. This program is a one-way switch enabled demand response program offered to residential SPS customers to control AC load. Impacts for this program were evaluated by making a comparison between actual energy use during events and an estimated counterfactual baseline. Demand reductions were estimated for event days

based on logged interval load data collected in the field. Hourly load data from event-like days were then used to develop event-day baseline estimates specific to each event day. An operability rate was also determined based on field observations, and communication rates were assessed by analyzing logging data during events.

Table 1 summarizes the PY2018 evaluation methods.

Table 1: Summary of PY2018 Evaluation Methods by Program

Program	Deemed Savings Review	Phone Verification	Engineering Desk Reviews	Site Visits	Billing Regression
Business Comprehensive	◆	◆	◆	◆	
Energy Feedback					◆
Home Energy Services	◆	◆	◆		
Saver's Switch				◆	◆

The results of the PY2018 impact evaluation are shown in Table 2 (kWh) and Table 3 (kW), with the programs evaluated in 2018 highlighted in blue. A summary of the NTG ratios by program is shown in Table 4. For the non-evaluated programs, the totals are based on the *ex ante* savings and NTG values from the SPS tracking data.

Table 2: PY2018 Savings Summary - kWh[3]

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Business Comprehensive						
Computer Efficiency	10	11,140	0.9464	10,543	0.8800	9,278
Cooling Efficiency	21	890,184	1.1605	1,033,033	0.7825	808,349
Custom Efficiency	19	1,900,488	1.0496	1,994,805	0.7825	1,560,935
Lighting Efficiency	94	3,291,604	0.9269	3,050,893	0.7825	2,387,324
Motors Efficiency	83	11,851,495	1.1302	13,394,216	0.7825	10,480,974
Home Lighting & Recycling	323,139	13,504,535	1.0000	13,504,535	0.7100	9,588,220
Energy Feedback	37,438	3,897,090	N/A	N/A	1.0678	4,161,260
Residential Cooling	58	79,017	1.0000	79,017	0.6600	52,151
School Education Kits	2,427	1,006,950	1.0000	1,006,950	1.0000	1,006,950
Home Energy Services	3,089	11,524,863	1.1425	13,167,363	0.9708	12,782,862
Saver's Switch	4,360	178	0.0000	0	1.0000	0
Saver's Stat	528	3,151	1.0000	3,151	1.0000	3,151
Total		**47,960,695**				**42,841,453**

[3] All kWh savings shown in this table and throughout the report are at the customer level.

Table 3: PY2018 Savings Summary - kW[4]

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Business Comprehensive						
Computer Efficiency	10	1.0	0.9198	0.9	0.8800	0.8
Cooling Efficiency	21	198	1.0252	203	0.7825	159
Custom Efficiency	19	371	0.8898	330	0.7825	258
Lighting Efficiency	94	408	0.9719	397	0.7825	310
Motors Efficiency	83	1,696	1.0155	1,722	0.7825	1,348
Home Lighting & Recycling	323,139	1,834	1.0000	1,834	0.7100	1,302
Energy Feedback	37,438	1,007	N/A	N/A	1.0678	1,075
Residential Cooling	58	17	1.0000	17	0.6600	11
School Education Kits	2,427	35	1.0000	35	1.0000	35
Home Energy Services	3,089	1,287	0.9176	1,181	0.9708	1,148
Saver's Switch	4,360	18	36.5556	658	1.0000	658
Saver's Stat	528	1,234	1.0000	1,234	1.0000	1,234
Total		**8,106**				**7,539**

[4] All kW savings shown in this table and throughout the report are peak coincident kW at the customer level.

Table 4: PY2018 Net-to-Gross Ratios

Program	NTG Ratio
Business Comprehensive	0.7826
Home Lighting & Recycling	0.7100
Energy Feedback	1.0678
Residential Cooling	0.6600
School Education Kits	1.0000
Home Energy Services	0.9708
Saver's Switch	1.0000
Saver's Stat	1.0000
Overall Portfolio	**0.8377**

Using net realized savings from this evaluation and cost information provided by SPS, the evaluation team calculated the ratio of benefits to costs for each of SPS's programs and for the portfolio overall. The evaluation team calculated cost effectiveness using the UCT, which compares the benefits and costs to the utility or program administrator implementing the program.[5] The evaluation team conducted this test in a manner consistent with the California Energy Efficiency Policy Manual.[6] The results of the UCT are shown below in Table 5. All programs except Residential Cooling and Saver's Switch had a UCT of greater than 1.00, and the portfolio overall was found to have a UCT ratio of 2.32.

[5] The Utility Cost Test is sometimes referred to as the Program Administrator Cost Test, or PACT.
[6] Version 5. 2013.
http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/EEPolicyManualV5forPDF.pdf

Table 5: PY2018 Cost Effectiveness

Program	Utility Cost Test (UCT)
Business Comprehensive	2.24
Home Lighting & Recycling	3.26
Energy Feedback	2.07
Residential Cooling	0.79
School Education Kits	2.48
Home Energy Services	2.25
Saver's Switch	0.56
Saver's Stat	3.24
Overall Portfolio	**2.32**

Based on the data collection and analysis conducted for this evaluation, the evaluation team found that, overall, SPS is operating high quality programs that are achieving significant energy and demand savings and producing satisfied participants.

The impact evaluation—which included engineering desk reviews for a sample of Business Comprehensive and Home Energy Services projects, and statistical models for Energy Feedback and Saver's Switch—resulted in relatively high realized gross savings. Adjustments to savings based on the Business Comprehensive desk reviews were due to two main factors: project-specific calculation inputs were documented solely in the processing database and adjustments were made based on available site-specific information. For Home Energy Services, adjustments to savings were also primarily due to those two factors as well as discrepancies between the SPS Technical Assumptions and the algorithms used by implementers. The evaluation team has provided a number of recommendations to improve savings values that include documenting calculations and adjustments to project savings, utilizing project-specific information when available, and other minor improvements to savings assumptions or algorithms.

In terms of cost effectiveness, the UCT test was used and found all SPS programs except Residential Cooling and Saver's Switch to be cost effective. The portfolio overall was found to be cost effective. If SPS or the NMPRC desires other cost effectiveness tests to be used in the future, the evaluation team would suggest that SPS track measure costs for all programs so that the Total Resource Cost (TRC) test could be calculated in future program years.

The process evaluation activities, which included surveys with Business Comprehensive and Home Energy Services participants as well as interviews with contractors serving both programs, found very high levels of satisfaction across various aspects of the programs. Very few instances of dissatisfaction were reported, and the program processes generally appear to be working well for participants.

1 Introduction

This report presents the independent evaluation results for the Southwestern Public Service Company (SPS) energy efficiency and demand response programs for program year 2018 (PY2018).

The SPS programs and evaluation requirements were first established in 2005 by the New Mexico legislature's passage of the 2005 Efficient Use of Energy Act (EUEA).[7] The EUEA requires public utilities in New Mexico, in collaboration with other parties, to develop cost-effective programs that reduce energy demand and consumption. Utilities are required to submit their proposed portfolio of programs to the New Mexico Public Regulation Commission (NMPRC) for approval. As a part of its approval process, the NMPRC must find that the program portfolio is cost effective based on the Utility Cost Test.

An additional requirement of the EUEA is that each program must be evaluated at least once every three years. As part of the evaluation requirement, SPS must submit to the NMPRC a comprehensive evaluation report prepared by an independent program evaluator. As part of the reporting process, the evaluator must measure and verify energy and demand savings, determine program cost effectiveness, assess how well the programs are being implemented, and provide recommendations for program improvements as needed.

Within this regulatory framework, the Evergreen evaluation team was chosen to be the independent evaluator for SPS in May 2017, and a project initiation meeting was held with SPS staff on September 14, 2017. The Evergreen evaluation team consisted of the following firms:

- **Evergreen Economics** was the prime contractor and managed all evaluation tasks and deliverables;
- **EcoMetric** provided engineering capabilities and led the review of SPS's savings estimates;
- **Demand Side Analytics** conducted the impact evaluation of the Saver's Switch program; and
- **Research & Polling** fielded all the phone surveys.

[7] NMSA §§ 62-17-1 *et seq* (SB 644). Per the New Mexico Public Regulation Commission Rule Pursuant to the requirements of the EUEA, the NMPRC issued its most recent *Energy Efficiency Rule* (*17.7.2 NMAC*) effective September 26, 2017, that sets forth the NMPRC's policy and requirements for energy efficiency and load management programs. This Rule can be found online at http://164.64.110.134/parts/title17/17.007.0002.html

For PY2018, the following SPS programs were evaluated:

- Business Comprehensive
- Energy Feedback
- Home Energy Services
- Saver's Switch

For each of the evaluated programs, the evaluation team estimated realized gross and net impacts (kWh and kW) and calculated program cost effectiveness using the Utility Cost Test (UCT). Brief process evaluations were also conducted for the Business Comprehensive and Home Energy Services programs.

The remaining programs that were not evaluated in 2018 are still summarized in this report. The accomplishments for the non-evaluated programs are reported using the following parameters:

- Gross impacts (kWh, kW) were calculated using the SPS *ex ante* values for annual savings;
- Net impacts were calculated from the gross impacts using the existing *ex ante* net-to-gross ratio; and
- Cost effectiveness calculations were calculated using the *ex ante* net impact values and cost data as reported by SPS.

The remainder of this report is organized as follows. The *Evaluation Methods* chapter describes the various analysis methods and data collection activities that were conducted for the PY2018 evaluation. The *Impact Evaluation Results* chapter follows and presents the energy and demand savings by program. *The Cost Effectiveness Results* are summarized in the next chapter, followed by a chapter presenting the *Process Evaluation Results.* The main report concludes with a chapter on evaluation *Conclusions and Recommendations.* Additional technical details on the evaluation methods and results are included in several appendices.

2 Evaluation Methods

The analysis methods used for the evaluated PY2018 programs are summarized as follows:

Business Comprehensive. This program offers rebates to SPS's commercial customers for the installation of energy efficient equipment. The measures eligible for the Business Comprehensive program are primarily prescriptive in nature, but the program also includes custom projects. Gross impacts were estimated based on a review of the deemed savings values combined with engineering desk reviews of a statistically representative sample of projects covering a range of project sizes and major measure types. A subset of projects that received desk reviews were also visited on-site by an evaluation engineer. A phone survey of participating customers was used to verify installation and to collect information needed for a self-report analysis of free ridership to determine net impacts.

Energy Feedback. This program provides participating customers with information on their energy consumption by providing a comparison with a matched set of similar households. The feedback on energy use, combined with tips for reducing energy use, is designed to create sustained reductions in consumption. Net impacts were estimated using a billing regression and data from both the participants and control group customers.

Home Energy Services. This is a prescriptive program serving SPS's residential customers, including low-income households, and offers the following measures: ceiling insulation, duct sealing, air infiltration, central AC, air source heat pumps, programmable thermostats, LEDs, and low flow shower heads. Low-income customers can receive these measures at a reduced cost. The impact evaluation of the Home Energy Services program included desk reviews for a sample of projects, deemed savings reviews, and a participant survey. For the process evaluation, the participant survey was used to assess how well the program is operating and serving customers.

Saver's Switch. This program is a one-way switch enabled demand response program offered to residential SPS customers to control AC load. Impacts for this program were evaluated by making a comparison between actual energy use during events and an estimated counterfactual baseline. Demand reductions were estimated for event days based on logged interval load data collected in the field. Hourly load data from event-like days were then used to develop event-day baseline estimates specific to each event day. An operability rate was also determined based on field observations, and communication rates were assessed by analyzing logging data during events.

Table 6 summarizes the PY2018 evaluation methods. Additional detail on each of these evaluation methods is included in the remainder of this chapter.

Table 6: Summary of PY2018 Evaluation Methods by Program

Program	Deemed Savings Review	Phone Verification	Engineering Desk Reviews	Site Visits	Billing Regression
Business Comprehensive	◆	◆	◆	◆	
Energy Feedback					◆
Home Energy Services	◆	◆	◆		
Saver's Switch				◆	◆

2.1 Phone Surveys

Participant phone surveys were fielded in early 2019 for participants in the Business Comprehensive and Home Energy Services programs. The surveys averaged about 15 to 20 minutes in length and covered the following topics:

- Verification of measures included in SPS's program tracking database;
- Satisfaction with the program experience;
- Survey responses for use in the free ridership calculations;
- Participation drivers and barriers; and
- Customer characteristics.

Additional interviews were also conducted by engineers if additional information was needed for the individual project desk reviews.

Given the relatively low number of participants in the Business Comprehensive program, the original goal was to complete as many surveys as possible, and a census of participants was contacted for this program. Ultimately, 26 phone surveys were completed with Business Comprehensive participants. For the Home Energy Services program, the goal was to complete 100 surveys, including a mix of low income and non-low income customers. A total of 106 surveys were completed for this program. Table 7 shows the distribution of completed surveys.

Table 7: Business Comprehensive and Home Energy Services Program Phone Survey Summary

Program	Number of Customers with Valid Contact Info	Target Number of Completes	Completed Surveys
Business Comprehensive	86	50	26
Home Energy Services	2,331	100	106
Total	**2,417**	**150**	**132**

The final survey instrument for the Business Comprehensive program is included in Appendix A, and the final survey instrument for the Home Energy Services program is included in Appendix B.

2.2 Engineering Desk Reviews

In order to verify gross savings estimates, the evaluation team conducted engineering desk reviews for a sample of the projects in the Business Comprehensive and Home Energy Services programs. The goal of the desk reviews was to verify equipment installation, operational parameters, and estimated savings.

Both prescriptive and custom projects received desk reviews that included the following:

- Review of project description, documentation, specifications, and tracking system data;
- Confirmation of installation using invoices and/or post-installation reports; and
- Review of post-installation reports detailing differences between installed equipment and documentation, and subsequent adjustments made by the program implementer.

For projects in the Business Comprehensive program that relied on deemed savings values for prescriptive measures, the engineering desk reviews included the following:

- Review of measures available in the New Mexico TRM and the SPS Technical Assumptions documents to determine the most appropriate algorithms which apply to the installed measure;
- Recreation of savings calculations using TRM/Technical Assumptions algorithms and inputs as documented by submitted specifications, invoices, and post-installation inspection reports; and
- Review of TRM/Technical Assumptions algorithms to identify candidates for future updates and improvements.

For the custom projects included in the Business Comprehensive program, the engineering desk reviews included the following:

- Review of engineering analyses for technical soundness, proper baselines, and appropriate approaches for the specific applications;
- Review of methods of determining demand (capacity) savings to ensure they are consistent with program and utility methods for determining peak load/savings;
- Review of input data for appropriate baseline specifications and variables such as weather data, bin hours, and total annual hours to determine if they are consistent with facility operation; and
- Consideration and review for interactive effects between affected systems.

Projects in the Home Energy Services program used deemed savings values for prescriptive measures, and the engineering desk reviews of these projects included the following:

- Review of measures available in the New Mexico TRM and the SPS Technical Assumptions to determine the most appropriate algorithms which apply to the installed measure;
- Recreation of savings calculations using TRM/ Technical Assumptions algorithms and inputs as documented by submitted specifications, invoices, and post-installation inspection reports; and
- Review of TRM/ Technical Assumptions algorithms to identify candidates for future updates and improvements.

In support of the engineering desk reviews, primary data were collected for select projects in the Business Comprehensive program through on-site verification. The evaluation team visited sites to confirm the installation of efficiency measures and operational parameters. Based on participant feedback and visual inspection of equipment and controls, the evaluation team was able to make adjustments to the energy savings calculations to more accurately capture savings.

2.3 Billing Regression

A billing regression model was used to evaluate two different SPS programs in 2018: the Energy Feedback and the Saver's Switch programs. The general framework for the billing regression model is to estimate post-participation energy consumption while controlling for the timing of the measures installation and changes in weather over the analysis period. The model framework was tailored to match the individual programs, as discussed below.

2.3.1 Energy Feedback

For the Energy Feedback program, a billing regression was used to estimate energy savings based on an analysis of customer bills before and after they received the energy feedback reports. The billing regression uses a fixed effects specification and includes variables for monthly energy consumption, weather (heating and cooling degree days) and other variables to control for external influences on energy use. The analysis dataset is a randomized control trial (RCT) design that includes both a participating (treatment) group and a matched control group of customers. Since data on the control group are included in the model, the resulting impact estimates are interpreted as net impacts.

Specific modeling details are included in the following *Impact Evaluation Results* chapter.

2.3.2 Saver's Switch

The Saver's Switch program is a one-way switch-enabled demand response program offered to residential Southwestern Public Service (SPS) customers. To facilitate load control, participants must have a load control switch installed on their cooling unit. The switch must be able to receive radio-based control signals in order to cycle AC runtime during an event. About 4,400 residential customers in SPS's service territory are enrolled in the Saver's Switch program, but because the program is intended for emergency relief purposes, events are rarely called. Because switches are controlled by one-way radio pagers, it is not possible to know which are still installed at customer sites and capable of receiving control signals. Field data collection was therefore used to assess switch operability rates and estimate program load reductions. Forty-nine data loggers were installed at Saver's Switch participant sites, sampled within three usage tertiles. The field study recruiting and installation process revealed a 60 percent operability rate, excluding sites that could not be accessed. The cycling strategy used for these events was described as "adaptive". Our analysis of logged switch status data appears to show functionality roughly consistent with 50 percent cycling, which in practice would cap runtimes at 30 minutes per hour.

For impact measurement purposes, five events were called in August and September 2018 for the 49 Saver's Switch sites with field data loggers. Table 8 provides some information on these five 2018 events, four of which were used for measurement purposes.[8] Note that the event start and end times are labeled Mountain Daylight Time (MDT), which would be the local prevailing time in SPS's service territory during the summer demand response season. All events began at 3:00 p.m. MDT and ended at 7:00 p.m. MDT.

[8] Two earlier events were also called, on July 20th and August 6th. However, control signals were not received by the switches due to communication issues, so these events are excluded from the evaluation. The September 5th event was also excluded from impact calculations—a thunderstorm resulted in uncharacteristically cold weather on that day.

Table 8: 2018 Saver's Switch Event Summary

Date	Day of Week	Start Time (MDT)	End Time (MDT)	Max Temp 3:00 – 7:00 p.m. at KROW (F)	Avg Temp 3:00 – 7:00 p.m. at KROW (F)	Daily Avg Humidity at KROW (F)
23-Aug	Thursday	3:00 p.m.	7:00 p.m.	98	91	55%
28-Aug	Tuesday	3:00 p.m.	7:00 p.m.	101	96	49%
5-Sep	Wednesday	3:00 p.m.	7:00 p.m.	89	73	63%
13-Sep	Thursday	3:00 p.m.	7:00 p.m.	92	88	57%
25-Sep	Tuesday	3:00 p.m.	7:00 p.m.	95	83	49%
Average (excludes 5-Sep)		**3:00 p.m.**	**7:00 p.m.**	**96**	**89**	**53%**

To evaluate impacts for these five events, the Evergreen team used interval load data collected by the field data loggers. The interval loads were further combined with National Oceanic and Atmospheric Administration (NOAA) weather station data for Roswell Airport (KROW), central to SPS's service territory. The Roswell weather station was used for the *ex post* impact analysis to allow for consistency with the *ex ante* peak impact estimate.

The impact evaluation for the residential customers relied on a within-subjects approach to develop a baseline estimate of hourly cooling load for event days. This approach was necessary because no interval data were available to form a comparison group. Instead, load patterns on event-like days were used to select a weather-based regression model, which was in turn used to calculate a baseline estimate for event days.

Our approach for estimating demand reductions on event days was based on interval load data for AC units obtained from data loggers. The raw data were logged for 49 customer sites with operable switches in five-minute intervals and combined compressor runtime values with connected load measurements to derive a kW load measurement for each interval. These detailed five-minute interval data were converted to average load per hour and used for the load impact analysis.

To estimate impacts, loads from non-event days were used to develop event-day baseline estimates specific to each event day and hour. *Ex post* impacts are simply the difference between observed hourly loads and the estimated baseline. Baseline accuracy was assessed using the following steps.

1. Identify event-like days and narrow dataset to these days;
2. Remove these days one at a time to create training datasets;
3. Use regression analysis to estimate reference loads;
4. Compare estimated reference loads to actual loads on validation days;
5. Compute metrics of bias, accuracy, and precision; and
6. Assess estimation method based on performance across key metrics.[9]

Equation 1 shows the model selected for its performance in predicting loads on event-like days. This model was selected from among 27 candidate models, which in addition to the terms below in Table 9 included various combinations of terms addressing maximum temperature, heat accumulation (average early morning temperature), average and hourly humidity, and monthly variation.

Equation 1: *Ex-Post* Baseline Regression Model

$$\widehat{kW_t} = \beta_0 + \beta_1 * kW_{14} + \beta_2 * temp_{1-24} + \beta_3 * temp_t + \varepsilon$$

Table 9: Definition of Terms for Equation 1

Term	Definition
kW_t	Estimated reference load in hour *t*
β_0	Intercept
t	Hour *t*
kW_{14}	Load in pre-event hour ending 14 (1:00 p.m. to 2:00 p.m.)
$temp_{1-24}$	Average daily temperature (hours ending 1 through 24)
$temp_t$	Temperature in hour *t*
ε	Error term

[9] The following algorithm was used to identify the best performing baseline model: select the model with the best fit (lowest root mean square error) among the three models with the least bias (lowest absolute percent bias).

Table 10 shows the event-like days used for the model selection process. These days were chosen to mirror the range of temperature and humidity of the event days.

Table 10: Event-like Days Used for Model Selection

Date	Day of Week	Max Temp 3:00 p.m. – 7:00 p.m. at KROW (°F)	Avg Temp 3:00 p.m. – 7:00 p.m. at KROW (°F)	Daily Avg Humidity at KROW
6-Jun	Wednesday	98	95	95%
20-Jun	Wednesday	92	91	91%
26-Jun	Tuesday	99	97	97%
12-Jul	Thursday	88	87	87%
25-Jul	Wednesday	99	98	98%
6-Aug	Monday	94	92	92%
28-Sep	Friday	93	88	88%
	Average	**95**	**92**	**92%**

Additional detail on the analysis methods used for the Saver's Switch program is included in Appendix E.

2.4 Net Impact Analysis

2.4.1 Self-Report Approach

The evaluation team estimated net impacts for the Business Comprehensive and Home Energy Services (non-low income) programs using the self-report approach. This method uses responses to a series of carefully constructed survey questions to learn what participants would have done in the absence of a utility's program. The goal is to ask enough questions to paint an adequate picture of the influence of the program activities (rebates and other program assistance) within the confines of what can reasonably be asked during a phone survey.

With the self-report approach, specific questions that are explored include the following:

- What were the circumstances under which the customer decided to implement the project (that is, new construction, retrofit/early replacement, replace-on-burnout)?
- To what extent did the program accelerate installation of high efficiency measures?
- What were the primary influences on the customer's decision to purchase and install the high efficiency equipment?

- How important was the program rebate on the decision to choose high efficiency equipment?
- How would the project have changed if the rebate had not been available (for example, would less efficient equipment have been installed, would the project have been delayed, etc.)?
- Were there other program or utility interactions that affected the decision to choose high efficiency equipment (for example, was there an energy audit done, has the customer participated before, is there an established relationship with a utility account representative, was the installation contractor trained by the program)?

The method used for estimating free ridership (and ultimately the net-to-gross [NTG] ratio) using the self-report approach is based on the 2017 Illinois Statewide Technical Reference Manual.[10] For the SPS programs, questions regarding free ridership were divided into several primary components:

- A ***Program Component*** series of questions that asked about the influence of specific program activities (rebate, customer account rep, contractor recommendations, other assistance offered) on the decision to install energy efficient equipment;
- A ***Program Influence*** question, where the respondent was asked directly to provide a rating of how influential the overall program was on their decision to install high efficiency equipment; and
- A ***No-Program Component*** series of questions, based on the participant's intention to carry out the energy-efficient project without program funds or due to influences outside of the program.

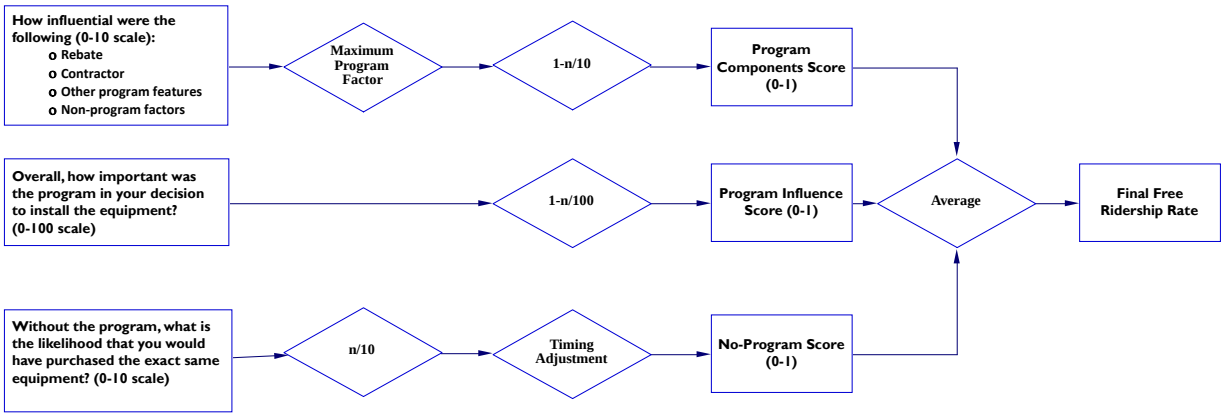
Each component was assessed using survey responses that rated the influence of various factors on the respondent's equipment choice. Since opposing biases potentially affect the main components, the *No-Program* component typically indicates higher free ridership than the *Program Component/Influence* questions. Therefore, combining these opposing influences helps mitigate the potential biases. This framework also relies on multiple questions that are crosschecked with other questions for consistency. This prevents any single survey question from having an excessive influence on the overall free ridership score.

Figure 1 provides a simplified version of the scoring algorithm. In some cases, multiple questions were asked to assess the levels of efficiency and purchase timing in absence of the program. For each of the scoring components, the question responses were scored so that they were consistent and resulted in values between 0 and 1. Once this was

[10] The full Illinois TRM can be found at http://www.ilsag.info/il_trm_version_6.html

accomplished, the three question components were averaged to obtain the final free ridership score.

Figure 1: Self-Report Free Ridership Scoring Algorithm



Source: Adapted by Evergreen Economics from the 2017 Illinois TRM.

More detail on each of the three question tracks is provided below.

Program Component Questions

The ***Program Component*** battery of questions was designed to capture the influence of the program on the equipment choice. These questions were also designed to be as comprehensive as possible so that all possible channels through which the program is attempting to reach the customer were included.

The type of questions included in the Program Component question battery included the following:

- How influential were the following on your decision to purchase your energy efficient equipment?
  - Rebate amount
  - Contractor recommendation
  - Utility advertising/promotions
  - Technical assistance from the utility (e.g., energy audit)
  - Recommendation from utility customer representative (or program implementer)
  - Previous participation in a utility efficiency program

As shown at the top of Figure 1, the question with the highest value response (i.e., the program factor that had the greatest influence on the decision to install a high efficiency

measure) was the one that was used in the scoring algorithm as the Program Component score.

Program Influence Question

A separate ***Program Influence*** question asked the respondent directly to rate the combined influence of the various program activities on their decision to install energy efficient equipment. This question allowed the respondent to consider the program as a whole and incorporated other forms of assistance (if applicable) in addition to the rebate. Respondents were also asked about potential non-program factors (condition of existing equipment, corporate policies, maintenance schedule, etc.) to put the program in context with other potential influences.

The Program Influence question also provided a consistency check so that the stated importance of various program factors could be compared across questions. If there appeared to be inconsistent answers across questions (rebate was listed as very important in response to one question but not important in response to a different question, for example), then the interviewer asked follow-up questions to confirm responses. The verbatim responses were recorded and were reviewed by the evaluation team as an additional check on the free ridership results.

No-Program Questions

A separate battery of ***No-Program*** component questions was designed to understand what the customer might have done if the SPS rebate program had not been available. With these questions, we attempted to measure how much of the decision to purchase the energy efficient equipment was due to factors that were unrelated to the rebate program or other forms of assistance offered by SPS.

The types of questions asked for the No-Program component included the following:

- If the program had not existed, would you have
  - Purchased the exact same equipment?
  - Chosen the same energy efficiency level?
  - Delayed your equipment purchase?
- Did you become aware of the utility rebate program before or after you chose your energy efficient equipment?

The question regarding the timing of awareness of the rebate was used in conjunction with the importance rating the respondent provided in response to the earlier questions. If the respondent had already selected the high efficiency equipment prior to learning about the rebate **and** said that the rebate was the most important factor, then a downward adjustment was made on the influence of the rebate in calculating the Program Component score.

The responses from the No-Program questions were analyzed and combined with a timing adjustment to calculate the No-Program score, as shown in Figure 1. The timing adjustment was made based on whether or not the respondent would have delayed their equipment purchase if the rebate had not been available. If the purchase would have been delayed by one year or more, then the No-Program score was set to zero, thereby minimizing the level of free ridership for this algorithm component only.

Free Ridership and NTG Calculation

The values from the Program Component score, the Program Influence score, and the No-Program score were averaged in the final free ridership calculation; the averaging helped reduce potential biases from any particular set of responses. The fact that each component relied on multiple questions (instead of a single question) also reduced the risk of response bias. As discussed above, additional survey questions were asked about the relative importance of the program and non-program factors. These responses were used as a consistency check, which further minimized potential bias.

Once the self-report algorithm was used to calculate free ridership, the total NTG ratio was calculated using the following formula:

$$Net\text{-}to\text{-}Gross\ Ratio = (1 - Free\ Ridership\ Rate)$$

2.5 Realized Gross and Net Impact Calculation

The final step in the impact evaluation process is to calculate the realized gross and net savings, based on the program-level analysis described above. The **Gross Realized Savings** are calculated by taking the original *ex ante* savings values from the participant tracking databases and adjusting them using an **Installation Adjustment** factor (based on the count of installed measures verified through the phone surveys) and an **Engineering Adjustment** factor (based on the engineering analysis, desk reviews, etc.):

Gross Realized Savings =

(*Ex Ante* Savings)*(Installation Adjustment)*(Engineering Adjustment Factor)

Net Realized Savings are then determined by multiplying the Gross Realized Savings by the net-to-gross ratio:

Net Realized Savings = (Net-to-Gross Ratio)*(Gross Realized Savings)

2.6 Cost Effectiveness

The cost effectiveness of the SPS programs was tested using the Utility Cost Test (UCT). In the UCT, the benefits of a program are considered to be the present value of the net energy saved, and the costs are the present value of the program's administrative costs plus

incentives paid to customers. In order to perform the cost effectiveness analysis, the evaluation team obtained the following from SPS:

- Avoided cost of energy (costs per kWh over a 20+ year time horizon);
- Avoided cost of capacity (estimated cost of adding a kW/year of generation, transmission, and distribution to the system);
- Avoided cost of CO2 (estimated monetary cost of CO2 per kWh generated);
- Avoided transmission and distribution costs;
- Discount rate;
- Line loss factor; and
- Program costs (all expenditures associated with program delivery).

SPS has different avoided costs of capacity and line loss factors for energy efficiency and load management (demand) programs. Per the guidance of SPS, the cost effectiveness analysis assumes that the Saver's Stat and Saver's Switch programs are characterized as load management programs, while all others are characterized as energy efficiency programs.

For all programs, the Evergreen team took the energy savings and effective useful life values from the final PY2018 tracking data submitted by SPS. The evaluation team reviewed the effective useful life values and compared them to the values contained in the New Mexico TRM to confirm that the values assumed by SPS were reasonable. The final cost-effectiveness analyses use net verified impacts, which take into account NTG ratios and engineering adjustment factors.

SPS also provided the evaluation team with measure-specific net present values for the avoided cost per kWh saved over each measure's life. These values took into account measure load shapes, hourly avoided energy costs, measure effective useful lives, the SPS discount rate, and line loss factors.

Additionally, Section 17.7.2.9.B(4) of the New Mexico Energy Efficiency Rule allows utilities to claim utility system economic benefits for low income programs equal to 20 percent of the calculated energy benefits. We applied the 20 percent adder to the benefits calculated for the Low Income Home Energy Services and Low Income Kits programs.

The evaluation team input the savings and cost data into a cost effectiveness model that calculated the benefits, costs, and benefit-cost ratio for each measure, project, or program entered, and rolled up the data into program-level UCT values.

3 Impact Evaluation Results

The results of the PY2018 impact evaluation are shown in Table 11 (kWh) and Table 12 (kW), with the programs evaluated in 2018 highlighted in blue. A summary of the net-to-gross (NTG) ratios by program is shown in Table 13. For the non-evaluated programs, the totals are based on the *ex ante* savings and NTG values from the SPS tracking data.

As noted previously, each program is required to be evaluated a minimum of once every three years. For 2018, the evaluated programs covered 69 percent of the *ex ante* kWh savings and 61 percent of the *ex ante* kW savings.

Table 11: PY2018 Savings Summary – kWh[11]

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Business Comprehensive						
Computer Efficiency	10	11,140	0.9464	10,543	0.8800	9,278
Cooling Efficiency	21	890,184	1.1605	1,033,033	0.7825	808,349
Custom Efficiency	19	1,900,488	1.0496	1,994,805	0.7825	1,560,935
Lighting Efficiency	94	3,291,604	0.9269	3,050,893	0.7825	2,387,324
Motors Efficiency	83	11,851,495	1.1302	13,394,216	0.7825	10,480,974
Home Lighting & Recycling	323,139	13,504,535	1.0000	13,504,535	0.7100	9,588,220
Energy Feedback	37,438	3,897,090	N/A	N/A	1.0678	4,161,260
Residential Cooling	58	79,017	1.0000	79,017	0.6600	52,151
School Education Kits	2,427	1,006,950	1.0000	1,006,950	1.0000	1,006,950
Home Energy Services	3,089	11,524,863	1.1425	13,167,363	0.9708	12,782,862
Saver's Switch	4,360	178	0.0000	0	1.0000	0
Saver's Stat	528	3,151	1.0000	3,151	1.0000	3,151
Total		**47,960,695**				**42,841,453**

[11] All kWh savings shown in this table and throughout the report are at the customer level.

Table 12: PY2018 Savings Summary – kW[12]

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Business Comprehensive						
Computer Efficiency	10	1.0	0.9198	0.9	0.8800	0.8
Cooling Efficiency	21	198	1.0252	203	0.7825	159
Custom Efficiency	19	371	0.8898	330	0.7825	258
Lighting Efficiency	94	408	0.9719	397	0.7825	310
Motors Efficiency	83	1,696	1.0155	1,722	0.7825	1,348
Home Lighting & Recycling	323,139	1,834	1.0000	1,834	0.7100	1,302
Energy Feedback	37,438	1,007	N/A	N/A	1.0678	1,075
Residential Cooling	58	17	1.0000	17	0.6600	11
School Education Kits	2,427	35	1.0000	35	1.0000	35
Home Energy Services	3,089	1,287	0.9176	1,181	0.9708	1,148
Saver's Switch	4,360	18	36.5556	658	1.0000	658
Saver's Stat	528	1,234	1.0000	1,234	1.0000	1,234
Total		**8,106**				**7,539**

[12] All kW savings shown in this table and throughout the report are peak coincident kW at the customer level.

Table 13: PY2018 Net-to-Gross Ratios

Program	NTG Ratio
Business Comprehensive	0.7826
Home Lighting & Recycling	0.7100
Energy Feedback	1.0678
Residential Cooling	0.6600
School Education Kits	1.0000
Home Energy Services	0.9708
Saver's Switch	1.0000
Saver's Stat	1.0000
Overall Portfolio	**0.8377**

Details on the individual program impacts are summarized below, with additional details on the analysis methods and results for some programs included as appendices where noted.

3.1 Business Comprehensive Program

3.1.1 Business Comprehensive Gross Impacts

The *ex ante* 2018 impacts for the Business Comprehensive program are summarized in Table 14. In total, the Business Comprehensive program accounted for approximately 37 percent of *ex ante* energy impacts in SPS's overall portfolio.

Table 14: Business Comprehensive Savings Summary

Sub-Program	# of Projects	Expected Gross kWh Savings	Expected Gross kW Savings
Computer Efficiency	10	11,140	1
Cooling Efficiency	21	890,184	198
Custom Efficiency	19	1,900,488	371
Lighting Efficiency	94	3,291,604	408
Motors Efficiency	83	11,851,495	1,696
Total	**227**	**17,944,911**	**2,674**

The majority of the gross impact evaluation activities were devoted to engineering desk reviews of a sample of projects. For the desk reviews, the sample frame included projects in the Computer, Cooling, Custom, Lighting, and Motors sub-programs. The sample was stratified to cover a range of different measure types so that no single measure (often lighting) would dominate the desk reviews. The sample was also stratified based on total energy savings within each sub-program. In some cases, very large projects were assigned to a "certainty" stratum and were automatically added to the sample (rather than randomly assigned). This allowed for the largest projects to be included in the desk reviews and maximized the amount of savings covered in the sample. Overall, the sampling strategy ensured that a mix of projects in terms of both project size and measure type would be included in the desk reviews.

The final sample design is shown in Table 15. The resulting sample achieved a relative precision of 90/5.6 overall, with precision ranging from 90/1.5 to 90/16.6 for the individual sub-programs.

Table 15: Business Comprehensive Desk Review Sample

Sub-Program	Stratum	Count	Average kWh	Total kWh Savings	% of Savings	Final Sample
Computers	Certainty	2	2,627	5,254	<1%	2
	1	3	1,469	4,408	<1%	2
	2	5	296	1,478	<1%	2
Cooling	Certainty	3	395,276	840,101	5%	3
	1	18	2,782	50,083	<1%	4
Custom	Certainty	4	504,695	1,717,491	10%	4
	1	15	12,200	182,997	1%	4
Lighting	Certainty	6	201,399	1,208,394	7%	6
	1	15	75,390	1,130,851	6%	7
	2	73	13,046	952,359	5%	7
Motors	Certainty	3	1,327,229	3,981,686	22%	3
	1	9	355,627	3,200,640	18%	4
	2	71	65,763	4,669,169	26%	6
Total		**227**		**17,944,911**	**100%**	**54**

As discussed in the *Evaluation Methods* chapter, gross realized impacts for the Business Comprehensive program were determined by performing engineering desk reviews on the sample of projects.

For prescriptive projects, the evaluation team found multiple measures that existed in both the New Mexico TRM and the SPS Technical Assumptions. For most of these measures, the approaches were consistent between the two sources. However, certain lighting parameters (for example, available building types) differed between these documents. Additionally, the custom lighting calculator used by SPS for certain projects included slight deviations from the New Mexico TRM. In cases where these sources were not consistent, the evaluation team examined the sources to determine which approach we believed offered greater detail and accuracy. Additionally, the evaluation team considered the 2016 New Mexico TRM to be the "safe harbor" and did not make negative adjustments to SPS calculations that correctly adhered to the TRM. Other incentivized measures existed

only in the SPS Technical Assumptions, and so these algorithms were reviewed for accuracy and adjusted as necessary to verify savings estimates.

For custom projects, savings analyses were recreated when possible (for example, simple spreadsheet calculations). For more complex analyses (for example, whole building energy simulations), the evaluation team reviewed the calculation methods and input values. When applicable, approaches and assumptions used in custom analyses were compared to those contained in the TRM.

A sub-sample of projects also received on-site verification visits from an evaluation team engineer. The evaluation team identified custom projects, lighting projects with savings of 750,000 kWh or greater, non-lighting projects with savings of 250,000 kWh or greater, and certainty stratum projects as candidates for on-sites.

Evaluation engineers contacted selected participants by phone and email to schedule appointments to conduct a site visit. During the site visits, evaluation team engineers confirmed installation of incentivized equipment and verified operational parameters integral to the calculation of estimated savings. The evaluation team completed six site visits for the 2018 evaluation.

For one variable frequency drive (VFD) project, the evaluation engineer identified two 50-HP VFDs that were not installed, lowering the total VFD horsepower from a submitted value of 665 HP to 615 HP. These two VFDs did not fit in their slated cabinets, and the cabinets would need to be modified to accommodate them. This led to a 12 percent reduction of energy savings for the participant.

For most of these VFD projects, the evaluation team verified hours of operation on site, which were found to be higher than the deemed values in the Technical Assumptions. The evaluation team modified the savings calculations for these projects based on the verified hours, resulting in higher estimated savings. An increase in operating hours was the most significant change discovered during the site visits.

Table 16 and Table 17 show the results of the desk reviews and site visits and how the resulting engineering adjustments were used to calculate realized savings. For the Business Comprehensive program overall, these adjustments resulted in an engineering adjustment factor of 1.0857 for kWh and 0.9921 for kW.

Table 16: PY2018 Business Comprehensive Gross kWh Impact Summary

Sub-Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Computer Efficiency	10	11,140	0.9464	10,543
Cooling Efficiency	21	890,184	1.1605	1,033,033
Custom Efficiency	19	1,900,488	1.0496	1,994,805
Lighting Efficiency	94	3,291,604	0.9269	3,050,893
Motors Efficiency	83	11,851,495	1.1302	13,394,216
Total	**227**	**17,944,911**	**1.0857**	**19,483,490**

Table 17: PY2018 Business Comprehensive Gross kW Impact Summary

Sub-Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings
Computer Efficiency	10	1	0.9198	0.9
Cooling Efficiency	21	198	1.0252	203
Custom Efficiency	19	371	0.8898	330
Lighting Efficiency	94	408	0.9719	397
Motors Efficiency	83	1,696	1.0155	1,722
Total	**227**	**2,674**	**0.9921**	**2,653**

Engineering adjustment factors that varied significantly from 1 were predominately caused by two overarching reasons:

- **Project-specific calculation inputs were documented solely in processing database.** For multiple projects, the evaluation team followed the algorithms contained in the SPS Technical Assumptions but arrived at savings that differed from those reported by SPS. Specific algorithm inputs and any project-specific adjustments were not documented in the materials available to the evaluation team for the desk reviews, which prevented us from identifying the specific sources of discrepancies for roughly one-third of the sampled projects.
- **Adjustments were made based on available site-specific information.** The evaluation team adjusted the savings calculation approaches and inputs for multiple projects to account for the available site-specific information. Adjustments

were made to parameters such as motor hours of use, light fixture quantities, installed insulation levels, and installed HVAC unit efficiencies. Site-specific information was gathered through review of the provided project documentation as well as on-site verification. The evaluation team only used site-specific data to adjust savings when the information gathered substantially supported overriding the approaches and values used by SPS, and only in cases where the values used by SPS were not TRM-based defaults.

In addition to these broader issues, there were additional measure- or project-specific reasons for engineering adjustment factors significantly different than 1:

- One Business Comprehensive project had estimated savings for exterior lighting upgrades calculated assuming 8,760 hours of operation. The evaluation team changed the operating hours to dusk-to-dawn hours as these lights are not expected to be on for all hours of the year. This resulted in a 53 percent decrease in kWh savings for this project.
- The evaluation team calculated kWh savings for packaged air conditioning units larger than 65,000 Btu/h using Integrated Energy Efficiency Ratio (IEER) efficiency ratings instead of Energy Efficiency Ratio (EER) efficiency ratings. IEER is a part-load rating and is more representative of overall annual performance. For one Business Comprehensive project, this resulted in a 104 percent increase in kWh savings.
- For one Business Comprehensive project which installed VFDs on motors, the evaluation team performed a site visit and found that the actual motor operating hours were much higher than assumed in the *ex ante* analysis. The evaluation team updated the savings calculations with the site-verified operating hours, resulting in a 92 percent increase in kWh savings for that project.
- For one Business Comprehensive project that installed a packaged air conditioner, the evaluation team found that the documented EER rating of the installed unit was lower than the baseline value. The evaluation team used the documented EER in the analysis, resulting in a 113 percent decrease in kW reduction for that project.

A summary of the individual desk review findings for each of the Business Comprehensive projects is included in Appendix F.

3.1.2 Business Comprehensive Net Impacts

Net impacts for the Business Comprehensive program were calculated using NTG ratios from the participant phone survey or *ex ante* values, depending on the sub-program. For the Cooling, Custom, Lighting and Motors sub-programs, the NTG ratio was developed using the self-report method described in the *Evaluation Methods* chapter using participant phone survey data. The resulting NTG ratio for these measures is 0.7825. For the Computer Efficiency sub-program, the *ex ante* NTG ratio of 0.88 was applied.

Table 18 and Table 19 summarize the PY2018 net impacts for the Business Comprehensive program using the NTG ratios described above. Net realized savings for the program overall are 15,246,859 kWh, and net realized demand savings are 2,076 kW.

Table 18: PY2018 Business Comprehensive Net kWh Impact Summary

Sub-Program	# of Projects	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Computer Efficiency	10	10,543	0.8800	9,278
Cooling Efficiency	21	1,033,033	0.7825	808,349
Custom Efficiency	19	1,994,805	0.7825	1,560,935
Lighting Efficiency	94	3,050,893	0.7825	2,387,324
Motors Efficiency	83	13,394,216	0.7825	10,480,974
Total	**227**	**19,483,490**	**0.7826**	**15,246,859**

Table 19: PY2018 Business Comprehensive Net kW Impact Summary

Sub-Program	# of Projects	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Computer Efficiency	10	0.9	0.8800	0.8
Cooling Efficiency	21	203	0.7825	159
Custom Efficiency	19	330	0.7825	258
Lighting Efficiency	94	397	0.7825	310
Motors Efficiency	83	1,722	0.7825	1,348
Total	**227**	**2,653**	**0.7825**	**2,076**

3.2 Energy Feedback Program

The Energy Feedback program was designed as a randomized control trial for the purposes of measuring program savings. As part of this design, the program implementer randomly assigned customers to a treatment group that receives the Energy Feedback Home Energy Report, which compares their household energy use to similar customers and also provides tips on how to reduce energy consumption. Those customers not in the treatment group are randomly assigned to the control group and do not receive the report.

The Energy Feedback program also uses an opt-out approach to participation. Customers are randomly selected into the program and automatically begin receiving the Home Energy Reports. There are two ways that customers can leave the program. Customers can opt out at any time, or customers can cancel their electric service when they vacate the premises. Over time, this leads to some attrition in the program, which needs to be accounted for in savings estimation.

There were three deployment waves for the Energy Feedback program, each of which is tracked separately and has its own matched control group. Table 20 shows the participation numbers at the beginning of each wave, in January 2018, and in December 2018. Figure 2 shows the program attrition among recipients, due to opt-out or account closure.

Table 20: Participation by Deployment Wave

Wave	Group	Participants – Start Date	Participants – January 1, 2018	Participants – December 31, 2018
Wave 1: 201203	Recipient	15,500	9,934	9,253
	Control	15,500	10,296	9,649
Wave 2: 201507	Recipient	5,250	3,128	2,747
	Control	5,250	3,187	2,801
Wave 3: 201705	Recipient	10,000	7,773	6,385
	Control	10,000	8,062	6,603
Total	**Recipient**	**30,750**	**20,835**	**18,385**
	Control	**30,750**	**21,545**	**19,053**

Figure 2: Recipient Attrition by Wave, 2018

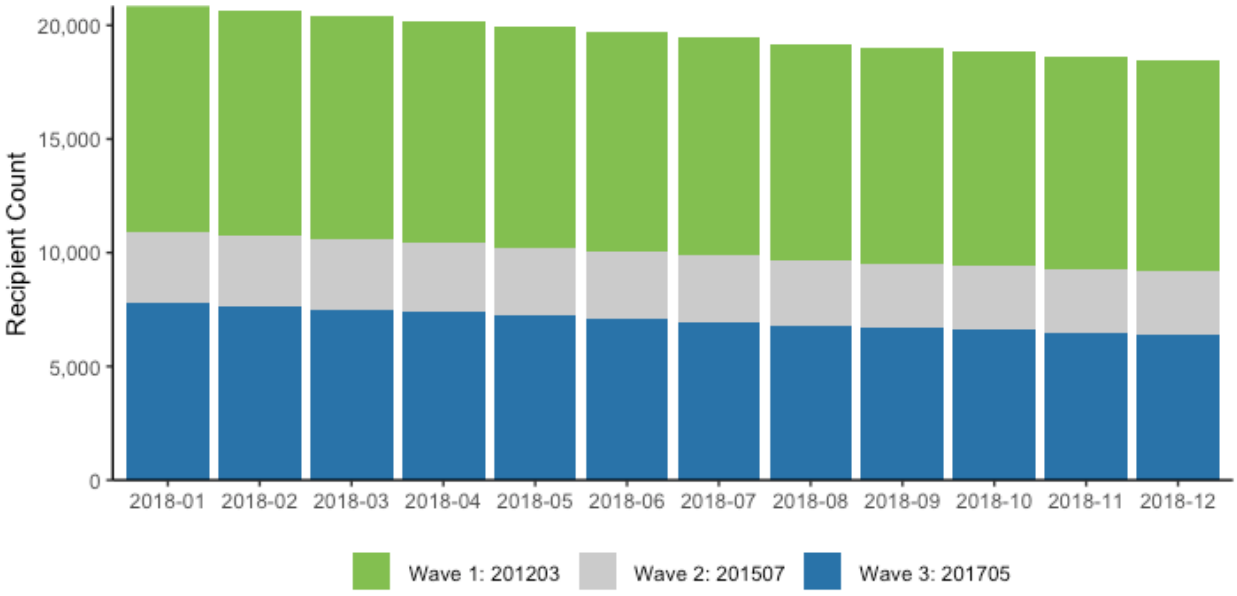


Table 21 provides a detailed accounting of program participants that were filtered out of our analysis, reducing the sample from 61,522 customers to the 50,387 customers included in the final models. The most substantial loss of participants came from a lack of billing data for the unique combination of premise and customer. We also required that a customer in the recipient group must have received at least one print or email report.

Table 21: Energy Feedback Participant Filters

Description of Filter	Removed (n)	Removed (%)	Remaining (n)
Total program customers (treatment and control)	-	-	61,522
Recipient has not received at least one communication (print or email report)	1,545	3%	59,977
Customer does not have valid New Mexico zip code	5	<1%	59,972
Billing data not available for unique premise/customer	9,374	15%	50,598
Remove readings after program opt-out	33	<1%	50,565
Remove readings after account close	27	<1%	50,538
Retain readings only from relevant pre and post years	151	<1%	50,387

All valid zip codes for program participants were assigned to the closest NOAA weather station. Hourly weather data were pulled for seven unique weather stations. We calculated cooling degree-hours (CDH) for each hourly temperature using a base temperature of 65 degrees Fahrenheit, and then took the average of these hourly values to create a single cooling degree-day (CDD) value for each weather station on each day in the study period.[13] This process was repeated for heating degree-days (HDD), again using a base temperature of 65 degrees Fahrenheit.

3.2.1 Fixed Effects Model Specification

We used a fixed effects regression model to estimate the Energy Feedback program impacts, which is the standard approach used for these types of home energy report programs. The benefit of a fixed effects model is that it controls for unique characteristics within each household, such as general levels of electricity use and household occupancy, which would not otherwise be represented in the model. These types of time-invariant characteristics are the fixed effects that the model controls for with a household-specific constant term.

The final billing model using the fixed effects specification is provided below as Equation 2. Variations on this model were explored during the evaluation, including more complex iterations that use a variety of interaction terms and additional explanatory variables. These alternative models all provided similar results and did not improve model performance. An identical model specification was used for each of the Energy Feedback deployment waves.

The variable of interest is the *Post*Treatment* interaction term, and the coefficient on this variable can be interpreted as the change in normalized daily energy consumption attributable to a household being in the treatment group in the post-report period.

[13] A cooling degree-day (CDD) is a metric designed to measure the demand for energy required to maintain a comfortable temperature inside a building. It represents the number of degrees that the outdoor temperature exceeded an assumed baseline (in this case, 65°F), averaged across all hours in the day. By calculating this metric from hourly temperatures instead of daily averages, we can identify days that require some cooling during peak hours as well as heating in the early morning or evening.

Equation 2: Daily kWh Regression Model

$$kWh_{i,t} = \alpha_i + \beta_1 Post_t + \beta_2 Treatment + \beta_3 CDD_{i,t} + \beta_4 HDD_{i,t} + \beta_5 Post_t * Treatment + \varepsilon_{i,t}$$

$Where$:

$kWh_{i,t}$ = daily electricity usage of customer i on day t

α_i = customer-specific fixed effect

$Post_t$ = indicator for post-program for year t

$Treatment$ = indicator for treatment group participants

CDD_t, HDD_t = cooling and heating degree days (base of 65°F) for customer i on day t

$\beta_1, \beta_2, \ldots$ = coefficients to be estimated by the regression

ε = random error term

For each deployment wave, the post-period of interest was the 2018 calendar year. The pre-program period varied for each wave, and was the calendar year prior to the original start date of each wave.[14] Table 22 summarizes key dates and time periods for each deployment wave.

Table 22: Deployment Wave Period

Wave	Start Month	Pre-Program Period	Post-Program Period
Wave 1: 201203	March 2012	Jan 1, 2011 – Dec 31, 2011	Jan 1, 2018 – Dec 31, 2018
Wave 2: 201507	July 2015	Jan 1, 2014 – Dec 31, 2014	Jan 1, 2018 – Dec 31, 2018
Wave 3: 201705	May 2017	Jan 1, 2016 – Dec 31, 2016	Jan 1, 2018 – Dec 31, 2018

3.2.2 Model Results and Net Impacts

The results of the models we estimated for each of the three deployment waves are summarized in Table 23, including a 90 percent confidence interval for the customer level daily energy savings. We found statistically significant savings in energy usage for recipients in all three waves, but the magnitude of the savings varied by wave. The coefficient on the $Post * Treatment$ interaction variable can be interpreted as the change in

[14] Pre and post indicators were set using the start date of a billing period.

daily energy consumption attributable to a household being in the treatment group in the post-report period.

Table 23: Daily Energy Savings by Deployment Wave

Wave	N	Daily Savings (kWh)	
		Post * Treatment Coefficient	Savings as a % of Energy Usage
Wave 1: 201203	22,841	-0.63 ± 0.18	1.36% ± 0.39%
Wave 2: 201507	8,566	-0.42 ± 0.38	0.75% ± 0.67%
Wave 3: 201705	18,980	-0.30 ± 0.15	0.77% ± 0.40%

To calculate annual program level savings, the duration (in days) of each recipient's participation in 2018 was calculated. If a customer did not opt out of the program or cancel their electric service, they were assigned 365 participation days. The number of total participation days was multiplied by daily savings to obtain annual savings. Since billing data for both the treatment and control groups are used to estimate the fixed effects model, the resulting savings estimates reflect net impacts. Table 24 shows the annual net kWh and kW savings for PY2018.

Table 24: PY2018 Energy Feedback Net Impact Summary

Deployment Wave	Net kWh Savings	Net kW Savings
Wave 1: 201203	2,540,278	611
Wave 2: 201507	642,618	105
Wave 3: 201705	978,364	358
Total	**4,161,260**	**1,075**

3.2.3 My Energy Sub-Program

In addition to the Home Energy Reports distributed by mail or email, SPS also has an online energy report program called My Energy. There is some crossover between the Home Energy Report and My Energy programs, with many customers having access to both programs. We analyzed participation overlap between the Home Energy Report program and the My Energy program, and found there were too few households with sufficient billing data to analyze. Therefore, the estimated kWh and kW savings for the My Energy program were found to be zero.

In reviewing the participation data for this program, we did identify two potentially problematic issues:

1. For households that both receive the Home Energy Reports and have My Energy online access, it will not be possible to separate savings attributable to each program, introducing the potential for double counting savings in the future.
2. Some households that participate in the My Energy program are control homes in the Home Energy Report program. The impact of the My Energy program on energy consumption may make them inappropriate to use in the Home Energy Report program as a control home.

The evaluation team recommends careful tracking of the overlap of Energy Feedback Home Energy Report participants and controls and My Energy participants and controls to minimize the possibility of double counting savings and to ensure all control group customers are valid comparison households.

3.3 Home Energy Services Program

3.3.1 Home Energy Services Gross Impacts

The *ex ante* 2018 impacts are summarized in Table 25 for the Home Energy Services program, which includes both the low-income and non-low-income program components. In total, the Home Energy Services program accounted for 24 percent of energy impacts in SPS's overall portfolio.

Table 25: Home Energy Services Savings Summary

Program	# of Projects	Expected Gross kWh Savings	Expected Gross kW Savings
Home Energy Services	1,455	6,172,301	661
Home Energy Services – Low Income	1,634	5,352,562	626
Total	**3,089**	**11,524,863**	**1,287**

The gross impact evaluation activities included engineering desk reviews of a sample of program projects. For the desk reviews, the sample frame included all measure types except lighting and low-flow showerheads, as those were covered by a deemed savings review. The sample was stratified to cover a range of different measure types so that no single measure would dominate the desk reviews. The sample was also stratified based on total energy savings within each measure type. As most projects had multiple measures installed, a typical desk review covered more than one measure type. Overall, the sampling strategy ensured that a mix of projects in terms of both project size and measure type would be included in the desk reviews. The final sample design is shown in Table 26. The resulting sample achieved a relative precision of 90/12.4 overall for Home Energy Services projects.

Table 26: Home Energy Services Desk Review Sample

Measure Type	Stratum	Count	Average kWh	Total kWh Savings	% of Savings	Final Sample
Air Infiltration Reduction	1	107	13,538	1,448,520	13%	4
	2	201	7,556	1,518,850	14%	2
	3	807	1,882	1,518,676	14%	3
Ceiling Insulation	1	153	11,154	1,706,514	15%	2
	2	270	6,129	1,654,866	15%	3
	3	773	2,141	1,654,841	15%	2
Central AC	1	20	3,629	72,574	1%	2
	2	37	2,322	85,902	1%	2
Duct Efficiency	1	42	9,117	382,935	3%	2
	2	73	5,426	396,086	4%	2
	3	163	2,425	395,199	4%	3
Heat Pump	1	32	5,454	174,520	2%	2
	2	63	2,404	151,428	1%	2
Thermostat	1	46	1,055	48,528	0%	2
Total		**2,787**	**5,302**	**11,209,438**	**100%**	**33**

As discussed in the *Evaluation Methods* chapter, gross realized impacts for the Home Energy Services program were determined by performing engineering desk reviews on the sample of projects as shown above.

Table 27 and Table 28 show the summary results of the desk reviews and how the resulting engineering adjustments were used to calculated realized savings. For the Home Energy Services program overall, these adjustments resulted in an engineering adjustment factor of 1.1425 for kWh and 0.9176 for kW.

Table 27: PY2018 Home Energy Services Gross kWh Impact Summary

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Home Energy Services	1,455	6,172,301	1.1425	7,051,965
Home Energy Services – Low Income	1,634	5,352,562	1.1425	6,115,398
Total	**3,089**	**11,524,863**	**1.1425**	**13,167,363**

Table 28: PY2018 Home Energy Services Gross kW Impact Summary

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings
Home Energy Services	1,455	661	0.9176	607
Home Energy Services – Low Income	1,634	626	0.9176	574
Total	**3,089**	**1,287**	**0.9176**	**1,148**

For individual projects, engineering adjustment factors that varied significantly from 1 were predominately caused by two overarching reasons:

- **Project-specific calculation inputs were documented solely in processing database.** For multiple projects, the evaluation team followed the algorithms contained in the SPS Technical Assumptions but arrived at savings that differed from those reported by SPS. Specific algorithm inputs and any project-specific adjustments were not documented in the materials available to the evaluation team for the desk reviews, which prevented us from identifying the specific sources of discrepancies for roughly one-third of the sampled projects.
- **Adjustments were made based on available site-specific information.** The evaluation team adjusted the savings calculation approaches and inputs for multiple projects to account for the available site-specific information. Adjustments were made to parameters such as motor hours of use, light fixture quantities, installed insulation levels, and installed HVAC unit efficiencies. Site-specific information was gathered through review of the provided project documentation as well as on-site verification. The evaluation team only used site-specific data to adjust savings when the information gathered substantially supported overriding the approaches and values used by SPS, and only in cases where the values used by SPS were not TRM-based defaults.

- **Discrepancies between the SPS Technical Assumptions and the algorithms used by implementers.** The evaluation team calculated savings for programmable thermostats and high-efficiency air-conditioners using the SPS Technical Assumptions but arrived at results that differed from those reported by SPS. The evaluation team brought this to SPS's attention, and SPS confirmed that the algorithms that its implementer was using for these measures differed from those listed in the Technical Assumptions. SPS directed its implementer to update its algorithms to match the Technical Assumptions moving forward, and the evaluation team proceeded with calculating savings based on the Technical Assumptions.

In addition to these broader issues, there was another measure-specific reason for engineering adjustment factors significantly different than 1:

- For Home Energy Services projects that installed ceiling insulation, SPS followed the approach set forth in the 2016 New Mexico TRM. The TRM approach provides deemed savings values for different ranges of baseline insulation levels, and assumes a proposed insulation level of R-30. The evaluation team created new calculations that more accurately account for these projects' specific baseline and proposed ceiling insulation levels. The baseline insulation was the main driver in the savings calculations as the TRM values assume the average of the listed baseline insulation range, thus underestimating and overestimating savings for insulation levels on the low and high ends of the range. These project-specific calculations resulted in an increase in kWh savings and kW reductions for these projects on an order of 14 to 116 percent, depending on the project.

A summary of the individual desk review findings for each of the 33 projects is included in Appendix F.

3.3.2 Home Energy Services Net Impacts

Net impacts for the Home Energy Services program were calculated using NTG ratios from the participant phone survey or an assigned value of 1, depending on the participant income level and measure type. For low-income participants, an NTG ratio of 1 was assigned to those projects. For two specific measures—air infiltration reduction and duct sealing—SPS has indicated these services would not be available in its service territory were it not for the program contractors. For this reason, these two measure types were assigned an NTG ratio of 1. For non-low-income participants with other measures, the NTG ratio was developed using the self-report method described in the *Evaluation Methods* chapter using participant phone survey data. The resulting NTG ratio for the non-low income portion of the Home Energy Services program is 0.9455. As a result, the overall NTG ratio for the Home Energy Services program is 0.9708.

Table 29 and Table 30 summarize the PY2018 net impacts for the Home Energy Services program using the NTG ratios described above. Net realized savings for the program overall are 12,782,862 kWh, and net realized demand savings are 1,148 kW.

Table 29: PY2018 Home Energy Services Net kWh Impact Summary

Program	# of Projects	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Home Energy Services	1,455	7,051,965	0.9455	6,667,463
Home Energy Services – Low Income	1,634	6,115,398	1.000	6,115,398
Total	**3,089**	**13,167,363**	**0.9708**	**12,782,862**

Table 30: PY2018 Home Energy Services Net kW Impact Summary

Program	# of Projects	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Home Energy Services	1,455	607	0.9455	574
Home Energy Services – Low Income	1,634	574	1.000	574
Total	**3,089**	**1,148**	**0.9708**	**1,148**

3.4 Saver's Switch Program

As discussed earlier in the *Evaluation Methods* chapter, Saver's Switch is a one-way switch-enabled demand response program offered to residential SPS customers. To facilitate load control, participants must have a load control switch installed on their cooling unit. The switch must be able to receive radio-based control signals in order to cycle AC runtime during an event. About 4,400 residential customers in SPS's service territory are enrolled in Saver's Switch but because the program is intended for emergency relief purposes, events are rarely called. Because switches are controlled by one-way radio pagers, it is not possible to know which are still installed at customer sites and capable of receiving control signals. Field data collection was therefore used to assess switch operability rates and estimate program load reductions. Forty-nine data loggers were installed at Saver's Switch participant sites, sampled within three usage tertiles.

The results of the Saver's Switch impact analysis are summarized below, with a more detailed discussion provided in Appendix E.

3.4.1 Field Operability and Communication Rates

During the logger installation process, 137 Saver's Switch participants were contacted. Loggers were not installed at a majority of these sites for a variety of reasons, as summarized in Figure 3. Reason codes were classified as access or safety issues versus operability issues. Only customer sites with operability issues, as summarized in Figure 4, were included in the operability rate analysis. In total, of 81 switches with no access issues, 49 (60%) were found to be operable. Data loggers were installed to collect data from these 49 switches.

Figure 3: Reasons for Unsuccessful Logger Installation

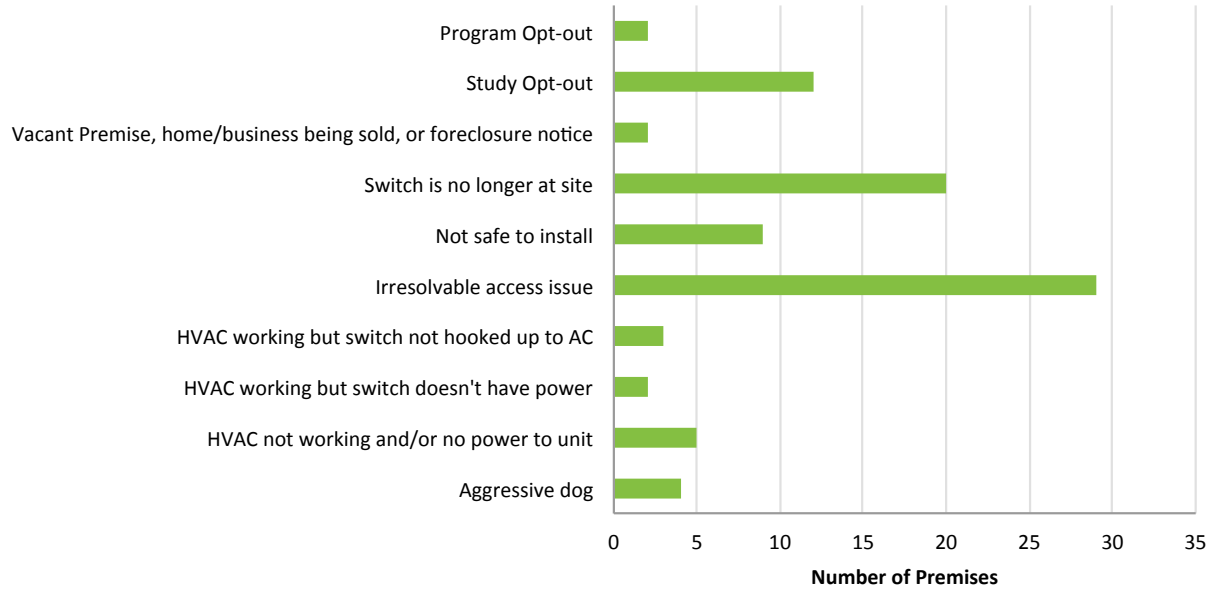
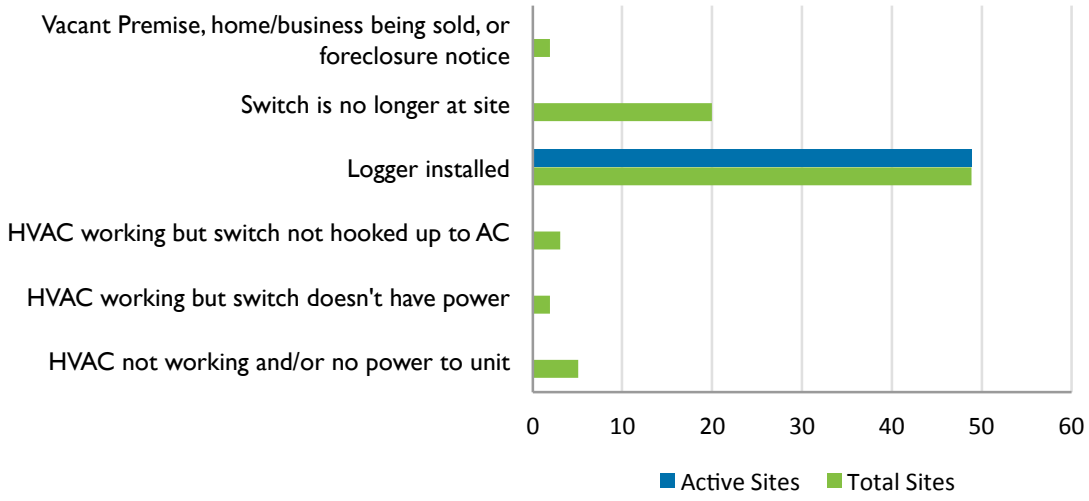


Figure 4: Implications for Field Operability

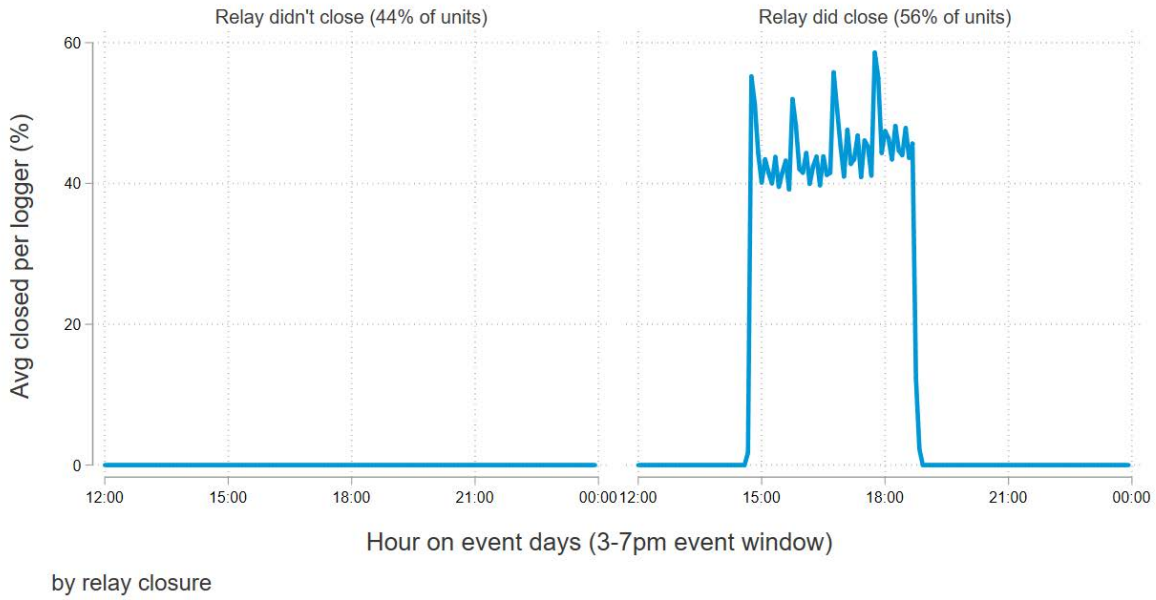


In addition to operability rates, another observed factor affecting load reductions is switch closure rates. An active switch controls an AC unit when the switch relay closes, but load reductions are zero for inactive switches with switch relays that do not close. Analysis of switch status interval data revealed that about half of units functioned during at least one event, while the remainder did not.[15] Inactive switches were found in all cities, but were somewhat overrepresented in the cities of Hobbs and Roswell. Further exploration of radio signal strength and coverage may help address switch inactivity.

The implication for the impact analysis is that demand reductions were dampened by the inactive switches. Figure 5 shows the five-minute interval closure rates for the inactive switches (left) and for the active switches (right). Notably, switch closure rates for the active switches is in the 40 to 60 percent range, appearing to reflect a 50 percent cycling strategy. In contrast, closure rates during events were 20 to 30 percent for all switches, averaged across active and inactive switches.

[15] Average active rates per event were lower—42 percent—because activity for some switches varied by events.

Figure 5: Switch Relay Closures



3.4.2 *Ex Post* Event Load Impacts

Event impacts for Saver's Switch events are the baseline load less the observed event day load. Figure 6 shows average[16] baseline loads (grey), observed event day loads (blue), and estimated reductions (orange) for logged switches including those deemed to be inactive. Load reductions are the most substantial in the first hour, and mild snapback is observed post event. Notably, peak AC load is estimated at about 1.5 kW during the average event, and load reductions are about 0.2 kW during the event, or about 13 percent. Recall that these average impacts include inactive switches, which lessen the reductions.

[16] Includes loads for the four successful events (Aug 23, Aug 28, Sep 13, Sep 25). Excludes loads for the two events with communication issues and the event with unseasonably cold weather.

Figure 6: Load Impacts for Operable Switches (Active and Inactive)

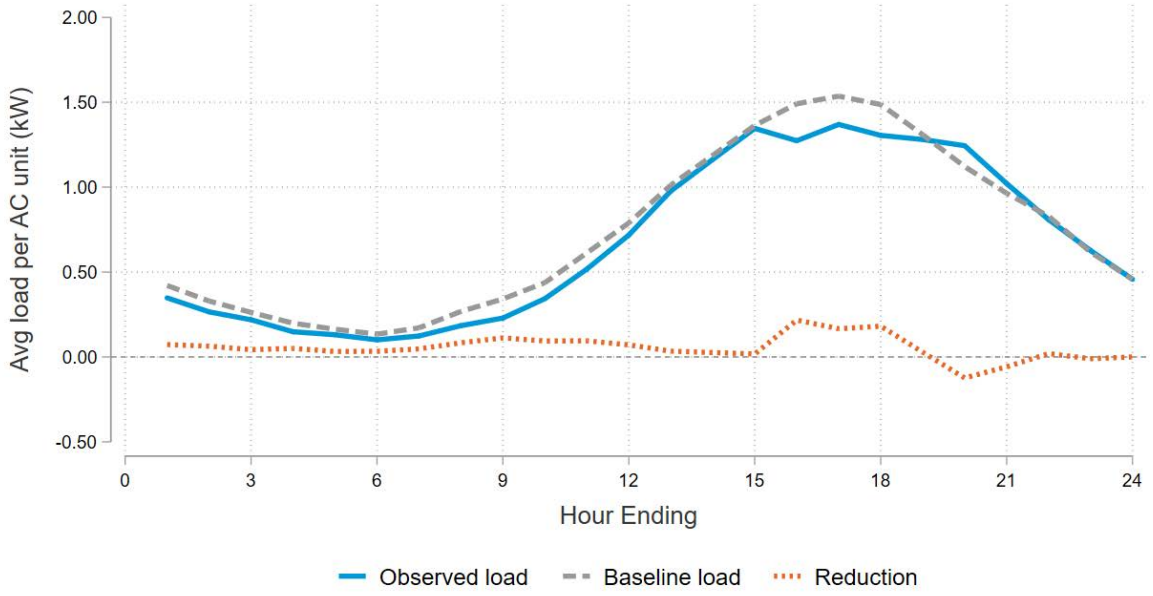


Table 31 and Table 32 show the hourly and average event reductions for each event per dispatched switch and per active switch, respectively. These summaries quantify the differences in first hour reductions and snapback observed in the load shape image above. These summaries also highlight the effect of switch inactivity on load reductions; since about 58 percent of dispatched switches were inactive, average load reductions across dispatched switches (0.15 kW) are also about 58 percent lower than load reductions for active switches only (0.36 kW). The snapback observed in post-event hours minimizes any small energy savings due to the program.

Table 31: Hourly Reductions per Dispatched Device

		Reduction per Dispatched Device (kW), Hour Beginning (MDT)					
Date	% of Devices Active	3:00 p.m.	4:00 p.m.	5:00 p.m.	6:00 p.m.	7:00 p.m. (post event)	Average 3:00 – 7:00 p.m.
22-Aug	42%	0.28	0.05	0.06	-0.09	-0.04	0.07
27-Aug	40%	0.33	0.18	0.23	0.04	-0.51	0.19
12-Sep	42%	0.21	0.26	0.29	0.05	0.01	0.20
24-Sep	43%	0.05	0.18	0.14	0.11	0.04	0.12
Average	**42%**	**0.22**	**0.17**	**0.18**	**0.03**	**-0.12**	**0.15**

Table 32: Hourly Reductions per Active Device

Date	% of Devices Active	Reduction per Active Device (kW), Hour Beginning (MDT)					
		3:00 p.m.	4:00 p.m.	5:00 p.m.	6:00 p.m.	7:00 p.m. (post event)	Average 3:00 – 7:00 p.m.
22-Aug	42%	0.67	0.12	0.15	-0.21	-0.09	0.18
27-Aug	40%	0.84	0.45	0.58	0.10	-1.29	0.49
12-Sep	42%	0.49	0.61	0.69	0.12	0.02	0.48
24-Sep	43%	0.12	0.42	0.33	0.26	0.10	0.28
Average	**42%**	**0.52**	**0.40**	**0.44**	**0.07**	**-0.30**	**0.36**

3.4.3 *Ex Ante* Program Impacts

To produce an *ex ante* impact estimate, the Evergreen team analyzed the relationship between temperature and impacts to derive a relationship. Figure 7 compares the load reduction estimate for each event hour (for example, the hourly data points in Table 31) with the outdoor air temperature for that hour. Weather data, which were provided by the Evergreen team from the NOAA website,[17] comes from weather station KROW in Roswell. Figure 7 shows a weak but positive correlation between load reductions and temperature—the hotter it is outside, the greater the impacts tend to be (note the trend line equation in the legend). Predicted load reductions for the first hour would be 0.25 kW at 100°F (-0.6984 + 0.0095 * 100).

[17] ftp://ftp3.ncdc.noaa.gov/pub/data/noaa/

Figure 7: Hourly Impacts Against Outdoor Temperature (°F) - All Hours

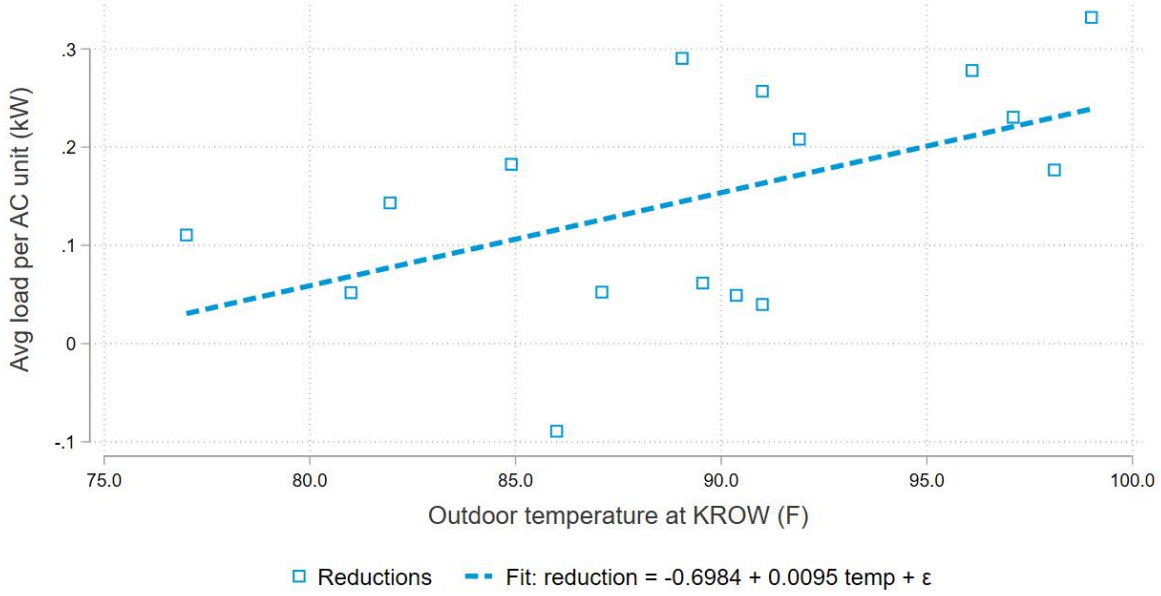


Figure 8 portrays the same data points as in Figure 7, but splits them into four panels by hour of day. There is a clear trend in the figure for the first event hour. Predicted load reductions for the first hour would be 0.37 kW at 100°F (-1.9418 + 0.0231 * 100). However, the relationship is less clear in subsequent hours. This makes sense given that the impacts were estimated to be much greater in the first one or two hours of an event than in subsequent hours. Because of this, using a simple linear temperature-impact model to predict *ex ante* impacts will not be as accurate as an approach that also takes into account the event hour.

Figure 8: Hourly Impacts Against Outdoor Temperature (°F) – By Hour

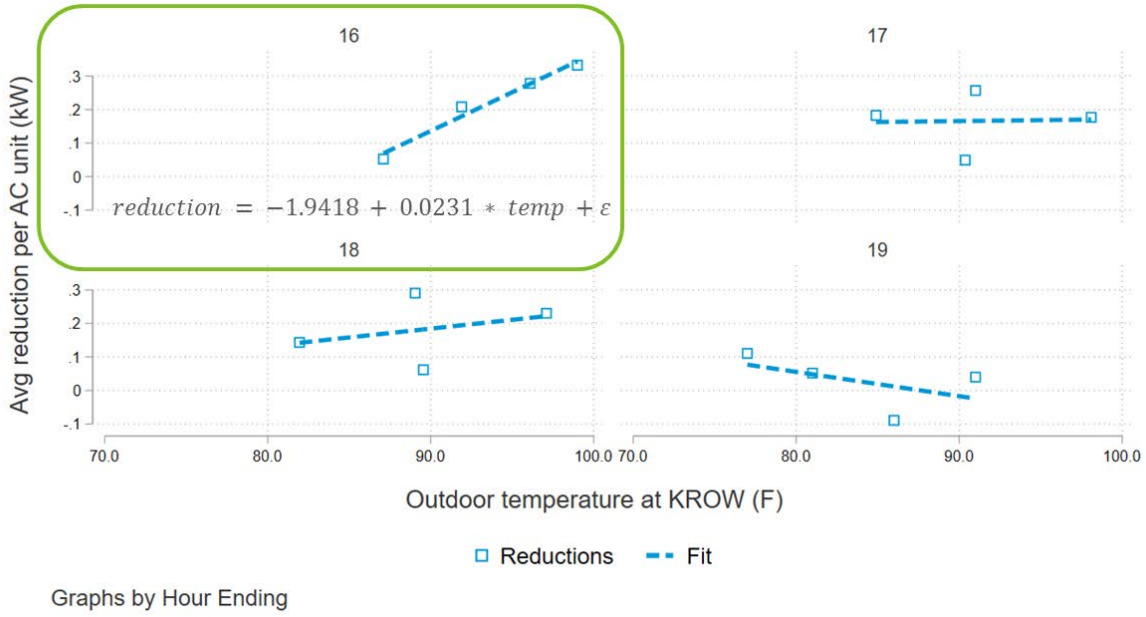


Figure **9** shows the steps used to predict the hourly impacts of a future Saver's Switch event on a day when temperatures reach 100 degrees and emergency load relief is needed. Load reductions for the average event hour and for the first event hour are included. The figure summarizes the elements measured in this evaluation and discussed above: operability rate (60%), reduction-temperature correlation values, and the portion of switches actively communicating (42%). To get an idea of what the Saver's Switch resource is worth on aggregate, these factors are then applied to the total number of program participants.

Figure 9: *Ex Ante* Calculation Steps

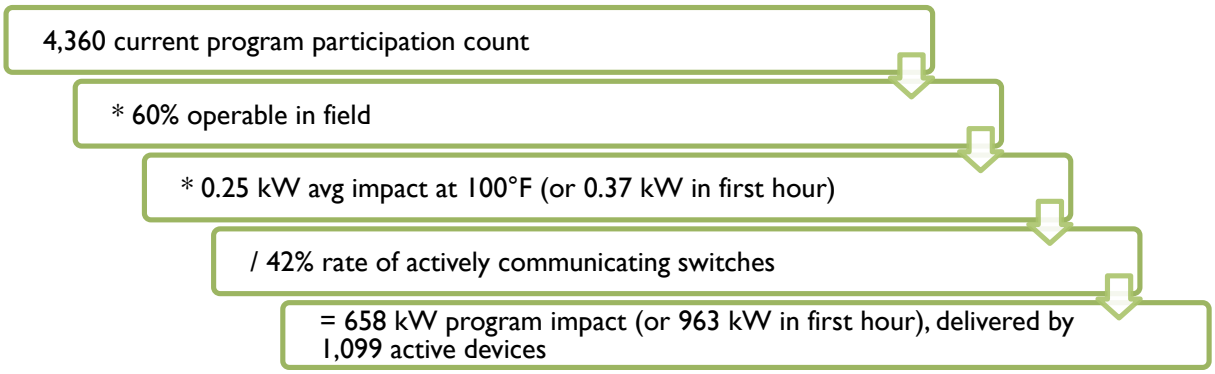


Table 33 summarizes the calculations laid out above. It shows the number of active switches, operable switches, and total program switches as well as the first hour and average event hour load reductions for each type of device.

Table 33: *Ex Ante* Impacts per Device

Avg Temp 3:00 – 7:00 p.m. at KROW (°F)	Program Total Devices	% Operable (Field)	% Communicating (Logged)	per Active Device (kW)	per Operable Device (kW)	per Program Device (kW)
				Number of Devices		
				1,099	2,616	4,360
				Average Reduction		
100	4,360	60%	42%	0.60	0.25	0.15
				First Hour Reduction		
				0.88	0.37	0.22

3.4.4 Program Findings

The Evergreen team determined there are three key findings that limit program impacts for Saver's Switch. Table 34 summarizes these findings and provides an assessment of how and to what extent each finding could be addressed.

Table 34: Program Findings and How to Address

Finding	How to Address
The "adaptive" dispatch approach used during events appears to function similarly to a 50 percent cycling strategy. In practice, this may be limiting impacts on cooler days when AC units typically do not run for more than 30 minutes per hour.	**Definitely possible to address:** Reductions are greatest in the first hour on hot days (when AC units run more often) and can be maximized by only calling events under these conditions. A more aggressive 66 percent or 100 percent cycling strategy should yield higher results.
Communication issues were observed among operable switches to which loggers were deployed in the field: • Widespread communication issues for all switches occurred on July 20 and Aug 6. • On average, 42 percent of switches were effectively receiving control signals during events.	**May be possible to address:** Switch activity rates may be a result of radio signal coverage or strength. A communication rate strategy could be developed by investigating the signals coming off pager towers to make sure the communication infrastructure is all working as intended and the radio signals are at least going out with adequate coverage.
A 60 percent operability rate was observed for sampled switches during the field study.	**Likely cost-prohibitive to address:** Without advanced metering infrastructure (AMI), it is not possible to detect which program homes likely have inoperable switches. Rolling trucks to check and reconnect switches is likely cost-prohibitive.

4 Cost Effectiveness Results

The evaluation team calculated cost effectiveness using the Utility Cost Test (UCT) for each individual SPS energy efficiency and demand response program, as well as the cost effectiveness of the entire portfolio of programs.[18] The evaluation team conducted these tests in a manner consistent with the California Energy Efficiency Policy Manual.[19]

Cost effectiveness tests compare relative benefits and costs from different perspectives. The specific cost effectiveness test used in this evaluation, the UCT, compares the benefits and costs to the utility or program administrator implementing the program. The UCT explicitly accounts for the benefits and costs shown in Table 35.

Table 35: Utility Cost Test Benefits and Costs

Benefits	Costs
• Utility avoided energy-related costs • Utility avoided capacity-related costs, including generation, transmission, and distribution	• Program overhead/administrative costs • Utility incentive costs • Utility installation costs

Using net realized savings from this evaluation and cost information provided by SPS, the evaluation team calculated the ratio of benefits to costs for each of SPS's programs and for the portfolio overall. The results of the UCT are shown below in Table 36. All programs except Residential Cooling and Saver's Switch had a UCT of greater than 1.00, and the portfolio overall was found to have a UCT ratio of 2.32.

[18] The Utility Cost Test is sometimes referred to as the Program Administrator Cost Test, or PACT.

[19] http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/EEPolicyManualV5forPDF.pdf

Table 36: PY2018 Cost Effectiveness

Program	Utility Cost Test (UCT)
Business Comprehensive	2.24
Home Lighting & Recycling	3.26
Energy Feedback	2.07
Residential Cooling	0.79
School Education Kits	2.48
Home Energy Services	2.25
Saver's Switch	0.56
Saver's Stat	3.24
Overall Portfolio	**2.32**

5 Process Evaluation Results

This chapter summarizes key methods and findings from the PY2018 process evaluation of the SPS Business Comprehensive and Home Energy Services programs. For both of these programs, we conducted phone surveys with program participants and phone interviews with contractors who were active in these programs in PY2018. These findings, along with findings from the impact evaluation, informed the conclusions and recommendations presented in the following chapter.

5.1 Business Comprehensive Participant Surveys

As part of the process evaluation, the evaluation team conducted telephone surveys with representatives from 26 participating companies that received rebates through the SPS Business Comprehensive program. The sample included participants in the Lighting, Cooling, Motors, and Custom sub-programs, and ultimately, surveys were completed with 25 participants from the Lighting sub-program and one from the Cooling sub-program. The surveys were completed in March 2019 and ranged from 15 to 20 minutes in length.

The participant survey was designed to cover the following topics:

- Verifying the installation of measures included in the program tracking database;
- Collecting information on participants' satisfaction with their program experience;
- Survey responses for use in the free ridership calculations;
- Baseline data on energy use and/or equipment holdings;
- Participant drivers/barriers; and
- Additional process evaluation topics.

SPS provided program data on the Business Comprehensive participant projects, which allowed the evaluation team to select a sample for surveys. Because of the relatively small number of participants in PY2018, all participants with valid contact information were contacted to complete the survey.

The following subchapters report results on company demographics, sources of program awareness, motivations for participation, and program satisfaction.

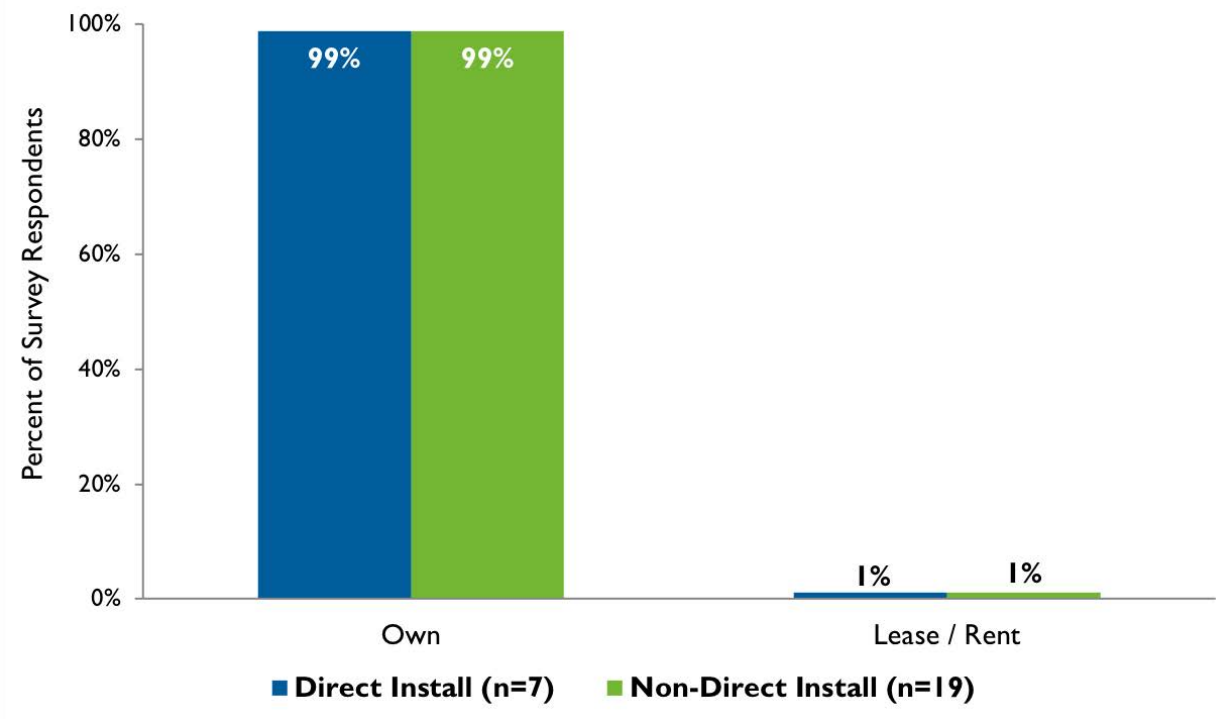
Throughout the analysis described here, we present the survey results as weighted percentages based on the proportion of savings represented by survey respondents relative to the total savings of all program participants.

5.1.1 Company Demographics

We asked survey respondents whether their company owns or leases the building where the project was completed. Counterintuitive to what would be expected of direct install

participants, Figure 10 shows that 99 percent of participants with direct install projects own their building, which is unexpected as direct install programs are often targeted toward customers that rent their spaces. Ninety-nine percent of non-direct install participants also reported they own the building where the measures were installed, which is consistent with what we would expect of non-direct install participants.

Figure 10: Direct Install and Non-Direct Install Participant Own or Rent



The following two figures summarize the survey respondents' number of employees and building size by whether they had direct install or non-direct install projects. Consistent with program design, Figure 11 and Figure 12 show that generally larger businesses participate through a non-direct install sub-program. Ten percent of non-direct install participants have between 100 and 999 full time employees, and 25 percent of non-direct install participants occupy buildings of 50,000 square feet of more. Comparatively, mid- to small-sized customers more commonly participated through direct install projects, with 95 percent of direct install respondents reporting they have five or fewer full time employees, and 85 percent reporting they occupy buildings smaller than 50,000 square feet.

Figure 11: Direct Install and Non-Direct Install Participant Number of Employees

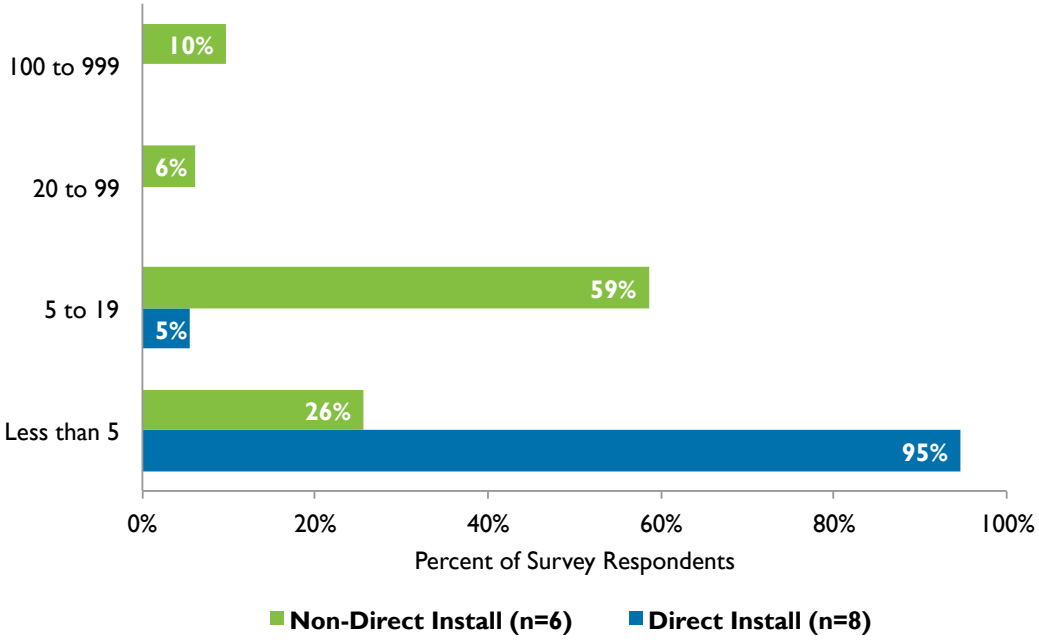
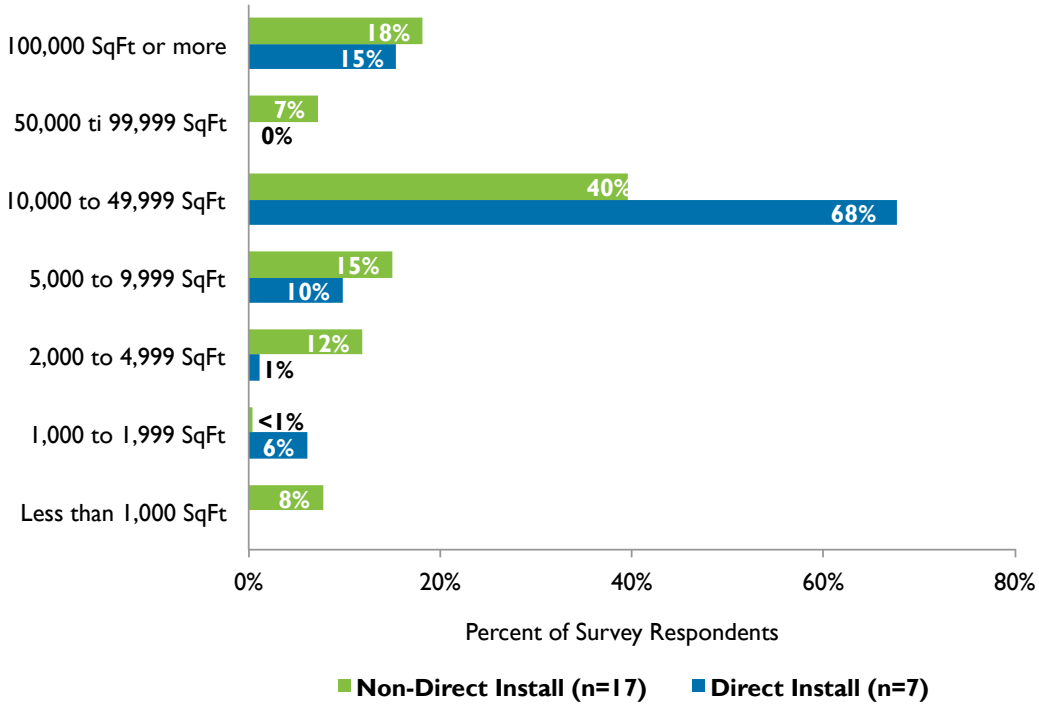
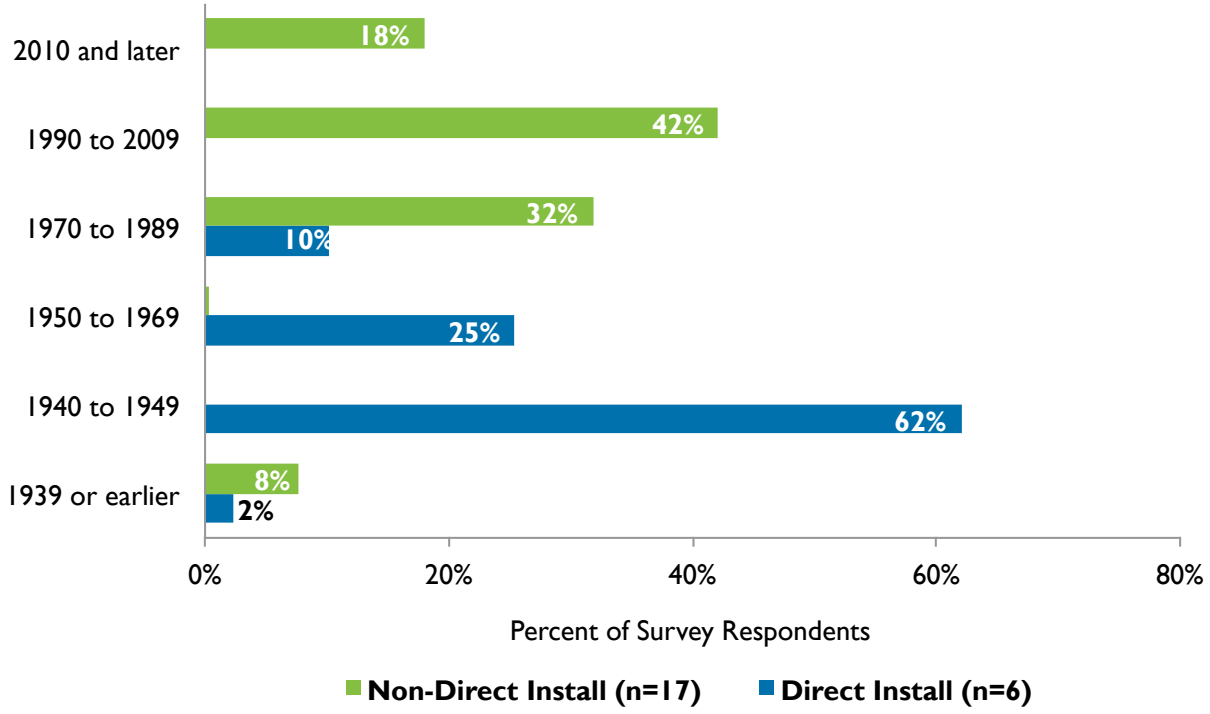


Figure 12: Direct Install and Non-Direct Install Participant Building Size



Additionally, Figure 13 shows that the majority (60%) of non-direct install participants' buildings were built in 1990 or later, compared to 0 percent of direct install participants' buildings. Direct install participants all occupied buildings built before 1990, with 90 percent reporting that their buildings were built sometime before 1970. Conversely, less than 10 percent of the non-direct install participants reported occupying a building built before 1970. This suggests that the direct install component of the program is doing a particularly good job at targeting older buildings where the potential for significant energy savings is the greatest.

Figure 13: Direct Install and Non-Direct Install Participant Building Age



5.1.2 Sources of Awareness

Business Comprehensive program participants became aware of the program rebates and assistance through a variety of channels including word of mouth, contractors and/or distributors, and SPS or CLEAResult marketing and outreach. As shown in Figure 14, 88 percent of participants learned about the program offerings through SPS, CLEAResult, or from previous participation. Additionally, 10 percent of participants also learned about the program offerings through word of mouth.

For those who indicated that they learned about the program through multiple sources, the evaluation team asked which source was the most useful in their decision to participate. As shown in Figure 15, CLEAResult was most frequently cited by name as the most useful source of awareness. Additionally, contractors or distributors and SPS direct contact or marketing were also frequently mentioned as the most useful source. This indicates that SPS contact and marketing and interactions with CLEAResult are significant drivers for the program.

Figure 14: Initial Source of Awareness (n=22)

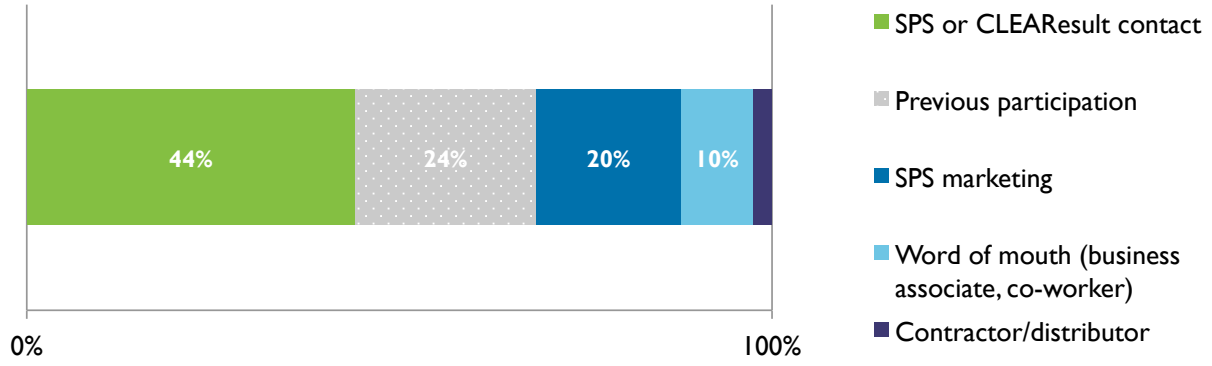
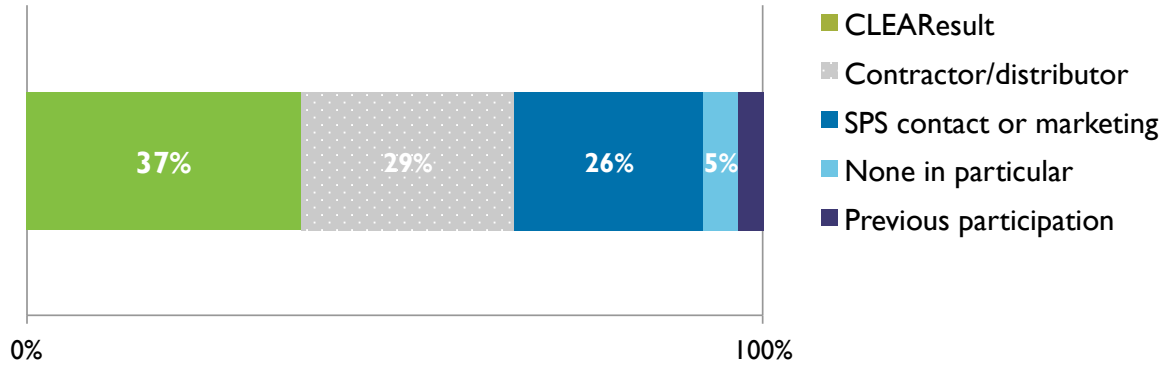


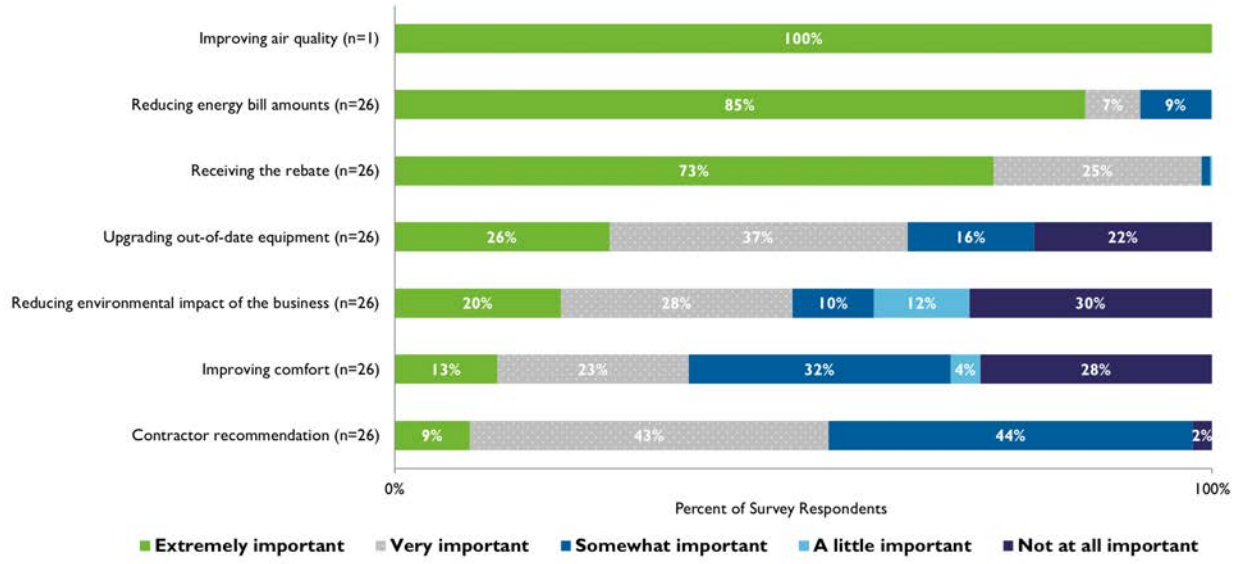
Figure 15: Most Useful Source of Awareness (n=13)



5.1.3 Motivations for Participation

Figure 16 shows the level of importance placed on a variety of factors that might be influencing customers to participate in the program. Improving air quality was rated as "extremely important" by the one participant with a cooling project who was asked about that factor in particular. Aside from that, reducing energy bill amounts was the most influential factor across all respondents, with 85 percent of participants reporting that it was extremely important in their decision to participate in the program. Other factors that participants reported as important included receiving the rebate, upgrading out-of-date equipment, reducing environmental impact of the business, improving comfort, and contractor recommendations. Interestingly, improving comfort was the least important (but still important) factor in participants' decision to participate in the Business Comprehensive program, with 64 percent saying it was either "somewhat," "a little," or "not at all important" in their decision to participate.

Figure 16: Motivations for Participation



In addition to motivations for participating, respondents were given a list of potential program and non-program factors that may have influenced their decision about how energy efficient their equipment would be and were then asked to rate their importance on a 0 to 10 point scale.[20] As shown in Figure 17 below, 80 percent or more of participants rated endorsement or recommendation by CLEAResult, previous participation in the program, and technical assistance received from SPS staff as extremely important (a score of 8 to 10) in their decision to determine how energy efficient their project would be. Endorsement or recommendation by a vendor or distributor was the least important factor

[20] On the 0 to 10 point scale, 0 indicated 'not at all important' and 10 indicated ' extremely important'.

in participants' decisions to determine how energy efficient their project would be, with only 25 percent saying it was extremely important and about half rating it a 5 or lower on the 10-point scale. Additionally, previous participation in an SPS program was the least important factor when this question was asked in the 2017 evaluation, but in 2018 it was rated by participants as the second most important factor, with 82 percent giving it a rating of 8 to 10.

Figure 17: Importance of Program Factors (n=26)

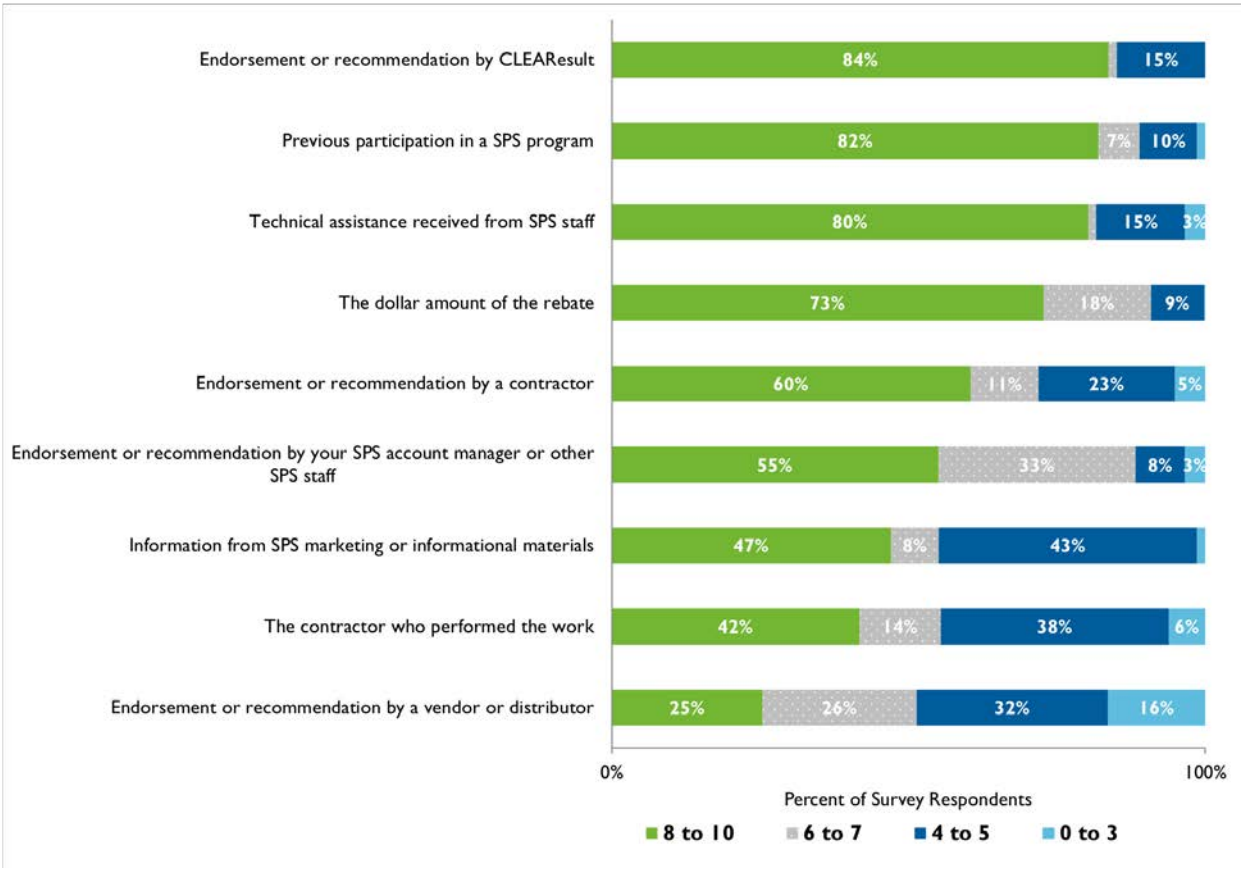
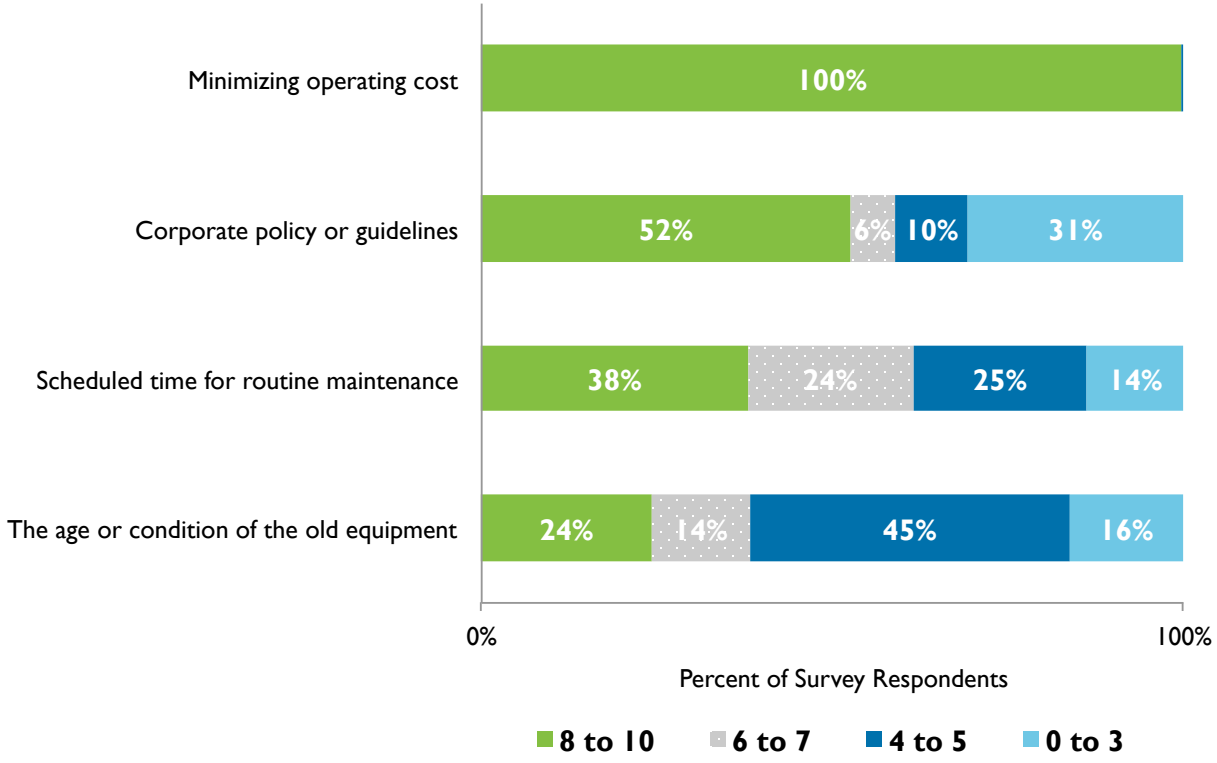


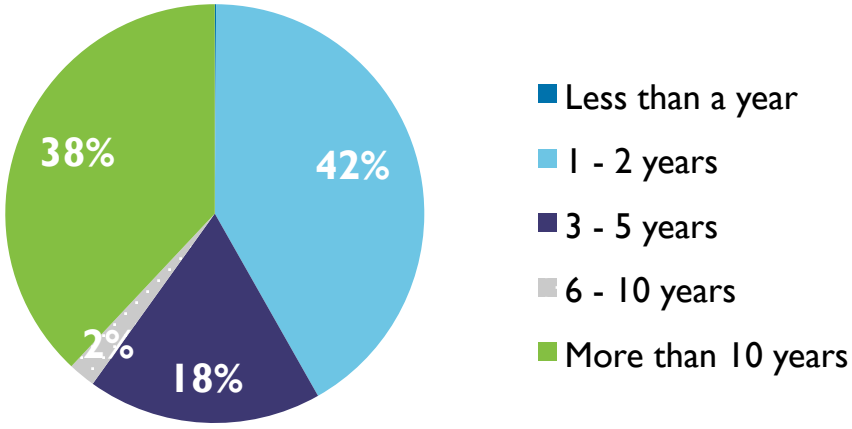
Figure 18 shows that all Business Comprehensive program participants rated minimizing operating cost as extremely important (a score of 8 to 10) on the decision to determine how energy efficient their project would be. Corporate policy or guidelines was the second most influential non-program factor in the decision regarding efficiency level of the equipment. The age or condition of the old equipment was reported as less influential (but still relatively influential) than other non-program factors, with 76 percent of participants reporting that it was somewhat important (6 to 7), a little important (4 to 5), or not at all important (0 to 3).

Figure 18: Importance of Non-Program Factors (n=26)



To get a sense of the condition of the existing equipment, respondents were asked approximately how much longer would the equipment have lasted if it had not been replaced. Figure 19 shows that the majority of surveyed respondents believed that their equipment would have lasted more than three years. This suggests that the program is doing a good job of targeting customers with functioning equipment, rather than those whose equipment is not working and would need to be replaced anyway (that is, potential free riders).

Figure 19: Equipment Remaining Life (n=20)



5.1.4 Participant Satisfaction

The participants evaluated their satisfaction with various components of the Business Comprehensive program on the following scale: very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, and very dissatisfied. The individual components that participants were asked to rank their satisfaction with included:

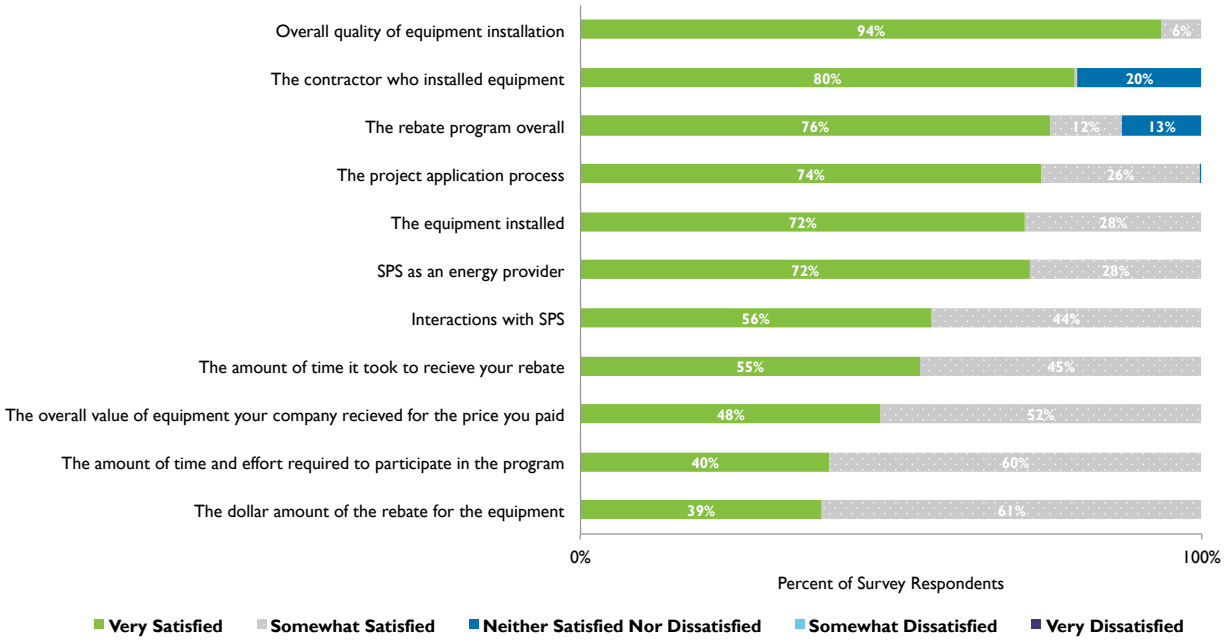
- SPS as an energy provider
- The rebate program overall
- The equipment installed through the program
- The contractor who installed the equipment
- Overall quality of the equipment installation
- The time it took to receive the rebate
- The dollar amount of the rebate
- Interactions with SPS
- The overall value of the equipment for the price they paid
- The time and effort required to participate
- The project application process

Figure 20 summarizes the satisfaction levels of the Business Comprehensive program participants.

Overall, surveyed program participants expressed high levels of satisfaction with the Business Comprehensive program components. As shown in Figure 20, the vast majority of participants reported that they were "very satisfied" or "somewhat satisfied" with all program components. Ninety-four percent reported being "very satisfied" with the overall quality of equipment installation, and 80 percent were "very satisfied" with the contractor who installed the equipment. Contrarily, the program component with the highest number of "neither satisfied nor dissatisfied" ratings was also the contractor that installed the equipment, with 20 percent of participants giving this rating.

Some of the justifications participants provided for their low satisfaction ratings were that "He [the contractor] took too long to complete the job, would show up late and sometimes would not show up at all" and "Rebate was much lower than anticipated".

Figure 20: Participant Program Satisfaction (n=42)



5.1.5 Net Promoter Score

In order to calculate a net promoter score, the evaluation team also asked customers about their likelihood to recommend the Business Comprehensive program to others on a scale from 1 to 10. Net promoter scores are measures of brand loyalty. To calculate a net promoter score, responses are classified in the following fashion:

- On a 1 to 10 scale, ratings of 9 or 10 are classified as **Promoters**, as these are customers who are satisfied with the program and are likely to actively recommend the program to other customers.
- Ratings of 7 or 8 are classified as **Passives**, as these are customers who are satisfied with the product but are not likely to actively promote it.
- Ratings of 1 through 6 are classified as **Detractors**, as these customers likely had some issues with the program and may dissuade other customers from participating.

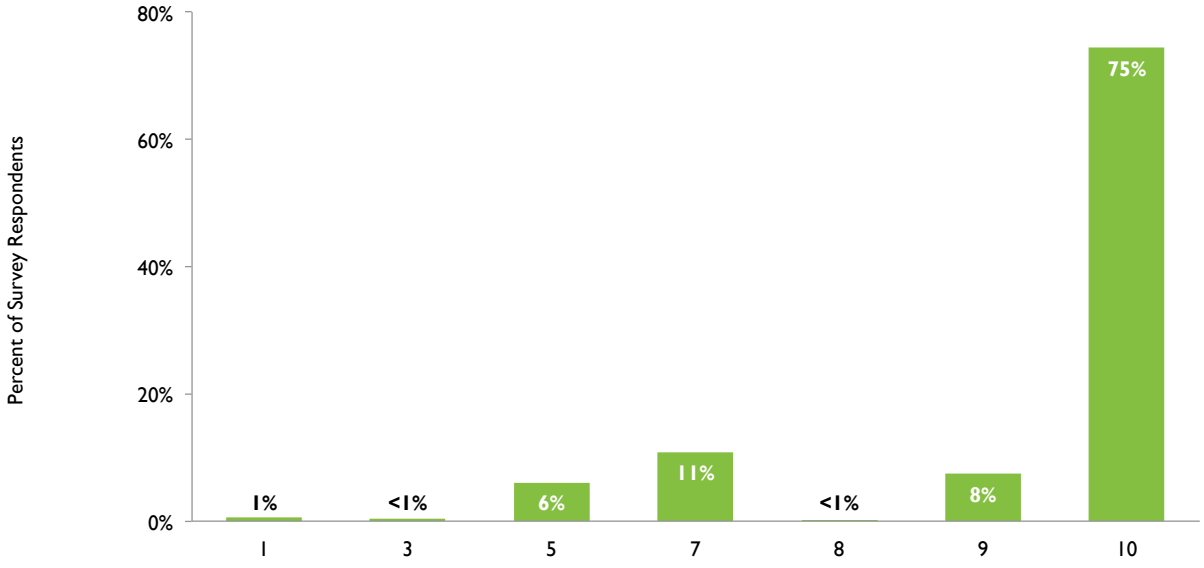
The net promoter score is then calculated using the following formula:

Net Promoter Score = % of Promoters - % Detractors

Responses from participating customers yielded a net promoter score of 75 percent. Figure 21 shows the distribution of responses, with 82 percent of respondents counting as promoters and 7 percent as detractors.

Some of the justifications provided by the detractors who reported they would not be willing to recommend the Business Comprehensive program were that "The paperwork was somewhat difficult." and "I don't generally give recommendations to people."

Figure 21: Distribution of Net Promoter Question Responses



5.2 Business Comprehensive Contractor Interviews

The evaluation team completed five interviews with contractors who installed equipment for participants in the 2018 Business Comprehensive program. The interviews focused on the following topics:

- Project context and background
- Role and influence of SPS's Business Comprehensive program
- Program satisfaction

Contractors that were interviewed completed three or more lighting projects for the Business Comprehensive program, with one participant having completed two custom efficiency projects as well. Respondent roles varied from rebate specialist to owner of the company; direct program interaction depended on those roles, all of which were significant in their company's participation in the program. Interviewed contractors' businesses focus on serving the commercial sector, although some also do work for residential, industrial, or agricultural clients.

5.2.1 Program Influence

In an effort to gauge the level of influence the Business Comprehensive program had on the contractors' businesses and the efficiency levels of their projects, the evaluation team

asked contractors a series of questions about the influence of various program factors on the market and on their customers' decisions to install energy efficient equipment.

Responses varied in terms of the impact of the program on the market for energy efficient products. One contractor stated that demand for efficiency was on the rise as a direct result of the Business Comprehensive program, and two contractors said they did not see or know of the program's influence on the demand for more efficient products. However, there were instances of contractors stating that their commercial customers usually mention the program or rebate before they do (two respondents), continuing to say that program awareness and efficiency consciousness is expanding, especially with certain products becoming more affordable.

We also asked contractors to compare the likelihood of a customer within SPS's service territory choosing to upgrade to higher efficiency equipment relative to the likelihood of a customer outside SPS's service territory choosing to upgrade, and four respondents said customers are just as likely to upgrade regardless of location. One contractor with a competing viewpoint believed that customers would be just as likely to install efficiency measures if rebates were not involved, but that there is currently a huge difference between customers within SPS's service territory and customers outside SPS's service territory.

In regard to the program's effect on contractor-customer interaction, contractors credited the program for giving them the ability to up-sell more efficient equipment. As one respondent stated,

> *[The program] was lucrative and provides savings for the customer that helps bridge the cost of the equipment to justify upgrading to energy efficient products.*

Yet, contractors believe their ability to use the Business Comprehensive program as a marketing tool is in decline as a result of rebate amounts diminishing over time, making the difference in cost between standard efficiency measures and higher efficiency measures more difficult to overcome (two respondents).

5.2.2 Program Satisfaction

Business Comprehensive contractors were asked to quantify their level of satisfaction with the program overall using a 1 to 5 point scale, with 1 being very dissatisfied and 5 being very satisfied. A single respondent rated the program a 3 (neither satisfied nor dissatisfied), two respondents rated the program a 4 (somewhat satisfied), and two respondents rated the program a 5 (very satisfied). None of the five contractors claimed they were dissatisfied with any aspects of the program, but when asked how their satisfaction with the program could be improved, they stated rebate amounts could be higher, and in one instance, a contractor said the rebate amount they received was lower than expected.

Throughout the interviews, three of the five contractors also mentioned difficulties with the application process, reporting that the paperwork was time consuming and cumbersome. Communication on which products are eligible or qualify could be clearer, and another comment revolved around the program deadlines, with one contractor reporting that the program year ended abruptly without notice.

5.3 Home Energy Services Participant Surveys

As part of the process evaluation, the evaluation team conducted telephone surveys with 106 participating residential customers that received reduced cost services and/or equipment through the SPS Home Energy Services program. The surveys were completed in March 2019 and ranged from 15 to 20 minutes in length.

The participant survey was designed to cover the following topics:

- Verifying the installation of measures included in the program tracking database
- Collecting information on participants' satisfaction with their program experience
- Survey responses for use in the free ridership calculations
- Participant drivers/barriers
- Additional process evaluation topics

SPS provided program participation data on the Home Energy Services participant projects, which allowed the evaluation team to select a sample for interviews. The evaluation team randomly selected and recruited program participants based on whether they had valid contact information and received services and/or equipment through the Home Energy Services program.

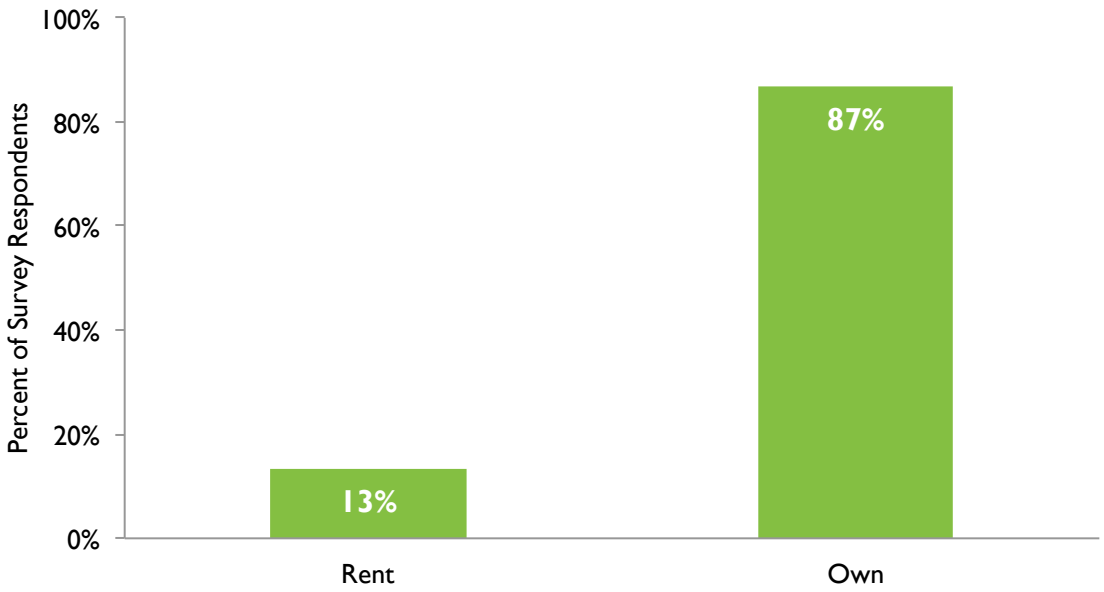
The following subchapters include data covering demographics, sources of program awareness, motivations for participation, and program satisfaction among survey respondents.

Throughout the analysis described here, we present the survey results as weighted percentages based on the proportion of savings that each survey respondent represents relative to the total savings of all program participants.

5.3.1 Participant Demographics

We asked survey respondents a number of questions about the characteristics of their home and household, including whether they own or rent, the size of their home, the number of people in the household, and the age of their home. The majority of survey respondents (87%) own their home (Figure 22).

Figure 22: Home Energy Services Participants Own or Rent (n=106)



The following two figures summarize the survey respondents' home and household size. As shown in Figure 23 below, the majority (67%) of survey respondents reported residing in homes of less than 2,000 square feet. Additionally the majority (53%) of respondents have two or three full-time residents living in the home where the project was completed (Figure 24).

Figure 23: Home Energy Services Participant Home Size (n=106)

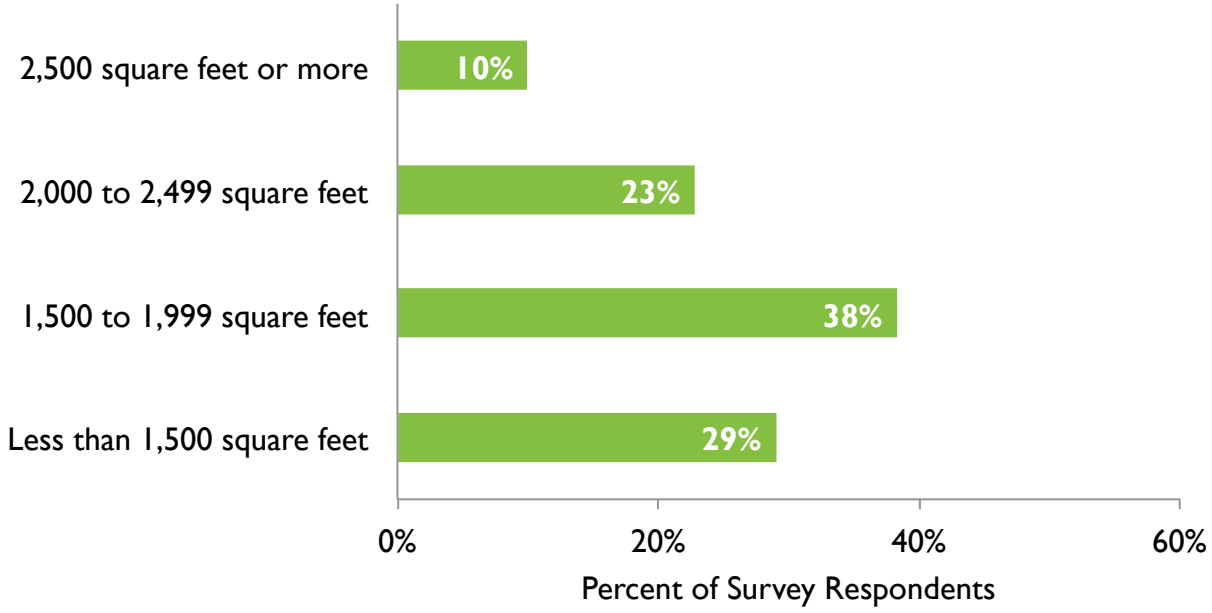


Figure 24: Home Energy Services Participant Household Size (n=106)

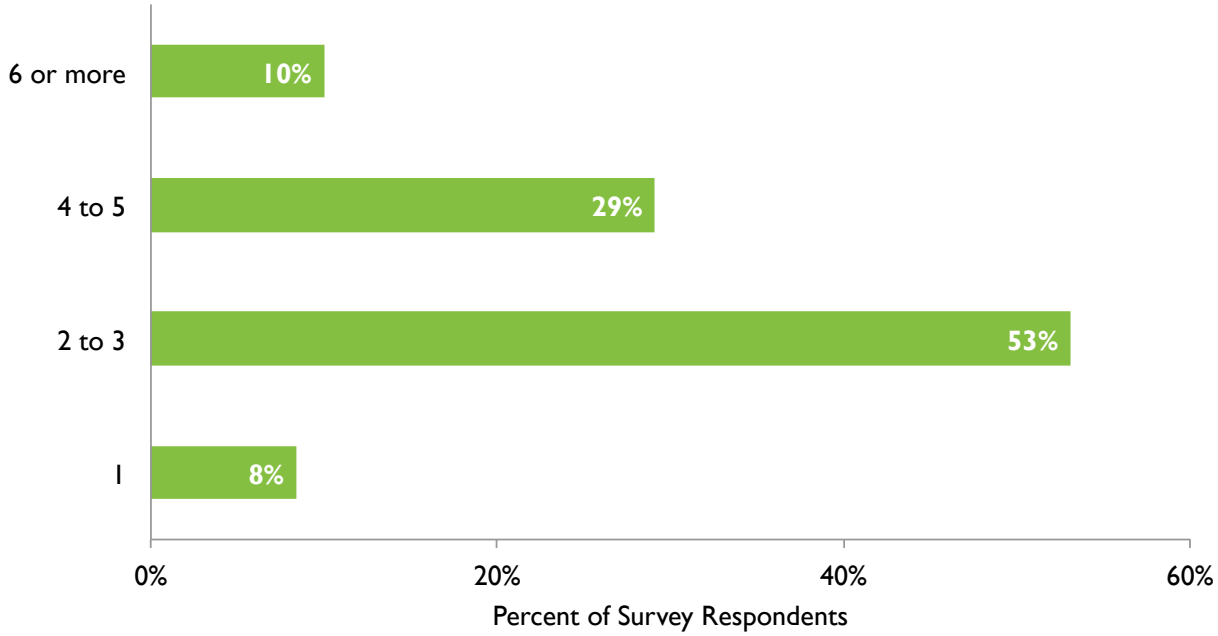
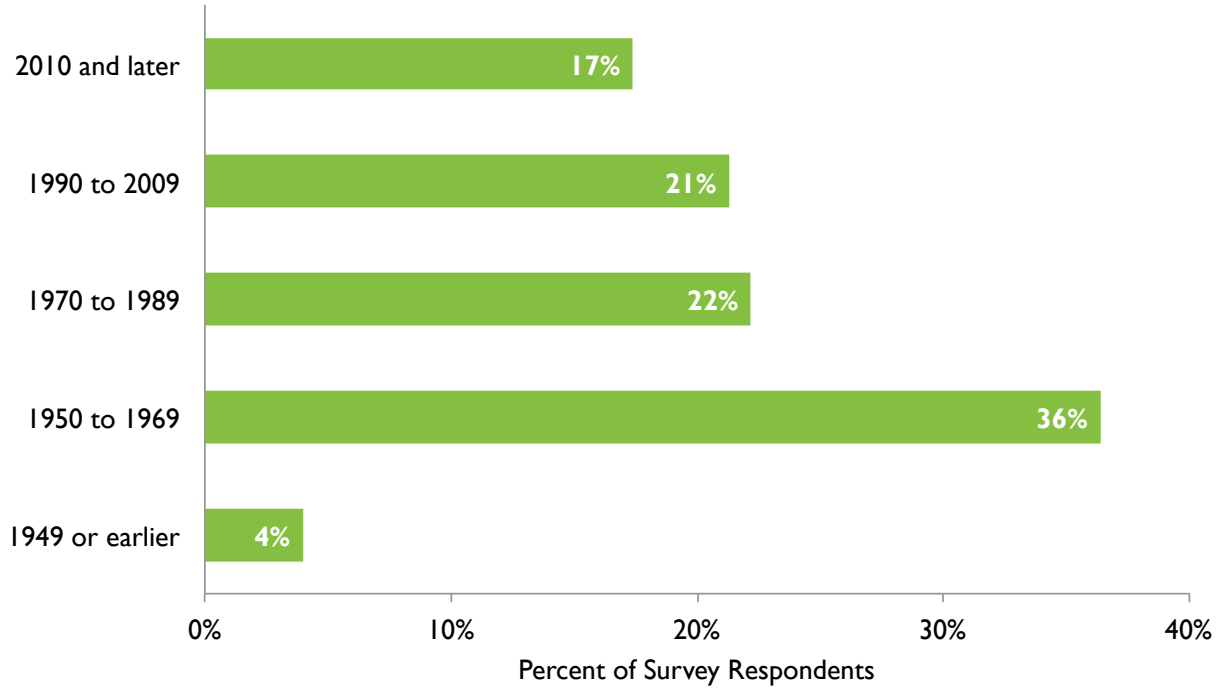


Figure 25 shows that the majority (62%) of Home Energy Services survey respondents reported that their homes were built sometime before 1989. This suggests that the program is effectively targeting older homes where the potential for significant energy savings is the greatest.

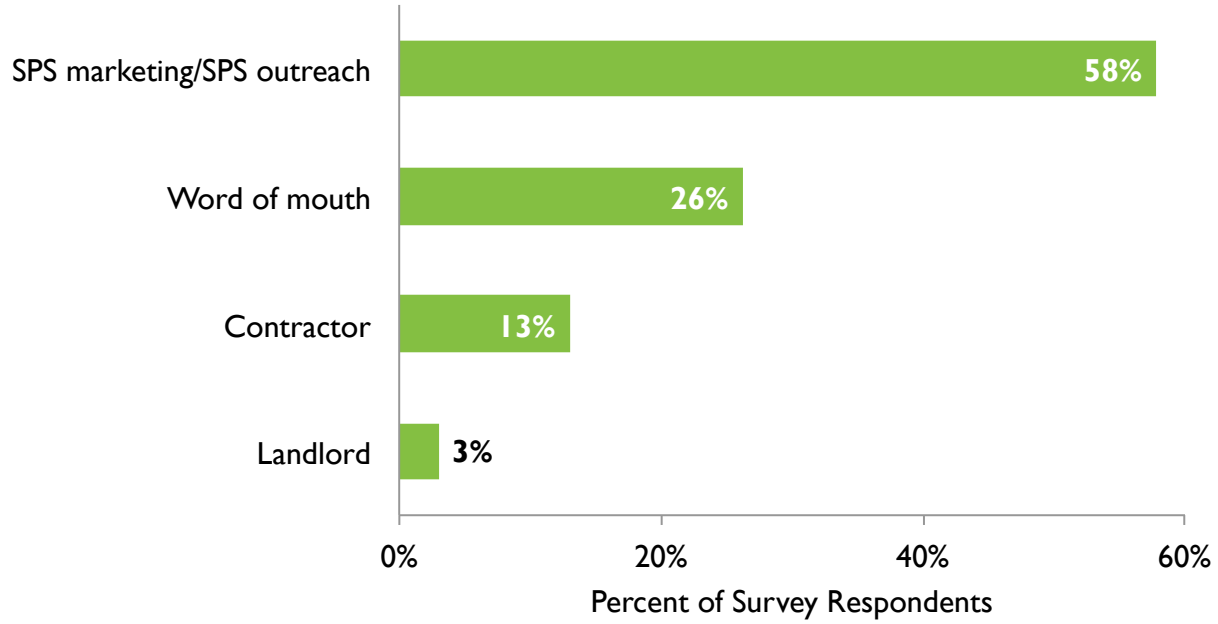
Figure 25: Home Energy Services Home Vintage (n=106)



5.3.2 Sources of Awareness

Participants became aware of the program assistance through a variety of channels, including SPS marketing/SPS outreach, word of mouth, contractors, and their landlords. As shown in Figure 26, just over half of survey respondents learned about the program offerings through interactions with SPS (either through direct contact or marketing). Word of mouth (26%) and contractors (13%) were also significant sources of awareness for survey respondents.

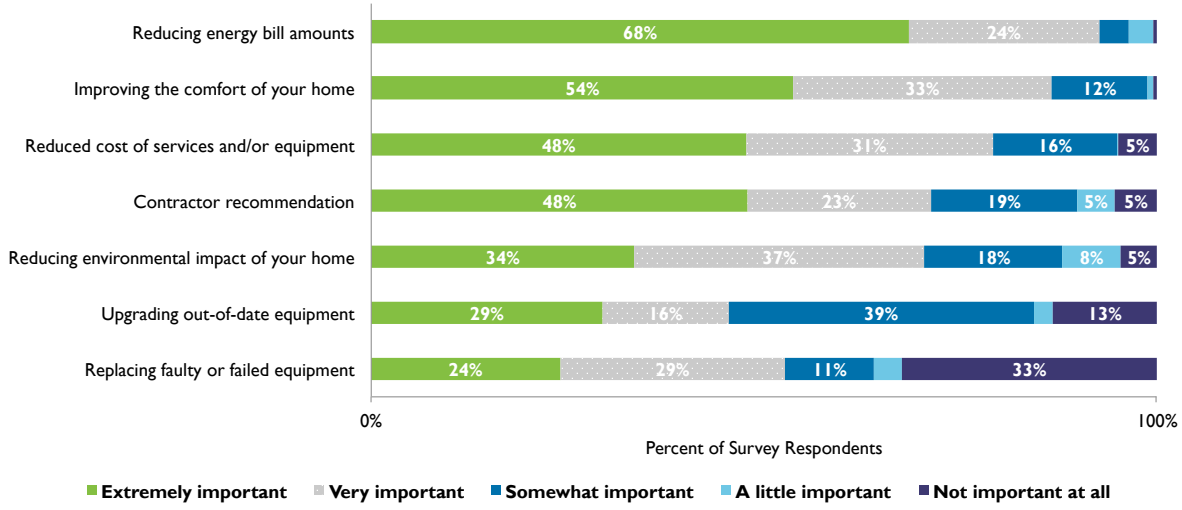
Figure 26: Home Energy Services Participants Source of Awareness (n=106)



5.3.3 Motivations for Participation

Respondents were asked to rate a variety of factors that might have been important in their decision to participate in the Home Energy Services program. Reducing energy bill amounts was the most important factor, with 68 percent of respondents reporting that it was extremely important in their decision to participate in the program (Figure 27). Improving comfort of the home was also important among survey respondents, with 54 percent reporting that it was "extremely important."

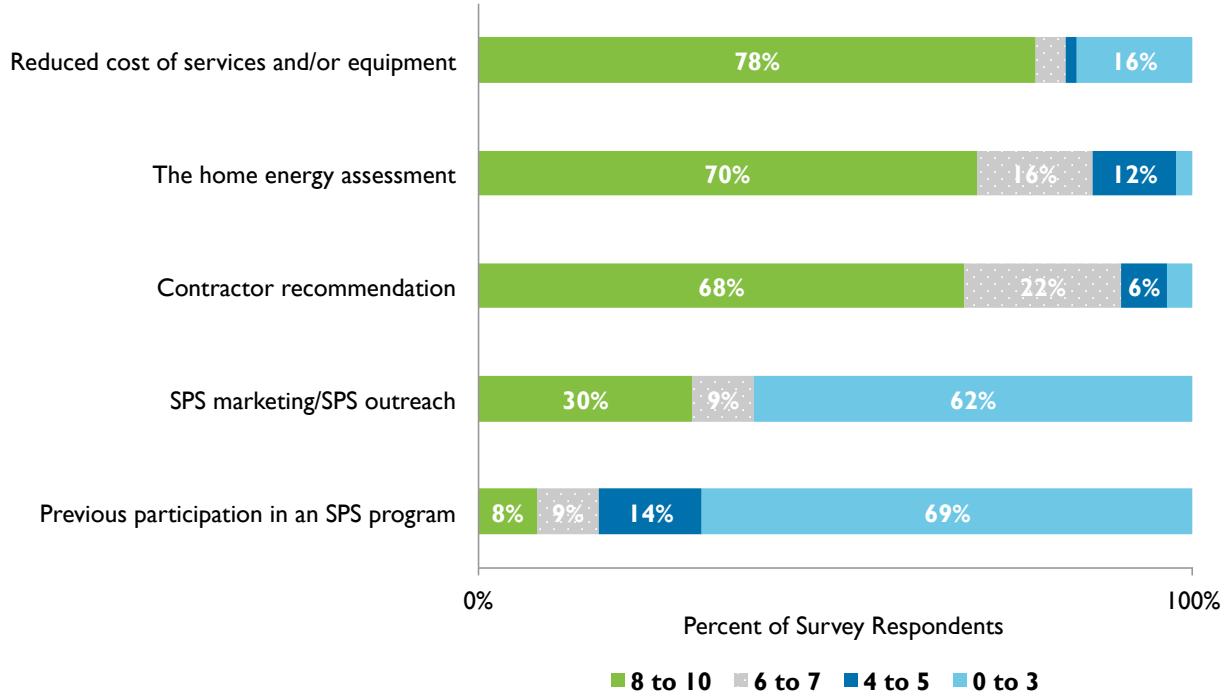
Figure 27: Home Energy Services Motivations for Participation (n=106)



In addition to motivations for participating, survey respondents were given a list of program factors that may have potentially influenced their decision to participate in the Home Energy Services program and were then asked to rate the influence of those factors on a 0 to 10 scale.[21] Figure 28 shows that receiving the reduced cost services and/or equipment was the most influential factor in the survey respondents' decision to participate in the program. Previous participation in an SPS program was the least influential factor in respondents' decisions to participate in the program, with 69 percent of respondents reporting it as not at all influential (ratings of 0 to 3).

[21] On the 0-to-10 point scale, 0 indicated 'not at all influential' and 10 indicated 'extremely influential'.

Figure 28: Home Energy Services Influence of Program Factors (n=37)



5.3.4 Participant Satisfaction

Survey respondents were also asked to evaluate their satisfaction with various components of the Home Energy Services program, and more broadly SPS as an energy provider, on the following scale: very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, and very dissatisfied. The individual components that participants were asked to rank their satisfaction with included:

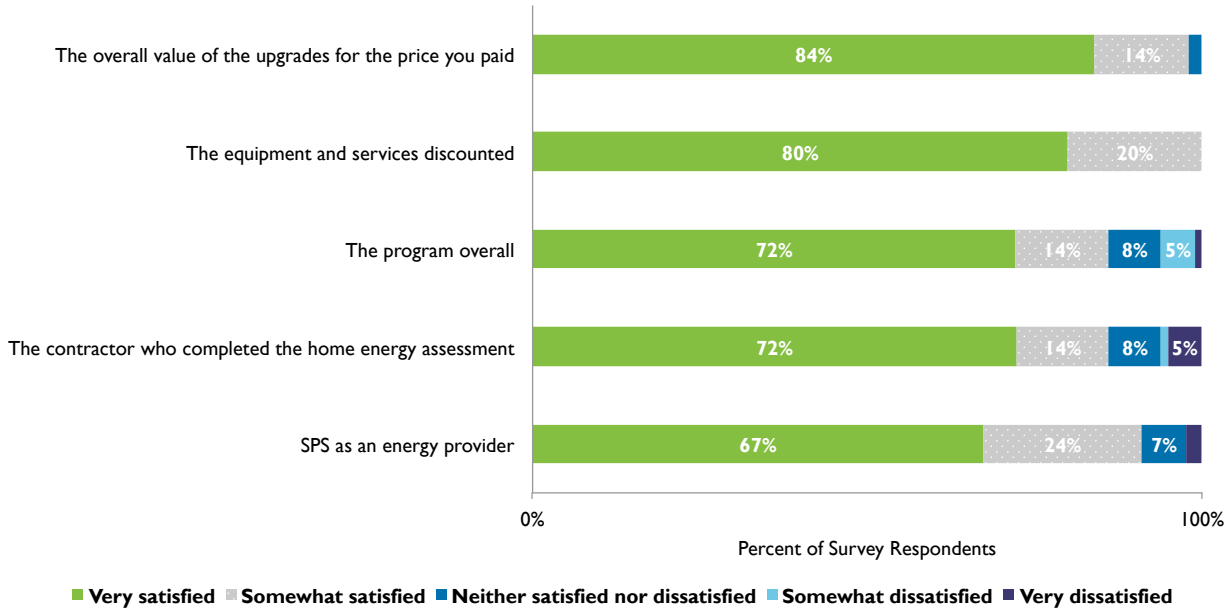
- SPS as an energy provider
- The Home Energy Services program overall
- The equipment and services discounted
- The contractor who completed the home energy assessment
- The overall value of the upgrades for the price they paid

Figure 29 summarizes the satisfaction levels of the Home Energy Services program participants.

Overall, surveyed program participants expressed high levels of satisfaction with the Home Energy Services program components. As shown in Figure 29, survey respondents expressed high levels of satisfaction across each individual program component, with the majority reporting being "very satisfied." A small percentage of respondents reported lower satisfaction ratings, primarily with the contractor who completed the home energy assessment and efficiency upgrades.

Some common themes among the justifications provided for the low satisfaction ratings with the contractor were that they were too quick, didn't explain things in detail, or had difficulty communicating. For those that gave higher satisfaction ratings regarding the contractor, some key words and phrases that appeared repeatedly were "polite," "professional," "quick," and "good job."

Figure 29: Home Energy Services Program Satisfaction (n=106)



5.4 Home Energy Services Contractor Interviews

The evaluation team completed interviews with five contractors who participated in the 2018 Home Energy Services program. These contractors had a range of experience with the program in terms of the number of projects they completed in 2018. The interviews focused on the following topics:

- Project context and background
- Role and influence of the SPS Home Energy Services program
- Satisfaction with their involvement with the program

All five contractors had completed more than 20 projects through the Home Energy Services program, including one contractor with more than 1,500 completed projects. Although the numbers of projects completed through the program varied by contractor, four of the five interviewees reported that the majority of their residential work is for the Home Energy Services program. Additionally, one interviewee reported that 100 percent of their company's projects are for the program. While contractors had varying levels of interaction with the Home Energy Services program directly, all five were familiar with the eligible projects and played a significant role in their business's participation in the program.

5.4.1 Program Influence

In an effort to gauge the level of influence the Home Energy Services program has on the contractors' overall business and business activities, the evaluation team asked interviewees a series of questions about how helpful various factors of the program are to their business.

Overall, all five contractors noted that the ability to offer reduced costs of services and equipment to customers helps increase customer satisfaction and provides customers with the ability to do more than they would have done if the discount was not available. Although the rebate is an important factor in motivating the upgrades, only two of the five contractors reported that their business has increased as a result of the program. Generally, interviewees stated that the program has not influenced what services or equipment they suggest to a customer, with three of the five contractors reporting that they have always promoted high efficiency services and equipment. As one contractor noted,

> *"I've been offering this level of [energy efficiency] work since I started my business 25 years ago; however, the reduced cost that I can offer as a result of the program has a large influence on what the customer ultimately chooses to go with."*

5.4.2 Program Satisfaction

Home Energy Services contractors were asked to quantify their level of satisfaction with the program using a 1 to 5 point scale, where 1 meant not at all satisfied and 5 meant very satisfied. Additionally, the evaluation team asked the contractors to try and gauge their customers' level of satisfaction on the same 1 to 5 point scale.

Overall, interviewees expressed high levels of satisfaction with the program, with four reporting a satisfaction rating of 5 (very satisfied) with the program overall. One

contractor reported a satisfaction rating of 4 (somewhat satisfied) with the program overall but added "I really enjoy the program and it works well, I would rate the program a 5 but I'm still waiting on my reimbursement from last year. Once I receive that check I would rate it a 5 overall." Additionally, all five contractors reported that their customers would rate the program a 5 overall, noting the additional money saved as the largest factor for customers' high satisfaction.

6 Conclusions and Recommendations

Based on the results from the data collection and analysis described in the previous chapters, the evaluation team has developed a number of conclusions and associated recommendations to improve SPS's programs. These are organized below by program.

6.1 Business Comprehensive Program

Impact evaluation activities for the Business Comprehensive program included engineering desk reviews for a sample of projects from each sub-program. A subset of sampled projects also received a site visit by an evaluation engineer. Based on these desk reviews and site visits, an overall engineering adjustment factor of 1.0857 was found for kWh savings and 0.9921 was found for kW savings. For individual projects with engineering adjustment factors that varied from 1, there were a number of reasons for those discrepancies:

- Specific *ex ante* calculation steps and adjustments for multiple prescriptive projects are only documented in the processing database, and were not documented in the files available for the evaluation team's review.
    - In the files that were available for the evaluation team's review, specific steps taken for individual projects between application submission and final reported savings were not always clearly documented, as adjustments were presumably made in SPS's processing database.
    - Using inputs from provided project documents and following algorithms from the SPS Technical Assumptions resulted in savings different (both higher and lower) than those reported by SPS for multiple projects.
    - Without additional documentation of any adjustments made by SPS in the processing database, the reasons for differences between reported and verified savings were not always clear to the evaluation team.
    - **Recommendation 1:** Provide documentation of calculation steps and adjustments made for each project, ensuring that submitted project documentation can be followed to reproduce the reported savings estimates.
- The evaluation team adjusted the savings for variable frequency drive (VFD) projects based on on-site verification findings.
    - Savings for VFD projects were calculated using deemed hours of use based on the motor horsepower (HP) and whether the motor is a fan, pump, air compressor motor, or other. For projects that received on-site verification, the evaluation team found that the deemed hours of use were conservative compared to the actual operation, with most of the inspected motors operating for significantly more hours than assumed.
    - For VFD projects, there is limited space on the application to provide specifications for the motors to which VFDs are being added. VFD HP,

model number, and quantity are collected. However, there are times where a larger drive is installed on a smaller HP motor. Energy savings depend mostly on the motor specifications rather than the VFD specifications.

  - **Recommendation 2:** Include a field in the application and calculations for VFDs to allow input of site-specific hours of use when available.
  - **Recommendation 3:** In addition to the documentation of the installed VFD, collect documentation on the motor the VFD will serve. We suggest collecting the motor equipment tag name/number (which helps to identify the motor while onsite and may help indicate potential weather dependency of motor operation), motor HP, and efficiency, which will allow for more site-specific data to be substituted for prescriptive values.

- The building type options in the SPS Technical Assumptions for lighting do not exactly match those listed in the New Mexico TRM. The New Mexico TRM lists more building type options than the SPS Technical Assumptions, and so offers the potential for more precise savings given a specific building type.
  - **Recommendation 4:** Expand the building type options and associated parameters in the SPS Technical Assumptions for lighting to provide more building-type-specific options. Reference the New Mexico TRM for additional building types.
- In addition to using baseline lighting wattages listed in the Xcel Input Wattage Guide, SPS has protocols for determining baseline fixture wattage assumptions for spaces that are initially over-lit, spaces that are initially under-lit, and fixture wattages not listed in the document. The SPS tracking data note when these approaches are utilized but do not list the baseline fixture wattage that was ultimately assumed. At the evaluation team's request, SPS provided the specific baseline wattages assumed for select lighting projects. However, the evaluation review would be expedited if the baseline wattage assumptions were included in the tracking data provided.
  - **Recommendation 5:** Record baseline fixture wattage assumptions in the program tracking data provided to the evaluation team to support the calculation of claimed savings.
- The evaluation team adjusted the hours of use assumed for exterior lighting projects.
  - One project assumed 8,760 exterior lighting hours. The evaluation team adjusted the hours of use to reflect New Mexico-specific dusk-to-dawn lighting hours, as these lights are not expected to operate at all hours of the year. This decreased the savings for this project.
  - The evaluation team created a new New Mexico-specific calculation of dusk-to-dawn lighting hours that is slightly higher (4,192 hours) than the 2016

New Mexico TRM value (4,100 hours). The evaluation team used the new value for exterior lighting projects, resulting in a slight increase in savings.

  - **Recommendation 6:** Starting in PY2019, use the New Mexico-specific value of 4,192 hours for exterior dusk-to-dawn light fixtures.

- For the projects included in the desk review sample which calculated savings using SPS''s custom lighting calculator tool, an HVAC interactive energy factor of (1/3) x 0.33 and an HVAC interactive demand factor of 0.33 were applied for all projects, regardless of building type. However, the interactive effects that lighting upgrades have on HVAC systems vary based on the building type. Therefore, different HVAC interactive factors should be applied to different building types. The evaluation team adjusted the savings calculations for these projects to use building type-specific HVAC interactive factors from the New Mexico TRM.
  - **Recommendation 7:** Apply building-type specific HVAC interactive factors to lighting projects.
- The kWh savings for one project that installed packaged air conditioning units were calculated based on the baseline and installed Energy Efficiency Ratio (EER) efficiency ratings. The evaluation team created new calculations based on the baseline and installed Integrated Energy Efficiency Ratio (IEER) efficiency ratings. As EER is a measure of full-load performance and IEER is a measure of part-load performance, calculations based on IEER should better reflect kWh consumption throughout a year. This adjustment resulted in higher estimated savings for this project.
  - **Recommendation 8:** Calculate kWh savings using part-load efficiency ratings, such as Seasonal Energy Efficiency Ratio (SEER) and IEER. Calculate kW savings using full-load efficiency ratings such as EER.
- One project installed a packaged air conditioner whose AHRI certificate shows an EER rating lower than the baseline EER value. It is not clear what proposed EER value SPS assumed, but SPS claimed positive kW savings for this project. The evaluation team created new calculations using the documented EER rating, resulting in negative kW savings for this project.
  - **Recommendation 9:** Only incentivize equipment that is more efficient than baseline assumptions.
  - **Recommendation 10:** Ensure that savings calculations are performed using the efficiency ratings shown in the project documentation.
- The SPS Technical Assumptions for chillers assume equivalent full-load hours (EFLH) and coincident factors (CF) equal to those assumed for packaged air conditioning systems. However, the evaluation team expects variations in operation, and thus in EFLH and CF, between chillers and packaged air conditioning systems. For one project in the sample that installed a chiller, the

evaluation team created new calculations using chiller-specific EFLH and CF values, increasing kWh savings and decreasing kW savings.

  - **Recommendation 11:** Use EFLH and CF values specific to chillers when calculating savings for chiller installations.

- The evaluation team published an updated version of the New Mexico TRM that is effective for PY2019 and will be referenced in the evaluation of PY2019.
  - **Recommendation 12:** Update the Technical Assumptions as needed based on the updated version of the New Mexico TRM.

6.2 Energy Feedback Program

Using a fixed effects billing regression analysis that included both participant and control groups, the evaluation team estimated net kWh savings of 4,161,260 and net kW savings of 1,075 for the Energy Feedback program. These savings included participants for all three waves that received home energy reports in PY2018.

For the online My Energy component of this program, the evaluation team identified two potentially problematic issues with participation:

1. For recipient households that both receive the Home Energy Reports and have My Energy online access, it will not be possible to separate savings attributable to each program, introducing the potential for double counting savings in the future.
2. Some households that participate in the My Energy program are control homes in the Home Energy Report program. The impact of the My Energy program on energy consumption may make them inappropriate to use in the Home Energy Report program as a control home.

Recommendation 13: Carefully track the overlap of Energy Feedback print report participants and controls and My Energy online participants and controls, to minimize the possibility of double counting savings and to ensure all control group customers are valid comparison households.

6.3 Home Energy Services Program

Desk reviews of a sample of the Home Energy Services projects yielded an upward adjustment in kWh savings with an engineering adjustment factor of 1.1425 for kWh savings and a slight downward adjustment for kW savings with an engineering adjustment factor of 0.9176. An overall net-to-gross (NTG) ratio of 0.9708 for the program was applied to realized gross savings, which yielded total net savings for the program of 12,782,862 kWh and 1,148 kW. The specific conclusions and recommendations below follow from the findings of the engineering desk reviews:

- Specific *ex ante* calculation steps were only documented in the processing database, and not documented in the files available for the evaluation team's review.
    - In the files that were available for the evaluation team's review, specific steps taken for individual projects between application submission and final reported savings were not always clearly documented, as project-specific inputs were presumably made in SPS's processing database.
    - Using inputs from provided project documents and following algorithms from the SPS Technical Assumptions resulted in savings different (both higher and lower) than those reported by SPS for multiple projects.
    - Without additional documentation of any adjustments made by SPS in the processing database, the reasons for differences between reported and verified savings were not always clear to the evaluation team.
    - The measures for which the evaluation team was the least clear on calculation differences were duct efficiency improvements and air infiltration reduction.
    - **Recommendation 14:** Provide documentation of calculation steps and adjustments made for each project, ensuring that submitted project documentation can be followed to reproduce the reported savings estimates.
- The savings claimed by SPS for programmable thermostats, central air conditioners, and heat pumps do not match those shown in the SPS Technical Assumptions. SPS informed the evaluation team that the algorithms being used by the program implementer to calculate savings for these measures did not match the Technical Assumptions and that SPS had directed the implementer to update their approaches to be consistent with the Technical Assumptions. The evaluation team calculated verified savings for these measures based on the SPS Technical Assumptions, resulting in lower savings than what had been claimed.
    - **Recommendation 15:** Update all programmed savings/algorithms as needed to ensure consistency between the program database and the SPS Technical Assumptions.
- SPS performed savings calculations for ceiling insulation based on the 2016 New Mexico TRM. The evaluation team created new savings calculations that take the project-specific pre-retrofit and post-retrofit insulation levels into account, resulting in higher savings for these projects.
    - **Recommendation 16:** Update the savings assumptions/approach for ceiling insulation to apply to the project-specific insulation levels that are commonly achieved.
- The documentation provided by SPS shows the number of LED lights installed and the installation locations, but the wattage of the pre- and post-retrofit bulbs were not provided. At the evaluation team's request, SPS clarified that the baseline is

assumed to be a Tier I, 60-watt equivalent with a deemed baseline of 43 watts. The measure calculation document provided by SPS suggests that the proposed LED bulb wattage is 10 watts.

  - **Recommendation 17:** Provide clear documentation of the baseline and proposed bulb wattage assumptions used to calculate savings.

- The program tracking data shows that LED installations have claimed savings values of either 34 kWh or 68 kWh. However, the project documentation shows more than two different combinations of bulb quantities and locations. The evaluation team calculated LED savings based on the bulb quantities and locations shown in the provided project documents.
  - **Recommendation 18:** Calculate LED savings for each project based on the project's specific bulb quantities and locations.
- The proposed flowrates for low-flow showerheads were not listed in the documentation provided to the evaluation team. SPS informed the evaluation team that a 1.5 gallon-per-minute (GPM) showerhead is standard for this program. The evaluation calculated savings based on a proposed 1.5 GPM flowrate, matching SPS's claimed savings for this measure.
  - **Recommendation 19:** Provide clear documentation of the proposed flowrate/showerhead model used to calculate savings for this measure.
- The evaluation team modified savings calculations based on site-specific HVAC equipment information shown in the provided documents.
  - For one project in the sample that claimed savings for improved duct efficiency, SPS performed savings calculations using an assumed cooling system efficiency based on the age of the home. However, the field notes listed the model number of the air conditioning unit, and the evaluation team found that the unit listed had a rated efficiency higher than what was assumed. The evaluation team used this installed cooling efficiency to calculate savings, and as the efficiency was higher than originally assumed, the improved duct efficiency yielded lower estimated savings.
  - For one project in the sample that claimed savings for improved duct efficiency and reduced air infiltration, SPS performed savings calculations assuming electric resistance heat. However, the field notes listed the model number of the HVAC equipment installed, and the evaluation team found that the model number listed was for a heat pump unit. The evaluation team created new savings calculations based on heat pump heating, and as heat pump heating is more efficient than electric resistance heating, the improved duct efficiency and reduced air infiltration yielded lower estimated savings.
  - **Recommendation 20:** When actual installed HVAC equipment model numbers are accessible, use the efficiency ratings of the installed units instead of general assumptions in the associated savings calculations.

- **Recommendation 21:** Ensure that the system types assumed in the savings calculations reflect the documented system types installed at project sites.

- The evaluation team published an updated version of the New Mexico TRM that is effective for PY2019 and will be referenced in the evaluation of PY2019.
  - **Recommendation 22:** Update the Technical Assumptions as needed based on the updated version of the New Mexico TRM.

6.4 Saver's Switch Program

The impact evaluation for the Saver's Switch program included a field operability assessment and regression analysis to estimate the demand reduction associated with events called in the PY2018 season. Based on this analysis, the demand reduction for the Saver's Switch program was found to be 658 kW. Analysis to estimate energy savings associated with the Saver's Switch program did not yield any statistically significant kWh savings.

In conducting the analysis to determine impacts for the Saver's Switch program, the evaluation team identified three key findings that limit program impacts for Saver's Switch. These findings and an assessment of how and to what extent each finding could be addressed are described below:

1. **The "adaptive" dispatch approach** used during events appears to function similarly to a 50 percent cycling strategy. In practice, this may be limiting impacts on cooler days when AC units typically do not run for more than 30 minutes per hour.
   a. **Definitely possible to address:** Reductions are greatest in the first hour on hot days (when AC units run more often) and can be maximized by only calling events under these conditions. A more aggressive 66 percent or 100 percent cycling strategy should yield higher results.
2. **Communication issues** were observed among operable switches to which loggers were deployed in the field. Widespread communication issues for all switches occurred on July 20 and August 6, 2018; on average, 42 percent of switches were effectively receiving control signals during events.
   a. **May be possible to address:** Switch activity rates may be a result of radio signal coverage or strength. A communication rate strategy could be developed by investigating the signals coming off pager towers to make sure the communication infrastructure is all working as intended and the radio signals are at least going out with adequate coverage.
3. **A 60 percent operability rate** was observed for sampled switches during the field study.
   a. **Likely cost-prohibitive to address:** Without advanced metering infrastructure (AMI), it is not possible to detect which program homes likely

have inoperable switches. Rolling trucks to check and reconnect switches is likely cost-prohibitive.

6.5 Cost Effectiveness

Cost effectiveness was calculated using the Utility Cost Test (UCT) for each individual program, as well as for the entire portfolio of SPS programs. The evaluation team found the following during its analysis:

- SPS does not use the Total Resource Cost (TRC) test, and instead relies solely on the UCT to determine program and portfolio cost effectiveness.
- A 20 percent benefit adder is included in the UCT calculation for low-income projects to account for utility system economic benefits.
- The UCT revealed that all programs except Residential Cooling and Saver's Switch were cost effective (i.e., had a UCT ratio of greater than 1.00), and the SPS portfolio overall had a UCT ratio of 2.32.

Recommendation 23: If there is a desire or need to calculate cost effectiveness using the TRC test by either SPS or the New Mexico Public Regulation Commission (NMPRC), SPS should track measure costs for all programs so that the TRC test can be used in future program years.

Evaluation of the 2018 Southwestern Public Service Company's Energy Efficiency and Demand Response Programs

Final Report - Appendices

April 19, 2019

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Appendix A – Business Comprehensive Participant Survey Instrument

Hello, my name is (*YOUR NAME*) from Research & Polling, Inc. I am calling on behalf of SPS. May I please speak with _____?

A. (Once correct respondent is reached) Hello, my name is (*YOUR NAME*) from Research & Polling, Inc. I am calling on behalf of SPS.

I'm calling because our records show that you recently completed an energy efficiency project where you installed [MEASURE_1] at your business located at [SITE_ADDRESS] and received a rebate through the SPS [REBATE PROGRAM] program. I'd like to ask a short set of questions about your experience with the [REBATE PROGRAM] program. Your time will help us improve this program for other customers like you. Are you the best person to talk to about the/these energy efficiency upgrade(s) and energy use at your firm?

1. Yes
2. No (Ask, Who would be the best person to talk to about the [MEASURE(S)] installed and energy use at your business? (REPEAT INTRO WHEN CORRECT PERSON COMES ON LINE; ARRANGE CALLBACK IF NECESSARY)
3. Never installed *(VOLUNTEERED SKIP TO Q.5)*

(IF NEEDED) SPS would like to better understand how businesses like yours think about and manage their energy use. The [REBATE_PROGRAM] program is designed to help firms with energy saving efforts. Your input is very important to help SPS improve its energy rebate programs.

SECTION A [MEASURE _1]

1. (A 1) Our records show in 2017 your business got a rebate through SPS for installing [MEASURE_1]. Are you familiar with this project?

1. Yes
2. No *(SKIP TO Q.2)*
3. Never installed *(VOLUNTEERED) (SKIP TO Q.5)*
4. Don't know *(SKIP TO Q.2)*

1a. Our records show it was installed at [SITE_ADDRESS] in [SITE_CITY]. Is that correct?

1. Yes *(SKIP TO Q. 3)*
2. No *(GO TO Q. 1b)*
3. Never installed *(VOLUNTEERED) (SKIP TO Q.5)*
4. Don't know *(SKIP TO Q.2)*

1b. Where was [MEASURE_1] installed? *(RECORD LOCATION)*

_____*(SKIP TO Q. 3)*

99. Never installed *(SKIP TO Q. 5)*

2. (A 1a) Is there someone else in your company who would know about buying the [MEASURE_1]?

1. Yes (Ask to be transferred to better contact and go back to intro)
2. Yes (Unable to be transferred, record contact's and number to call back)
3. No **(THANK AND TERMINATE)**
4. Don't know **(THANK AND TERMINATE)**

3. (A 2) Thinking about the [MEASURE_1] for which you received a rebate, is the [MEASURE_1] still installed in your facility?

1. Yes *(SKIP TO Q. 6)*
2. No *(CONTINUE TO Q. 4a)*
3. Prefer not to answer *(SKIP TO Q. 6)*
4. Don't know *(SKIP TO Q. 6)*

4a. (A 3) Was the [MEASURE_1] removed?

01. Yes, it was removed *(SKIP TO Q.5)*
02 No *(CONTINUE TO Q.4b)*
03. Prefer not to answer *(DO NOT READ) (SKIP TO Q.7)*
99. Don't know *(DO NOT READ) (SKIP TO Q.7)*

Other *(SPECIFY)* _____

4b. (A 3) Was the [MEASURE_1] never installed?

01. Yes, never installed
02. Prefer not to answer *(DO NOT READ) (SKIP TO Q.7)*
99. Don't know *(DO NOT READ) (SKIP TO Q.7)*

Other *(SPECIFY)* _____

5. (A3a) Why was the [MEASURE_1] removed/never installed? *(OPEN VERBATIM)*

_____

_____

_____

(SKIP TO SECTION A [MEASURE_2]

6. (A 4) Is the [MEASURE_1] still functioning as intended?

1. Yes
2. No

3. Prefer not to answer *(DO NOT READ)*

4. Don't know *(DO NOT READ)*

7. (A 5) Did your firm use a contractor to install the [MEASURE_1] or did internal staff do the work?

01. Contractor *(SKIP TO SECTION A [MEASURE_2])*

02. Internal Staff

03. Prefer not to answer *(SKIP TO SECTION A [MEASURE_2])*

99. Don't know *(SKIP TO SECTION A [MEASURE_2])*

Other *(SPECIFY)*_____
(SKIP TO SECTION A [MEASURE_2])

8. (A 6) Why did your firm choose to use internal staff instead of a contractor?

_____

_____

_____

98. Prefer not to answer

99. Don't know

SECTION A [MEASURE_2]

1. (A 1) Our records also show in 2017 your business got a rebate through SPS for installing a (MEASURE_2]. Do you remember this?

1. Yes

2. No *(SKIP TO INTRO BEFORE Q. 10)*

3. Never installed *(VOLUNTEERED) (SKIP TO Q.5)*

4. Don't know *(SKIP TO INTRO BEFORE Q. 10)*

1a. Our records show it was installed at [SITE_ADDRESS] in [SITE_CITY]. Is that correct?

1. Yes *(SKIP TO Q. 3)*

2. No *(GO TO Q. 1b)*

3. Never installed *(VOLUNTEERED) (SKIP TO Q.5)*

4. Don't know *(SKIP TO INTRO BEFORE Q. 10)*

1b. Where was [MEASURE_2] installed? *(RECORD LOCATION)*

_____*(SKIP TO Q. 3)*

99. Never installed *(SKIP TO Q. 5)*

3. (A 2) Thinking about the [MEASURE_2] for which you received a rebate, is the [MEASURE_2] still installed in your facility?

1. Yes *(SKIP TO Q. 6)*
2. No *(CONTINUE TO Q. 4a)*
3. Prefer not to answer *(SKIP TO Q. 6)*
4. Don't know *(SKIP TO Q. 6)*

4a. (A 3) Was the [MEASURE_2] removed?

01. Yes, it was removed *(SKIP TO Q.5)*
02 No *(CONTINUE TO Q.4b)*
03. Prefer not to answer *(DO NOT READ) (SKIP TO Q.7)*
99. Don't know *(DO NOT READ) (SKIP TO Q.7)*

Other *(SPECIFY)* _____

4b. (A 3) Was the [MEASURE_2] never installed?

01. Yes, never installed
02. Prefer not to answer *(DO NOT READ) (SKIP TO Q.7)*
99. Don't know *(DO NOT READ) (SKIP TO Q.7)*

Other *(SPECIFY)* _____

5. (A3a) Why was the [MEASURE_2] removed/never installed? *(OPEN VERBATIM)*

_____

_____

_____

(SKIP TO INTRO TO Q. 10)

6. (A 4) Is the [MEASURE_2] still functioning as intended?

1. Yes
2. No
3. Prefer not to answer *(DO NOT READ)*
4. Don't know *(DO NOT READ)*

7. (A 5) Did your firm use a contractor to install the [MEASURE_2] or did internal staff do the work?

01. Contractor *(SKIP TO Q. 9)*
02. Internal Staff
03. Prefer not to answer *(SKIP TO Q. 9)*
99. Don't know *(SKIP TO Q. 9)*

Other *(SPECIFY)*_____*(SKIP TO Q. 9)*

8. (A 6) Why did your firm choose to use internal staff instead of a contractor?

_____

_____

_____

98. Prefer not to answer
99. Don't know

9. (A 7) Was your [MEASURE_1] AND [MEASURE_2], installed/purchased together as a single project or were these done separately?

1. Together as one project
2 Separately
3. Prefer not to answer *(DO NOT READ)*
4. Don't know *(DO NOT READ)*

SECTION B

Now I have some questions about how your company became aware of the SPS rebate program.

10. (B 1) How did your company FIRST learn about the program?
(DO NOT READ CATEGORIES) (TAKE ONE RESPONSE)

01. Word of mouth (business associate, co-worker)
02. Utility program staff
03. Utility website
04. Utility bill insert
05. Utility representative
06. Utility advertising
07. Email from utility
08. Contractor/distributor
09. Building audit or assessment

10. Television Advertisement – Mass Media
11. Other mass media (sign, billboard, newspaper/magazine ad)
12. Event (conference, seminar workshop)
13. Online search, web links
14. Participated or received rebate before
98. No way in particular
99. Don't know

Other *(SPECIFY)* _____

11. (B 2) What other sources did your company use to gather information about the program….Were there any others? *(DO NOT READ CATEGORIES) (TAKE UP TO THREE RESPONSES)*

01. Word of mouth (business associate, co-worker)
02. Utility program staff
03. Utility website
04. Utility bill insert
05. Utility representative
06. Utility advertising
07. Email from utility
08. Contractor/distributor
09. Building audit or assessment
10. Television Advertisement – Mass Media
11. Other mass media (sign, billboard, newspaper/magazine ad)
12. Event (conference, seminar, workshop)
13. Online search, web links
14. Participated or received rebate before

98. None *(SKIP TO POLLER NOTE BEFORE Q. 13a)*
99. Don't know *(SKIP TO POLLER NOTE BEFORE Q. 13a)*

Other *(SPECIFY)* _____

12. (B 3) Of all the sources you mentioned, which did you find most useful in helping you decide to participate in the program?

_____

_____

_____

97. None in particular
98. Prefer not to answer
99. Don't know

SECTION C

POLLER NOTE:

If Respondent's answer to Q. 9 was:
Together as one project, prefer not to answer, or don't know **then READ:**

"For the remainder of this survey we will refer to your equipment upgrades collectively as a single project.

If Respondent's answer Q. 9 was:
Separately**, READ:**

"For the remainder of this survey we will refer only to the project where you installed [MEASURE_1]

POLLER NOTE: WAS MEASURE INSTALLED?

1. **Yes (GO TO Q. 13a)**
2. **No (GO TO Q. 13b)**

13a. (C 1) Did the equipment that your firm installed replace existing equipment?

1. Yes (i.e. all equipment was replacing old equipment) *(SKIP TO Q. 14a)*
2. Some equipment was a replacement and some was a new addition *(SKIP TO Q. 14a)*
3. No (i.e. all equipment was an addition to existing equipment*) (SKIP TO INTRO TO Q. 17)*
4. Prefer not to answer *(SKIP TO INTRO TO Q. 17)*
5. Don't know *(SKIP TO INTRO TO Q. 17)*

13b. (C 1) Is the equipment that your firm purchased intended to replace existing equipment?

1. Yes (i.e. all equipment is replacing old equipment) *(SKIP TO Q. 14b)*
2. Some equipment is a replacement and some was a new addition *(SKIP TO Q. 14b)*
3. No (i.e. all equipment is an addition to existing equipment) *(SKIP TO INTRO TO Q. 17)*
4. Prefer not to answer *(SKIP TO INTRO TO Q. 17)*
5. Don't know *(SKIP TO INTRO TO Q. 17)*

14a. (C 2) Was the replaced equipment…*(READ CATEGORIES)*

1. Fully functional and not in need of repair? *(SKIP TO Q. 15a)*
2. Functional, but needed minor repairs? *(SKIP TO Q. 15a)*
3. Functional, but needed major repairs? *(SKIP TO Q. 15a)*
4. Not functional? *(SKIP TO INTRO TO Q. 17)*
5. Prefer not to answer *(DO NOT READ) (SKIP TO INTRO TO Q. 17)*
6. Don't know *(DO NOT READ) (SKIP TO INTRO TO Q. 17)*

14b. (C 2) Is the equipment you intend to replace*…(READ CATEGORIES)*

1. Fully functional and not in need of repair? *(SKIP TO Q. 15b)*
2. Functional, but needed minor repairs? *(SKIP TO Q. 15b)*
3. Functional, but needed major repairs? *(SKIP TO Q. 15b)*
4. Not functional? *(SKIP TO INTRO TO Q. 17)*
5. Prefer not to answer *(DO NOT READ) (SKIP TO INTRO TO Q. 17)*
6. Don't know *(DO NOT READ) (SKIP TO INTRO TO Q. 17)*

15a. (C 3) About how old, in years, was the equipment prior to replacement? (Probe if necessary: Best guess is fine.)

____ _____ _____ (Record Years)

499. Prefer not to answer

500. Don't know

ALL ANSWERS TO 15a GO TO Q. 16

15b. (C 3) About how old, in years, is the equipment you are replacing? (Probe if necessary: Best guess is fine.)

_____ _____ _____ (Record Years)

499. Prefer not to answer

500. Don't know

ALL ANSWERS TO 15b. GO TO Q.16

16. (C 4) How much longer (in years) do you think your old equipment would have lasted if you had not replaced it? (Probe if necessary: Best guess is fine.)

1. Less than a year
2. 1 – 2 years
3. 3 – 5 years
4. 6 – 10 years
5. More than 10 years
6. Prefer not to answer
7. Don't know

(C 5a-g) Next I will read a list of reasons your firm may have considered when you decided to conduct your project. For each one, please tell me if it was *not at all important, a little important, somewhat important, very important or extremely important*.

How important was… on your decision to conduct your project?

(RANDOMIZE)	*Extremely Important*	*Very Important*	*Somewhat Important*	*A little Important*	*Not important At All*	*Don't Know/ Won't Say*
17. (C5a) Reducing environmental impact of the business	**5**	**4**	**3**	**2**	**1**	**6**
18. (C5b) Upgrading out-of-date equipment	**5**	**4**	**3**	**2**	**1**	**6**
19. (C5c) Improving comfort at the business	**5**	**4**	**3**	**2**	**1**	**6**

POLLER NOTE: Was HVAC Measure installed?

1. **Yes (CONTINUE TO Q. 20)**
2. **No (SKIP to Q. 21)**

20. (C5d) Improving air quality	**5**	**4**	**3**	**2**	**1**	**6**
21. (C5e) Receiving the rebate	**5**	**4**	**3**	**2**	**1**	**6**

(Q21 NOT ASKED IF DIRECT INSTALL)

22. (C5f) Reducing energy bill amounts	**5**	**4**	**3**	**2**	**1**	**6**

POLLER NOTE: Did respondent answer Contractor in Q.7?

1. **Yes (CONTINUE TO Q. 23)**
2. **No (SKIP TO INTRO Q. 24)**

23. (C5g) The contractor recommendation	**5**	**4**	**3**	**2**	**1**	**6**

SECTION D (INTRO TO Q.24)

Next, I'm going to ask a few questions about your decision to participate in the program, and choose equipment that was energy efficient

(D 1A-N). I'm going to ask you to rate the importance of each of the following factors on your decision to determine how energy efficient your project would be. Please rate the importance of each of these factors in determining your project's energy efficiency level using a scale from 0 to 10, where 0 means *not at all important* and 10 means *extremely important.* Please let me know if the factor is not applicable.

First I would like to read you some factors related to the rebate program itself.

POLLER NOTE: Did respondent answer Contractor in Q.7?

1. **Yes (CONTINUE TO Q. 24)**
2. **No (CIRCLE [12 N/A] ON Q. 24 AND SKIP TO Q. 25)**

How important was (read below)…in determining how energy efficient your project would be?

(RANDOMIZE) N/A	*Extremely Important*										*Not at all Important*	*DK/ WS*	
Program Factors													
24. (D1A) The contractor who performed the work	10	09	08	07	06	05	04	03	02	01	00	11	12
25. (D1B) The dollar amount of the rebate	10	09	08	07	06	05	04	03	02	01	00	11	12
26. (D1C) Technical assistance or project economic analysis (e.g. rate of return or payback analysis) received from SPS staff	10	09	08	07	06	05	04	03	02	01	00	11	12
27. (D1D) Endorsement or recommendation by your SPS account manager or other SPS staff	10	09	08	07	06	05	04	03	02	01	00	11	12
28. (D1E) Information from SPS marketing or informational materials	10	09	08	07	06	05	04	03	02	01	00	11	12
29. (D1F) Previous participation in a SPS program	10	09	08	07	06	05	04	03	02	01	00	11	12
30. (D1G) Endorsement or recommendation by a contractor	10	09	08	07	06	05	04	03	02	01	00	11	12
31. (D1H) Endorsement or recommendation by a vendor or distributor	10	09	08	07	06	05	04	03	02	01	00	11	12
32. (D1I) Endorsement or recommendation by CLEAR Result, the program implementer	10	09	08	07	06	05	04	03	02	01	00	11	12

Now, I would like to read you some factors that are not related to the rebate program. Using the same scale from 0 to 10, where 0 means *not at all important* and 10 means *extremely important,* please rate the following non program factors importance in determining your project's energy efficiency.

How important was (read below)…..in determining your project's energy efficiency?

(RANDOMIZE)	*Extremely Important*										*Not at all Important*	*DK/ WS*	*N/A*
Non-program Factors													
33. (D1J) The age or condition of the old equipment	10	09	08	07	06	05	04	03	02	01	00	11	12
34. (D1K) Corporate policy or guidelines	10	09	08	07	06	05	04	03	02	01	00	11	12
35. (D1L) Minimizing operating cost	10	09	08	07	06	05	04	03	02	01	00	11	12
36. (D1M) Scheduled time for routine maintenance	10	09	08	07	06	05	04	03	02	01	00	11	12

37. (D2) Of the items I just asked you about, think of the program factors as relating to assistance provided by the utility, such as the rebate, marketing from SPS, recommendation by a contractor and technical assistance from SPS. I also asked you about some non-program factors, which included the age and condition of the old equipment, company policy, operating costs and routine maintenance.

If you had to divide 100% of the influence on your decision to determine how energy efficient your new equipment would be between the SPS program and non-program factors, what percent would you give to the importance of the program factors? [IF NEEDED: Again, these are things like the rebate, marketing from SPS, recommendation by a contractor and technical assistance from SPS]

____ ____ _____ % = Program Factors

499. Prefer not to answer *(SKIP TO Q.39)*

500. Don't know *(SKIP TO Q. 39)*

38. D3. And what percent would you give to the importance of the non-program factors? (IF NEEDED: These include things like the age and condition of the old equipment, company policy, operating costs and routine maintenance.)

_____ _____ _____ %= Non Program Factors

499. Prefer not to answer *(SKIP TO Q.39)*

500. Don't know *(SKIP TO Q.39)*

POLLER NOTE: ENSURE ANSWERS TO Q. 37 AND Q. 38 EQUAL 100%

39. (D 5) Did you first learn about the [REBATE_PROGRAM] program BEFORE or AFTER you decided how energy efficient your equipment would be?

1. Before

2. After

3 Prefer not to answer

4. Don't know

40. (D6) Using a scale from 0 to 10, where 0 means *not at all likely* and 10 means *extremely likely*, please rate the likelihood that you would have installed the same equipment with the exact same level of energy efficiency if the [REBATE_PROGRAM] program was not available.

Extremely Likely											*Not at all Likely*	*DK/ WS*
10	09	08	07	06	05	04	03	02	01	00		11
GO TO Q. 41			**SKIP TO Q. 43**					**GO TO Q. 42**				**SKIP TO Q. 43**

POLLER NOTE: IF ANSWER TO Q. 40 IS 8 OR HIGHER AND ANY RESPONSE TO Q. 24-Q.32 IS 8 OR HIGHER, THEN GO TO Q. 41. IF ANSWER TO Q. 40 IS 2 OR LESS AND ANY RESPONSE TO Q.24-Q.32 IS 2 OR LESS THEN GO TO Q. 42.

41. (D7) You just rated your likelihood to install the same equipment without any assistance from the program as a(n) [RATE RESPONSE FROM Q. 40] out of 10. Earlier, when I asked you to rate the importance of each program factor on your decision, the highest rating you gave was a [HIGHEST RATING FROM Q.24-Q.32] out of 10 for the importance of [RE-READ WORDING FOR HIGHEST RESPONSES Q.24-Q.32, PAGE 10].

Can you briefly explain why you were likely to install the equipment without the program but also rated the program factors as highly influential in your decision?
(RECORD VERBATIM)

_____

_____

_____

_____

(SKIP TO Q. 43)

42. (D8) You just rated your likelihood to install the same equipment without any assistance from the program as a(n) [RATE RESPONSE FROM Q. 40] out of 10. Earlier, when I asked you to rate the importance of each program factor on your decision, the highest rating you gave was a [LOWEST RATING FROM Q.24-Q.32, Page 10] out of 10.

Can you briefly explain why you said you were not likely to install the equipment without help from the program, yet did not rate the program as highly influential in your decision? *(RECORD VERBATIM)*

43. (D 9) If the [REBATE_PROGRAM] program was not available, would you have delayed starting the project to a later date?

1. Yes
2. No *(SKIP TO INTRO TO Q. 46)*
3. Would not have done the project at all *(SKIP TO INTRO TO Q. 46)*
4. Prefer not to answer *(SKIP TO INTRO TO Q. 46)*
5. Don't know *(SKIP TO INTRO TO Q. 46)*

44. (D10) Approximately how much later would you have done the project if the [REBATE_PROGRAM] program was not available? Would it have been…
(READ CATEGORIES)

1. Within one year
2. Between 12 months and less than 2 years *(SKIP TO INTRO TO Q. 46)*
3. Between 2 years and 3 years *(SKIP TO INTRO TO Q. 46)*
4. Greater than 3 years *(SKIP TO INTRO TO Q. 46)*
5 Or would you not have installed the equipment at all *(SKIP TO INTRO TO Q. 46)*
6. Prefer not to answer *(SKIP TO INTRO TO Q. 46)*
7. Don't know *(SKIP TO INTRO TO Q. 46)*

45. (D11) Using a scale from 0 to 10, where 0 means *not at all likely* and 10 means *extremely likely*, please rate the likelihood that you would have conducted this project within 12 months of when you actually completed this project if the [REBATE_PROGRAM] program was not available.

Extremely Likely *Not at all Likely* *DK/ WS*

10 ..... 09..... 08.....07 ..... 06 ..... 05 ..... 04 .....03 .....02 ..... 01 .....00 11

46. (D 12) Can you briefly describe in your own words whether the availability of the rebate influenced the timing and/or scope of your project?

SECTION E

Now I have some questions about your satisfaction with various aspects of SPS and the [REBATE_PROGRAM] program.

(E 1A-K). For each of the following, please tell me if you were *very dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied or very satisfied*.

47. (E1A) SPS as an energy provider

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q. 49)*
5. Very Satisfied *(SKIP TO Q. 49)*
6. Not applicable *(SKIP TO Q. 49)*
7. Prefer not to answer *(SKIP TO Q. 49)*
8. Don't know *(SKIP TO Q. 49)*

48. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

49. (E1B) The rebate program overall

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.51)*
5. Very Satisfied *(SKIP TO Q.51)*
6. Not applicable *(SKIP TO Q.51)*
7. Prefer not to answer *(SKIP TO Q.51)*
8. Don't know *(SKIP TO Q.51)*

50. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

51. (E1C) The equipment installed through the program

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.53)*
5. Very Satisfied *(SKIP TO Q.53)*
6. Not applicable *(SKIP TO Q.53)*
7. Prefer not to answer *(SKIP TO Q.53)*
8. Don't know *(SKIP TO Q. 53)*

52. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

POLLER NOTE: WAS INSTALLATION DONE BY A CONTRACTOR (Q.7)?

1. **Yes (CONTINUE TO Q. 53)**
2. **No (SKIP TO Q. 57)**

53. (E1D) The contractor who installed the equipment

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.55)*
5. Very Satisfied *(SKIP TO Q.55)*
6. Not applicable *(SKIP TO Q.55)*
7. Prefer not to answer *(SKIP TO Q.55)*
8. Don't know *(SKIP TO Q.55)*

54. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

55. (E1E) The overall quality of the equipment installation

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.57)*
5. Very Satisfied *(SKIP TO Q.57)*
6. Not applicable *(SKIP TO Q.57)*
7. Prefer not to answer *(SKIP TO Q.57)*
8. Don't know *(SKIP TO Q.57)*

56. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

(Q57-60 NOT ASKED IF DIRECT INSTALL)

57. (E1F) The amount of time it took to receive your rebate for your equipment

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.59)*
5. Very Satisfied *(SKIP TO Q.59)*
6. Not applicable *(SKIP TO Q.59)*
7. Prefer not to answer *(SKIP TO Q.59)*
8. Don't know *(SKIP TO Q.59)*

58. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

59. (E1G). The dollar amount of the rebate for the equipment

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.61)*
5. Very Satisfied *(SKIP TO Q.61)*
6. Not applicable *(SKIP TO Q.61)*
7. Prefer not to answer *(SKIP TO Q.61)*
8. Don't know *(SKIP TO Q.61)*

60. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

61. (E1H) Interactions with SPS

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.63)*
5. Very Satisfied *(SKIP TO Q.63)*
6. Not applicable *(SKIP TO Q.63)*
7. Prefer not to answer *(SKIP TO Q.63)*
8. Don't know *(SKIP TO Q.63)*

62. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

63. (E1I) The overall value of the equipment your company received for the price you paid

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied

4. Somewhat Satisfied *(SKIP TO Q.65)*
5. Very Satisfied *(SKIP TO Q.65)*
6. Not applicable *(SKIP TO Q.65)*
7. Prefer not to answer *(SKIP TO Q.65)*
8. Don't know (SKIP TO Q.65)

64. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

65. (E1J) The amount of time and effort required to participate in the program

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.67)*
5. Very Satisfied *(SKIP TO Q.67)*
6. Not applicable *(SKIP TO Q.67)*
7. Prefer not to answer *(SKIP TO Q.67)*
8. Don't know *(SKIP TO Q.67)*

66. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

(Q67 and Q68 NOT ASKED IF DIRECT INSTALL)

67. (E1K) The project application process

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied *(SKIP TO Q.69)*
4. Somewhat Satisfied *(SKIP TO Q.69)*
5. Very Satisfied *(SKIP TO Q.69)*
6. Not applicable *(SKIP TO Q.69)*

7. Prefer not to answer *(SKIP TO Q.69)*
8. Don't know *(SKIP TO Q.69)*

68. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

69. (E2) Do you have any recommendations for improving the [REBATE_PROGRAM] program?

01. Yes *(RECORD VERBATIM)*

_____

_____

_____

97. No
98 Prefer not to answer
99. Don't know

70. (E 3) On a scale from 0 to 10, where 0 is "not at all likely" and 10 is "very likely," how likely is it that you would recommend the [REBATE_PROGRAM] to a colleague or professional contact?

Extremely Likely *Not at all Likely* *DK/ WS*

10 ..... 09 ..... 08 ..... 07 ..... 06 ..... 05 ..... 04 ..... 03 ..... 02 ..... 01 ..... 00 11

SKIP TO Q. 72

97. Have already recommended the program *(SKIP TO Q. 72)*
98. Prefer not to answer *(SKIP TO Q. 72)*
99. Don't know *(SKIP TO Q. 72)*

71. (E 3a). Can you tell me why you gave that rating? (RECORD VERBATIM)

_____

_____

98 Prefer not to answer

99. Don't know

SECTION: CHARACTERISTICS AND DEMOGRAPIHCS

72. (Gen 1) Finally, I have a few questions about your firm for classification purposes only. Do you own or lease your building where the project was completed?

01. Own
02. Lease / Rent
03. Prefer not to answer *(SKIP TO Q. 74)*
99. Don't know *(SKIP TO Q. 74)*

Other *(SPECIFY)* _____

73. (Gen1a) Does your firm pay your SPS bill, or does someone else (e.g., a landlord)?

1. Pay own
2. Someone else pays
3. Prefer not to answer
4. Don't know

74. (Gen2) Approximately what is the total square footage of the building where the project was completed? (READ CATEGORIES IF NEEDED)

1. Less than 1,000 square feet
2. Between 1,000 and 1,999 square feet
3. Between 2,000 and 4,999 square feet
4. Between 5,000 and 9,999 square feet
5. Between 10,000 and 49,999 square feet
6. Between 50,000 and 99,999 square feet
7. 100,000 square feet or more
8. Prefer not to answer *(DO NOT READ)*
9. Don't know *(DO NOT READ)*

75. (Gen3) Approximately what year was your firm's building built? (READ CATEGORIES IF NEEDED)

1. 1939 or earlier
2. 1940 to 1949

3. 1950 to 1959
4. 1960 to 1969
5. 1970 to 1979
6. 1980 to 1989
7. 1990 to 1999
8. 2000 to 2009
9. 2010 and later
10. Prefer not to answer *(DO NOT READ)*
11. Don't know *(DO NOT READ)*

76. (Gen4) Approximately, How many full-time equivalent (FTE) employees does your company currently have in the state of New Mexico?

1. Less than 5
2. 5-9
3. 10-19
4. 20 - 49
5. 50 - 99
6. 100 - 249
7. 250 - 499
8. 500 - 999
9. 1,000 - 2,500
10. More than 2,500
11. Prefer not to answer
12. Don't know

77. (Gen5) And this is my last question. How long has your company been in business?
(Poller : Please be specific, by writing in months and years.)

_____

98. Prefer not to answer
99. Don't know

THIS CONCLUDES OUR SURVEY. THANK YOU FOR YOUR TIME. HAVE A GOOD DAY.

NOTE TO INTERVIEWER, WAS RESPONDENT:

1. Male
2. Female

Unique ID #:_____ _____ _____

Respondent's Phone Number:_____

Interviewer's Name:_____

Interviewer's Code:_____

Appendix B – Home Energy Services Participant Survey Instrument

Hello, my name is (*YOUR NAME*) from Research & Polling, Inc. I am calling on behalf of Xcel Energy. May I please speak with _____?

A. (Once correct respondent is reached) Hello, my name is (*YOUR NAME*) from Research & Polling, Inc. I am calling on behalf of Xcel Energy.

I'm calling because our records show that you recently upgraded [MEASURE_TYPE1] at your home located at [SITE_ADDRESS] through the Xcel Energy Home Energy Services Program. This would have included a free home energy assessment from an approved contractor and installation of free or reduced cost energy efficient upgrades as part of the program. I'd like to ask a short set of questions about your experience with this program. Your time will help us improve this program for other customers like you. Are you the best person to talk to about these energy efficiency upgrades and energy use in your home?

1. Yes
2. No (Ask, Who would be the best person to talk to about the energy efficiency upgrades and energy use in your home? (REPEAT INTRO WHEN CORRECT PERSON COMES ON LINE; ARRANGE CALLBACK IF NECESSARY)
3. Never installed *(VOLUNTEERED SKIP TO Q.4)*

(IF NEEDED) Xcel Energy would like to better understand how residential customers like you think about and manage their energy use. The Xcel Energy efficiency program is designed to help customers save energy and money. Your input is very important to help Xcel Energy improve its energy efficiency programs.

SECTION A: Measure Verification

POLLER NOTE: What is MEASURE_1?

1. Central A/C (CONTINUE TO Q.1a)
2. Heat pump (CONTINUE TO Q.1a)
3. LED lighting (CONTINUE TO Q.1a)
4. Low flow showerhead (CONTINUE TO Q.1a)
5. Thermostat (SKIP TO Q.1a)
6. Air infiltration reduction (SKIP TO Q.6a)
7. Ceiling Insulation (SKIP TO Q.6a)
8. Duct Sealing (SKIP TO Q.6a)

1a. (A 1) Just to confirm, our records show that you received a free home energy assessment and reduced cost [MEASURE_TYPE1] at your home at [SITE_ADDRESS]. And this was done in approximately [MONTH, YEAR]. Is this correct?

1. Yes
2. No ***(THANK AND TERMINATE****—only if no other measures or services, otherwise move to next MEASURE_TYPE)*
3. Don't know ***(THANK AND TERMINATE****—only if no other measures or services, otherwise move to next MEASURE_TYPE)*

2a. (A 2) Is the [MEASURE_TYPE1] still installed?

1. Yes *(SKIP TO Q. 5a)*
2. No *(CONTINUE TO Q. 3a)*
3. Prefer not to answer *(SKIP TO Q. 5a)*
4. Don't know *(SKIP TO Q. 5a)*

3a. (A 3) Was the [MEASURE_TYPE1] removed or never installed?

01. Removed
02 Never Installed
03. Prefer not to answer *(SKIP TO Q.7, IF NO OTHER MEASURES)*
99. Don't know *(SKIP TO Q.7, IF NO OTHER MEASURES)*

Other *(SPECIFY)* _____*(SKIP TO Q.7, IF NO OTHER MEASURES)*

4a. (A3a) Why was the [MEASURE_TYPE1] removed/never installed? *(OPEN VERBATIM)*

_____

_____

_____

(SKIP TO Q. 7, IF NO OTHER MEASURES)

POLLER NOTE: Was measure ever installed? (Yes to Q. 1a)

1. **Yes** (SKIP TO Q. 7, IF NO OTHER MEASURES)
2. **No (THANK AND TERMINATE***—only if no other measures, otherwise move to next MEASURE_TYPE***)**

5a. (A 4) Is the [MEASURE_TYPE1] still functioning properly?

1. Yes
2. No
3. Prefer not to answer *(DO NOT READ)*
4. Don't know *(DO NOT READ)*

ALL RESPONSES TO 5A SKIP TO Q. 7, UNLESS THERE ARE OTHER MEASURES. IF THERE ARE OTHER MEASURES CONTINUE TO NEXT MEASURE, ON PAGE 3

6a. Just to confirm, our records show that a program contractor completed [MEASURE_TYPE1] at your home at [SITE_ADDRESS]. And this was done in approximately [MONTH, YEAR]. Is this correct?

1. Yes
2. No ***(THANK AND TERMINATE****—only if no other measures or services, otherwise move to next SERVICE_TYPE)*
3. Don't know ***(THANK AND TERMINATE****—only if no other measures or services, otherwise move to next SERVICE_TYPE)*

POLLER NOTE: Is there a Measure 2?

1. **Yes (CONTINUE TO NEXT POLLER NOTE)**
2. **No (SKIP TO Q. 7)**

MEASURE 2

POLLER NOTE: What is MEASURE_2?

1. Central A/C (CONTINUE TO Q.1b)
2. Heat pump (CONTINUE TO Q.1b)
3. LED lighting (CONTINUE TO Q.1b)
4. Low flow showerhead (CONTINUE TO Q.1b)
5. Thermostat (SKIP TO Q.1b)
6. Air infiltration reduction (SKIP TO Q.6b)
7. Ceiling Insulation (SKIP TO Q.6b)
8. Duct Sealing (SKIP TO Q.6b)

1b. (A 1) Just to confirm, our records show that you received a free home energy assessment and reduced cost [MEASURE_TYPE2] at your home at [SITE_ADDRESS]. And this was done in approximately [MONTH, YEAR]. Is this correct?

1. Yes
2. No
3. Don't know

2b. (A 2) Is the [MEASURE_TYPE2] still installed?

1. Yes *(SKIP TO Q. 5b)*
2. No *(CONTINUE TO Q. 3b)*
3. Prefer not to answer *(SKIP TO Q. 5b)*
4. Don't know *(SKIP TO Q. 5b)*

3b. (A 3) Was the [MEASURE_TYPE2] removed or never installed?

01. Removed
02 Never Installed
03. Prefer not to answer *(SKIP TO Q.7, IF NO OTHER MEASURES)*
99. Don't know *(SKIP TO Q.7, IF NO OTHER MEASURES)*

Other *(SPECIFY)* _____*(SKIP TO Q.7, IF NO OTHER MEASURES)*

4b. (A3a) Why was the [MEASURE_TYPE2] removed/never installed? *(OPEN VERBATIM)*

_____

_____

_____

(SKIP TO Q. 7, IF NO OTHER MEASURES)

POLLER NOTE: Was measure ever installed? (Yes to Q. 1b)

1. **Yes** (SKIP TO Q. 7, IF NO OTHER MEASURES)
2. **No**

5b. (A 4) Is the [MEASURE_TYPE2] still functioning properly?

1. Yes
2. No
3. Prefer not to answer *(DO NOT READ)*
4. Don't know *(DO NOT READ)*

ALL RESPONSES TO 5B SKIP TO Q. 7, UNLESS THERE ARE OTHER MEASURES. IF THERE ARE OTHER MEASURES CONTINUE TO NEXT MEASURE ON PAGE 5

6b. Just to confirm, our records show that a program contractor completed [MEASURE_TYPE2] at your home at [SITE_ADDRESS]. And this was done in approximately [MONTH, YEAR]. Is this correct?

1. Yes
2. No
3. Don't know

POLLER NOTE: Is there a Measure 3?

1. **Yes (CONTINUE TO NEXT POLLER NOTE)**
2. **No (SKIP TO Q. 7)**

MEASURE 3

POLLER NOTE: What is MEASURE_3?

1. Central A/C (CONTINUE TO Q.1c)
2. Heat pump (CONTINUE TO Q.1c)
3. LED lighting (CONTINUE TO Q.1c)
4. Low flow showerhead (CONTINUE TO Q.1c)
5. Thermostat (SKIP TO Q.1c)
6. Air infiltration reduction (SKIP TO Q.6c)
7. Ceiling Insulation (SKIP TO Q.6c)
8. Duct Sealing (SKIP TO Q.6c)

1c. (A 1) Just to confirm, our records show that you received a free home energy assessment and reduced cost [MEASURE_TYPE3] at your home at [SITE_ADDRESS]. And this was done in approximately [MONTH, YEAR]. Is this correct?

1. Yes
2. No
3. Don't know

2c. (A 2) Is the [MEASURE_TYPE3] still installed?

1. Yes *(SKIP TO Q. 5c)*
2. No *(CONTINUE TO Q. 3c)*
3. Prefer not to answer *(SKIP TO Q. 5c)*
4. Don't know *(SKIP TO Q. 5c)*

3c. (A 3) Was the [MEASURE_TYPE3] removed or never installed?

01. Removed

02 Never Installed

03. Prefer not to answer *(SKIP TO Q.7, IF NO OTHER MEASURES)*

99. Don't know *(SKIP TO Q.7, IF NO OTHER MEASURES)*

Other *(SPECIFY)* _____*(SKIP TO Q.7, IF NO OTHER MEASURES)*

4c. (A3a) Why was the [MEASURE_TYPE3] removed/never installed? *(OPEN VERBATIM)*

_____

_____

_____

(SKIP TO Q. 7, IF NO OTHER MEASURES)

POLLER NOTE: Was measure ever installed? (Yes to Q. 1c)

1. **Yes** (SKIP TO Q. 7, IF NO OTHER MEASURES)
2. **No**

5c. (A 4) Is the [MEASURE_TYPE3] still functioning properly?

1. Yes (SKIP TO Q. 7)
2. No (SKIP TO Q.7)
3. Prefer not to answer *(DO NOT READ) (SKIP TO Q. 7)*
4. Don't know *(DO NOT READ) (SKIP TO Q. 7)*

6c. Just to confirm, our records show that a program contractor completed [MEASURE_TYPE3] at your home at [SITE_ADDRESS]. And this was done in approximately [MONTH, YEAR]. Is this correct?

1. Yes
2. No
3. Don't know

Section B: Role of Contractor

7. (B 1) Did you initially contact a contractor, or did a contractor reach out to you directly to suggest a home assessment? [NOTE: this could be any contractor with whom the household discussed the assessment they did, not just the one who did the work.]

1. I contacted a contractor about the assessment
2. A contractor contacted me *(SKIP TO Q. 9)*
3 Other – Describe _____ (*SKIP TO Q. 10)*
4. Don't know *(SKIP TO Q. 10)*

8. (B 2) How did you determine which contractor or contractors to call?
(RECORD VERBATIM)

_____

_____

_____

9. (B 3) With how many different contractors did you ultimately discuss the home assessment with?

1. 1
2. 2-3
3. More than 3
4. Don't know

10. (B 4) Did the contractor that ended up doing the home assessment and provided the energy efficiency upgrades mention specifically that the program was being offered by Xcel Energy?

1. Yes *(SKIP TO Q. 12)*
2. No
3. Don't know/Don't recall *(SKIP TO Q. 12)*

11. (B 5) How did the contractor explain the free and discounted energy efficiency upgrades?
(RECORD VERBATIM)

_____

_____

_____

Section C: Awareness and Motivations for Participation

12. (C 1) How did you first hear about Xcel Energy's Home Energy Services program offering energy efficiency upgrades? *(DO NOT READ CATEGORIES)*

01. Xcel Energy website
02. Digital/web advertisement (not on the Xcel Energy website)

03. Newspaper advertisement
04. Contractor outreach or marketing
05. Friend or family
06. Social media
07. Xcel Energy representative
98. Prefer not to answer
99. Don't know

Other *(SPECIFY)* _____

(C 2) Next I will read a list of reasons you may have considered when you decided to make the energy efficiency upgrades. For each one, please tell me if it was *not at all important, a little important, somewhat important, very important or extremely important*.

How important was…on your decision to make the upgrades?

(RANDOMIZE)	*Extremely Important*	*Very Important*	*Somewhat Important*	*A little Important*	*Not imp At All*	*Don;t Know*	*Prefer not to answer*	*N/A*
13. (C2a) Reducing environmental impact of your home	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**

POLLER NOTE: WERE ANY MEASURES CENTRAL AC, HEAT PUMP, LOW FLOW SHOWERHEAD, LED LIGHTING OR A THERMOSTAT?

1. **Yes** (CONTINUE)
2. **No** (SKIP TO Q.16)

14. (C2b) Upgrading out-of-date equipment	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**
15. (C2c) Replacing faulty or failed equipment	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**
16. (C2d) Improving comfort of your home	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**
17. (C2e) Receiving financial incentive	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**
18. (C2f) Reducing energy bill amounts	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**
19. (C2g) The contractor recommendations	**5**	**4**	**3**	**2**	**1**	**6**	**7**	**8**

20. (C 3) Were there any other reasons that you made the upgrades that were more important than the ones we have mentioned?

01. Yes. (Ask what those reasons were and record response)

_____

_____

_____

97. No, none in particular

98. Prefer not to answer

99. Don't know

POLLER NOTE: Is the file marked as low income? (Refer to phone list)

1. **Yes** (SKIP TO Q.31)
2. **No** (CONTINUE)

POLLER NOTE: Did the respondent have Air Infiltration Reduction and/or Duct Sealing ONLY installed? (Refer to phone list)

1. **Yes** (SKIP TO Q.31)
2. **No, had other measures (listed below) installed** (CONTINUE)

POLLER NOTE FOR SECTION D:

If the respondent had Air Infiltration Reduction and/or Duct Sealing ONLY installed SKIP SECTION D Q. 21-31.

If the respondent had any of the following measures installed (either with or without Air Infiltration Reduction and/or Duct Sealing):

- Ceiling insulation
- Heat Pump
- Central AC
- Thermostat
- LED lighting
- Low flow shower head

Only mention those measures in Section D,(excluding Air Infiltration Reduction and/or Duct Sealing.
At no time during Section D, should Air Infiltration Reduction and/or Duct Sealing be referenced.

SECTION D: CUSTOMER DECISION MAKING PROCESS, FREE-RIDERSHIP [IF Low Income=NO]

Next, I'm going to ask a few questions about your decision to install [MEASURE_TYPE1], [MEASURE_TYPE2], and [MEASURE_TYPE3] at your home and participate in the Xcel Energy efficiency program. (Poller Note: Exclude Air Infiltration Reduction and Duct Sealing)

21. (D 2) Before participating in the Xcel Energy program, do you recall receiving any other rebates from Xcel Energy for making energy efficiency upgrades at your home?

1. Yes
2. No
3. Prefer not to answer
4. Don't know

(D 2) Next I will read a list of program aspects that may have been influential in your decision to make the efficiency upgrade. For each one, please tell me how influential it was on a scale of 0 to 10 where 0 means *not at all influential* and 10 means *extremely influential*.

How influential was…on your decision to make the upgrade?

(RANDOMIZE)	*Extremely Influential*										*Not at all Influential*	*Don't Know*	*Prefer not to answer*	*N/A*
22. (D2a) The available discount on services or equipment	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**97**	**98**	**99**
23. (D2b) The home energy assessment	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**97**	**98**	**99**
24. (D2c) The contractor recommendation	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**97**	**98**	**99**
25. (D2d) Information from Xcel Energy marketing or promotional materials	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**97**	**98**	**99**
26. (D2e) Previous participation in an Xcel Energy program	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**97**	**98**	**99**

27. (D 3) Did you first learn about the Xcel Energy efficiency program BEFORE or AFTER you decided to make the efficiency upgrades?

1. Before
2. After
3. Prefer not to answer *(DO NOT READ)*
4. Don't know *(DO NOT READ)*

28. (D 4) If you had not received the reduced cost item(s) and services during the home assessment, what is the likelihood you would have sought out similar services or installed [MEASURE_TYPE1], [MEASURE_TYPE2], or [MEASURE_TYPE3] within the next 12 months? (Poller Note: Exclude Air Infiltration Reduction and Duct Sealing)

Extremely Likely										*Not at all Likely*	*DK/ WS*

10 ..... 09..... 08.....07 ..... 06..... 05..... 04.....03 .....02 .....01 ..... 00 11

29. (D 5) If you had not received the reduced cost item(s) and services during the home assessment, what is the likelihood you would have purchased the <u>exact same</u> equipment or services?

Extremely Likely ... *Not at all Likely* *DK/ WS*

10 ..... 09..... 08.....07 ..... 06..... 05..... 04.....03 .....02 .....01 ..... 00 11

30. (D 6) In your own words, how would you describe the influence the Xcel Energy efficiency program had – including the available discounts, contractor support, and any other program information you may have received – on your decision to make the efficiency upgrades and the timing of those upgrades?
(RECORD VERBATIM)

<u>SECTION F: Program Satisfaction</u>

Now I have some questions about your satisfaction with various aspects of the program.

(F 2a-h). For each of the following, please tell me if you were *very dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied or very satisfied*.

31. (F1a) Xcel Energy as an energy provider

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q.33)*
5. Very Satisfied *(SKIP TO Q. 33)*
6. Prefer not to answer *(SKIP TO Q. 33)*
7. Don't know *(SKIP TO Q.33)*

32. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

---

33. (F1b) The energy efficiency program overall

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q. 35)*
5. Very Satisfied *(SKIP TO Q. 35)*
6. Prefer not to answer *(SKIP TO Q. 35)*
7. Don't know *(SKIP TO Q. 35)*

34. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

35. (F1c) The equipment and services that were discounted through the program

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q. 37)*
5. Very Satisfied *(SKIP TO Q. 37)*
6. Not applicable *(SKIP TO Q. 37)*
7. Prefer not to answer *(SKIP TO Q. 37)*
8. Don't know *(SKIP TO Q. 37)*

36. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

37. (F1d) The contractor who completed the home assessment and efficiency upgrades

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied
5. Very Satisfied
6. Not applicable
7. Prefer not to answer
8. Don't know

ASK FOLLOW UP (Q.38) OF ALL RESPONDENTS

38. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

499. No reason in particular
500. Don't know/won't say

39. (F1e) The overall value of the efficiency upgrades you received for the price you paid

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied *(SKIP TO Q. 41)*
5. Very Satisfied *(SKIP TO Q. 41)*
6. Not applicable *(SKIP TO Q. 41)*
7. Prefer not to answer *(SKIP TO Q. 41)*
8. Don't know (SKIP TO Q. *41*)

40. Can you tell me why you gave that rating? *(RECORD VERBATIM)*

_____

_____

_____

41. (F2) Do you have any recommendations for improving the Xcel Energy program?

01. Yes *(RECORD VERBATIM)*

_____

_____

_____

97. No
98 Prefer not to answer
99. Don't know

SECTION GEN: CHARACTERISTICS AND DEMOGRAPIHCS

42. (Gen 1) Finally, I have a few questions about your household for classification purposes only. Do you own or rent your home where the equipment was installed?

01. Own *(SKIP TO Q.44)*
02. Rent
03. Prefer not to answer
99. Don't know

Other *(SPECIFY)* _____

43. (Gen1a) Does someone in your household pay your Xcel Energy bill, or does someone else (e.g., a landlord)?

1. Pay own
2. Someone else pays
3. Prefer not to answer
4. Don't know

44. (Gen2) Which of the following best describes the building you reside in?
(READ CATEGORIES)

1. Single-family detached home *(SKIP TO Q. 46)*
2. Single family attached home (e.g. townhome)
3. Mobile home (e.g. a manufactured home or trailer home)
4. Multifamily (i.e. more than one residence in building)
98. Prefer not to answer *(SKIP TO Q. 46)*
99. Don't know *(SKIP TO Q. 46)*

45. (Gen2a) How many units are in the structure? (READ CATEGORIES IF NEEDED)

1. 2 to 4
2. 5 to 10
3. 11 to 25
4. 26 to 50
5. More than 50
98. Prefer not to answer
99. Don't know

46. (Gen3) Approximately what is the total square footage of your home?

(READ CATEGORIES IF NEEDED)

1. Less than 1,000 square feet
2. 1,000 to 1,499 square feet
3. 1,500 to 1,999 square feet
4. 2,000 to 2,499 square feet
5. 2,500 to 2,999 square feet
6. 3,000 to 3,999 square feet
7. 4,000 or more square feet
8. Prefer not to answer *(DO NOT READ)*
9. Don't know *(DO NOT READ)*

47. (Gen4) Approximately what year was your home built? *(READ CATEGORIES IF NEEDED)*

01. 1939 or earlier
02. 1940 to 1949
03. 1950 to 1959
04. 1960 to 1969
05. 1970 to 1979
06. 1980 to 1989
07. 1990 to 1999
08. 2000 to 2009
09. 2010 and later
10. Prefer not to answer *(DO NOT READ)*

11. Don't know *(DO NOT READ)*

48. (Gen5) How many people live in your household? (Record number)

_____ _____

499. Prefer not to answer

500. Don't know

49. (Gen6) How long have you lived in this home?

1. Less than 6 years
2. 6 to 10 years
3. 11 to 15 years
4. 16 to 20 years
5. 21 to 25 years
6. 26 to 30 years
7. More than 30 years
8. Prefer not to answer
9. Don't know

THIS CONCLUDES OUR SURVEY. THANK YOU FOR YOUR TIME. HAVE A GOOD DAY.

NOTE TO INTERVIEWER, WAS RESPONDENT:

1. Male
2. Female

Unique ID #:_____ _____ _____ _____

Respondent's Phone Number:_____

Interviewer's Name:_____

Interviewer's Code:_____

Appendix C – Business Comprehensive Contractor Interview Guide

Introduction

Talking points for recruitment

- Evergreen Economics is conducting an evaluation of [UTILITY's] [PROGRAM] for the New Mexico Public Regulation Commission and the state's utilities.
- We have identified selected contractors that installed equipment that received rebates from the efficiency programs in 2018 for brief telephone interviews.
- We would need about 20 minutes for the interview.
- Your responses will be anonymous, but will be very helpful in helping the state's utilities ensure their energy efficiency programs best serve their customers.
- When would be a good time to talk?

Talking points for starting the interview

- Identify self.
- This should take about 20 minutes.
- Your responses will be anonymous, so please feel free to speak candidly.
- Do you have any questions before we begin?
- Would you feel comfortable if I record this call for note taking purposes? We will not share the recording with anyone outside our company and will not attribute anything you say back to you.

Interviewee Background

Let's begin with a couple of background questions….

A1. To start, please tell me a bit about your company.

- Probe to understand:
    - Services offered
    - Types of customers (esp. sector – residential, commercial, or both)
    - Regions served
    - Interviewee role

Program Awareness and Engagement

B1. Do you recall how you first learned about and got involved with the [residential/commercial] rebate programs through [UTILITY]?

- Listen (and probe as needed) for:
    - Any reservations about participating
    - Any barriers to participating
    - Whether or not they work with any other New Mexico [UTILITY] rebate programs, or other utilities programs in New Mexico

B2. Could you describe what involvement with New Mexico [UTILITY] rebate programs as a contractor involves?

Probe as needed:

- In what ways do you interact with New Mexico [UTILITY] or their implementers about this program?
- What information or services do you receive from New Mexico [UTILITY] (beyond the ability to offer rebates to your customers)?

B3. In what ways is the [UTILITY] program helpful to you in your business? [Note to interviewers: this is a required question for all interviewees]

- [If not mentioned in interviewee's response, ask specifically about these three topics:]
    - Rebate
        - Increases customer satisfaction with us
        - Increases business
        - Helps us up-sale to higher efficiency levels
    - Ability to mention the connection with the [UTILITY] program
    - [UTILITY] messaging to customers on benefits of [MEASURE(S)]

B4. What share of your [residential/commercial] projects within [UTILITY] territory would you estimate currently end up qualifying for and receiving a [UTILITY] rebate?

- What could [UTILITY] do to involve you more in the program?

B5. Do you find that customers outside of [UTILITY] territory are more likely, less likely, or just as likely to install efficiency measures as those within [UTILITY] territory?

B6. Does [UTILITY] make it clear which of your products or services are eligible for [UTILITY] rebates?

Probe as needed:

- Is there anything [UTILITY] should do to more clearly communicate that?

B7. Have the programs influenced what equipment you suggest to a customer?

a. Does that differ depending on whether the customer is in [UTILITY] territory or outside of [UTILITY] territory?

B8. Do you have any suggestions for [UTILITY] contractor services and support – either overall or for the [PROGRAM] specifically?

Program Processes

C1. In what ways are you involved with the rebate portion of the program and the paperwork and process required to participate?

- Probe to understand:
    - Whether contractor completes the rebate application
    - Time required for paperwork and whether that is a burden
    - Whether the rebate goes directly to the customer or contractor (with a markdown on the charge to customer)
    - Recommended improvements

C2. When and how do you bring up either [UTILITY] rebates or the equipment they rebate when talking with customers?

- Listen for (and probe as needed):
    - What share of customers do you talk about rebates with
    - What share of customers are already aware of rebates before the contractor brings it up
    - What it is the most effective sales tool or message to get customers to upgrade to high efficiency
    - What role the [UTILITY] rebates play in motivating upgrades
    - What particular equipment is easier or harder to get customers to upgrade to high efficiency and why

C3. Do you have any comments about the program offerings? Is there anything missing? Anything not needed? Or anything that could be better?

Market Response

D1. Overall, to what degree do you see the program increasing the interest and demand for energy efficient equipment?

Probe to understand:

- Why is that?
- Is the program having a large or small effect on the market?
- How could the program increase its effect?

D2. Are there markets* that you feel [UTILITY] [residential/commercial] energy efficiency programs are reaching well? Not well? [*Note to interviewer: if needed, examples of markets could be small businesses, or certain business sectors such as retail, office, grocery—just as a few examples]

- Probe to understand:
    - Suggested approaches that might expand the reach of the program into markets that may be underserved by the program.

D3. Overall, what issue(s), if any, may affect future program participation by customers? What about future program participation by contractors? [INTERVIEWER NOTE: Example issues are changes to building codes and standards being promoted, availability of efficient equipment, and program incentive levels].

Program Satisfaction

E1. Finally, I'd like to ask about your and your customers' satisfaction with the [UTILITY] [PROGRAM]. Please rate your overall satisfaction with the program on a 1 to 5 scale where 1 is not at all satisfied, 2 is somewhat dissatisfied, 3 is neither satisfied nor dissatisfied, 4 is somewhat satisfied and 5 is very satisfied?

- What is your satisfaction?
- How do you think your customers would rate the program?
    -
    - [IF RATING < 5] What could [UTILITY] do to increase your satisfaction with the program?
    -

      Probe, only if they do not offer an unaided response:

        - What is working best?
        - What is most challenging or needs improvement?
        -

E3. Aside from anything we've already discussed, was there ever an occasion when the program didn't meet your expectations or, conversely, provided you and your customer an exceptional customer experience? Please explain.

Closing

F1. Is there anything else we didn't cover that you'd like to mention or discuss about your experiences with the [UTILITY] [PROGRAM]?

[THANK AND END]

Appendix D – Home Energy Services Contractor Interview Guide

Introduction

Talking points for recruitment

- Evergreen Economics is conducting an evaluation of Xcel Energy's Home Energy Services program for the New Mexico Public Regulation Commission and Xcel Energy.
- We have identified contractors that provided services or installed equipment through this program in 2018 for brief telephone interviews.
- We would need about 20 minutes for the interview.
- Your responses will be anonymous, but will be very helpful in helping Xcel Energy ensure their energy efficiency programs best serve their customers.
- When would be a good time to talk?

Talking points for starting the interview

- Identify self.
- This should take about 20 minutes.
- Your responses will be anonymous, so please feel free to speak candidly.
- Do you have any questions before we begin?
- Would you feel comfortable if I record this call for note taking purposes? We will not share the recording with anyone outside our company and will not attribute anything you say back to you.

Interviewee Background

Let's begin with a couple of background questions….

A2. To start, please tell me a bit about your company.

- Probe to understand:
    - Services offered
    - Types of customers (esp. sector – residential, commercial, or both)
    - Regions served
    - Length of time involved in Home Energy Services program in New Mexico
    - Interviewee role

Program Awareness and Engagement

B9. Do you recall how you first learned about and got involved with the Home Energy Services program through Xcel Energy?

- Listen (and probe as needed) for:
  - Any reservations about participating
  - Any barriers to participating
  - Whether or not they work with any other New Mexico rebate programs and Xcel Energy programs in Texas (or elsewhere)

B10. Could you describe what involvement with the New Mexico Home Energy Services program as a contractor involves?

Probe as needed:

- In what ways do you interact with Xcel Energy or their implementer, Frontier Energy, about this program?
- What information or services do you receive from Xcel Energy (beyond the ability to offer these services to your customers at a discounted rate)?

B11. In what ways is the Home Energy Services program helpful to you in your business? [Note to interviewers: this is a required question for all interviewees]

- [If not mentioned in interviewee's response, ask specifically about these three topics]:
  - Being able to offer reduced cost of services and equipment to customers
    - Increases customer satisfaction with us
    - Increases business
    - Helps us up-sale to higher efficiency levels
  - Ability to mention the connection with the Xcel Energy program
  - Xcel Energy messaging to customers on benefits of energy efficiency upgrades

B12. What share of your residential projects within Xcel Energy's New Mexico territory are for the Home Energy Services program?

a. In other words (if needed): how much residential work do you do in Xcel Energy's New Mexico territory that is not for the Home Energy Services program? If possible, describe separately other work that **is** eligible for Xcel Energy rebates (e.g. residential cooling) and work that is **not** eligible for Xcel Energy rebates.

B13. What share of your **total business** (in terms of number of projects) is for Xcel Energy's Home Energy Services program in New Mexico?

•

B14. Does Xcel Energy make it clear which products and services are eligible for the Home Energy Services program?

- Probe as needed:
    - Is there anything Xcel Energy should do to more clearly communicate that?

B15. Has the program influenced what services or equipment you suggest to a customer?

a. Does that differ depending on whether the customer is in [UTILITY] territory or outside of [UTILITY] territory?

B16. Do you have any suggestions for Xcel Energy's contractor services and support – either overall or for the Home Energy Services program specifically?

Program Processes

C1. What is your approach to marketing and outreach to get new customers to participate in the Home Energy Services program?

C2. How often do customers contact you requesting services or equipment that are eligible for the Home Energy Services program (as opposed to you initiating outreach to potential customers)?

C3. Can you briefly describe the paperwork and process required for each project you complete for the program?

- Probe to understand:
    - Time required for paperwork and whether that is a burden
    - Time it takes to receive reimbursement from Xcel Energy for project costs
    - Recommended improvements

C4. When and how do you bring up the discounts available through the Home Energy Services program when talking with customers?

- Listen for (and probe as needed):
    - What share of customers are already aware of the discounts/program before the contractor brings it up

- What it is the most effective sales tool or message to get customers to make efficiency upgrades
- What role the discounted price plays in motivating upgrades
- What particular services or equipment is easier or harder to get customers to upgrade and why

C5. Do you have any comments about the program offerings? Is there anything missing? Anything not needed? Or anything that could be better?

Market Response

D1. Overall, to what degree do you see the program increasing the interest and demand for energy efficient services and equipment?

Probe to understand:

- Why is that?
- Is the program having a large or small effect on the market?

D2. Are there segments of the residential market* that you feel the Home Energy Services program is reaching well? Not well? [*Note to interviewer: if needed, examples of markets could be low income/non-low income, geographic areas, or certain housing types (single family, manufactured homes/mobile homes, multifamily)]

- Probe to understand:
  - Suggested approaches that might expand the reach of the program into markets that may be underserved by the program.

D3. Overall, what issue(s), if any, may affect future program participation by customers? What about future program participation by contractors? [INTERVIEWER NOTE: Example issues are changes to building codes and standards being promoted and program, availability of higher efficiency equipment or trained staff, incentive levels].

Program Satisfaction

E1. Finally, I'd like to ask about your and your customers' satisfaction with the Home Energy Services program. Please rate your overall satisfaction with the program on a 1 to 5 scale where 1 is not at all satisfied, 2 is somewhat dissatisfied, 3 is neither satisfied nor dissatisfied, 4 is somewhat satisfied and 5 is very satisfied?

- What is your satisfaction?
- How do you think your customers would rate the program?

-
- [IF RATING < 5] What could [UTILITY] do to increase your satisfaction with the program?
-

  Probe if needed:

  - What is working best?
  - What is most challenging or needs improvement?

E2. Have you had any feedback from your customers about their experiences with the program that you think Xcel Energy should know?

E3. Aside from anything we've already discussed, was there ever an occasion when the program didn't meet your expectations or, conversely, provided you and your customer an exceptional program experience? Please explain.

Closing

F1. Is there anything else we didn't cover that you'd like to mention or discuss about your experiences with the Home Energy Services program in New Mexico?

[THANK AND END]

Appendix E – Saver's Switch Detailed Evaluation Methods and Findings

Saver's Switch is a one-way switch enabled demand response program offered to residential Southwestern Public Service (SPS) customers. To facilitate load control, participants must have a load control switch installed on their cooling unit. The switch must be able to receive radio-based control signals in order to cycle AC runtime during an event. About 4,400 residential customers in SPS territory are enrolled in Saver's Switch but because the program is intended for emergency relief purposes, events are rarely called. Because switches are controlled by one-way radio pagers, it is not possible to know which are still installed at customer sites and capable of receiving control signals. Field data collection was therefore used to assess switch operability rates and estimate program load reductions. Forty-nine data loggers were installed at Saver's Switch participant sites, sampled within three usage tertiles. The field study recruiting and installation process revealed a 60% operability rate, excluding sites that could not be accessed. The cycling strategy used for these events was described as "adaptive". Our analysis of logged switch status data appears to show functionality roughly consistent with 50% cycling, which in practice would cap runtime cap at 30 minutes per hour.

For impact measurement purposes, five events were called in August and September 2018 for the 49 Saver's Switch sites with field data loggers. Table 1 provides some information on these five 2018 measurement events, four of which were used for measurement purposes[1]. Note that the event start and end times are labeled Mountain Daylight Time (MDT), which would be the local prevailing time in SPS service territory during the summer DR season. All events began at 3 PM MDT and ended at 7 PM MDT.

Table 1: 2018 Saver's Switch Event Summary

Date	Day of Week	Start Time (MDT)	End Time (MDT)	Max Temp 3:00 – 7:00 p.m. at KROW (F)	Avg Temp 3:00 – 7:00 p.m. at KROW (F)	Daily Avg Humidity at KROW (F)
23-Aug	Thursday	3:00 p.m.	7:00 p.m.	98	91	55%
28-Aug	Tuesday	3:00 p.m.	7:00 p.m.	101	96	49%
5-Sep	Wednesday	3:00 p.m.	7:00 p.m.	89	73	63%
13-Sep	Thursday	3:00 p.m.	7:00 p.m.	92	88	57%
25-Sep	Tuesday	3:00 p.m.	7:00 p.m.	95	83	49%

[1] Two earlier events were also called, on July 20th and August 6th. However, control signals were not received

Average (excludes 5-Sep)	**3:00 p.m.**	**7:00 p.m.**	**96**	**89**	**53%**

To evaluate impacts for these five events the Evergreen team used interval load data collected by the field data loggers. The interval loads were further combined with NOAA weather station data for Roswell Airport (KROW), central to the SPS territory. The Roswell weather station was used for the *ex post* impact analysis to allow for consistency with the *ex ante* peak impact estimate.

Table 2 summarizes our operability and *ex ante* load reduction findings. The operability findings consist of two components. An operability rate of 60% was estimated by observing the portion of switches in the field metering sample that were found to be operable and connected to functioning AC units. Loggers were only installed at homes where the switch was found to be connected and operable. Communication rates were assessed by analyzing logger data during events. During events, 42% of switches consistently closed (therefore successfully cycling the AC unit), whereas the remainder never closed during events. Three types of impacts are reported in Table 2:

- Load reductions per active device represent impacts for operable and communicating switches, or 0.60 kW on average and 0.88 kW in the first hour;
- Reductions for operable devices, 0.25 kW on average and 0.37 kW in the first hour, are de-rated by 58% to reflect the portion of switches not effectively communicating; and
- Program impacts, 658 kW on average and 963 kW in the first hour, factor in both operability and communication rates and apply estimated impacts to the total enrolled population.

Table 2: Saver's Switch High Level Results

Avg Temp 3:00 – 7:00 p.m. at KROW (°F)	Program Total Devices	% Operable (Field)	% Communicating (Logged)	per Active Device (kW)	per Operable Device (kW)	per Program Device (kW)
				Number of Devices		
				1,099	2,616	4,360
				Average Reduction		
100	4,360	60%	42%	0.60	0.25	0.15
				First Hour Reduction		
				0.88	0.37	0.22

1 Saver's Switch Event Impacts

The impact evaluation for the residential customers relied on a within-subjects approach to develop a baseline estimate of hourly cooling load for event days. This approach was necessary because no interval data was available to form a comparison group. Instead, load patterns on event-like days were used to select a weather-based regression model, which was in turn used to calculate a baseline estimate for event days.

1.1 Evaluation Methodology

To estimate demand reductions on event days, the approach was based on interval load data for AC units obtained from data loggers. The raw data was logged for 49 customer sites with operable switches in five minute intervals and combined compressor runtime values with connected load measurements to derive a kW load measurement for each interval. This detailed 5-minute interval data was converted to average load per hour and used for the load impact analysis.

To estimate impacts, loads from non-event days were used to develop event-day baseline estimates specific to each event day and hour. *Ex post* impacts are simply the difference between observed hourly loads and the estimated baseline. Baseline accuracy was assessed using the following steps.

1. Identify event-like days and narrow dataset to these days;
2. Remove these days one at a time to create training datasets;
3. Use regression analysis to estimate reference loads;
4. Compare estimated reference loads to actual loads on validation days;
5. Compute metrics of bias, accuracy and precision; and
6. Assess estimation method based on performance across key metrics[2].

Equation 1 shows the model selected for its performance in predicting loads on event-like days. This model was selected among 27 candidate models, which in addition to the terms below included various combinations of terms addressing maximum temperature, heat accumulation (average early morning temperature), average and hourly humidity, and monthly variation.

Equation 1: Ex-Post Baseline Regression Model

$$\widehat{kW}_t = \beta_0 + \beta_1 * kW_{14} + \beta_2 * temp_{1-24} + \beta_3 * temp_t + \varepsilon$$

[2] The following algorithm was used to identify the best performing baseline model: select the model with the best fit (lowest root mean square error) among the three models with the least bias (lowest absolute percent bias).

Table 3: Definition of Terms for Equation 1

Term	Definition
kW_t	Estimated reference load in hour t
β_0	Intercept
t	Hour t
kW_{14}	Load in pre-event hour ending 14 (1:00 p.m. to 2:00 p.m.)
$temp_{1-24}$	Average daily temperature (hours ending 1 through 24)
$temp_t$	Temperature in hour t
ε	Error term

Table 4 shows the event-like days used for the model selection process. These days were chosen to mirror the range of temperature and humidity of the event days.

Table 4: Event-like Days Used for Model Selection

Date	Day of Week	Max Temp 3:00 p.m. – 7:00 p.m. at KROW (^{O}F)	Avg Temp 3:00 p.m. – 7:00 p.m. at KROW (^{O}F)	Daily Avg Humidity at KROW
6-Jun	Wednesday	98	95	95%
20-Jun	Wednesday	92	91	91%
26-Jun	Tuesday	99	97	97%
12-Jul	Thursday	88	87	87%
25-Jul	Wednesday	99	98	98%
6-Aug	Monday	94	92	92%
28-Sep	Friday	93	88	88%
	Average	**95**	**92**	**92%**

1.2 Field Operability and Communication Rates

During the logger installation process 137 Saver's Switch participants were contacted. Loggers were not installed at a majority of these sites for a variety of reasons as summarized in Figure 1. Reason codes were classified as access or safety issues versus

operability. Only customer sites with the operability issues, as summarized in Figure 2, were included in the operability rate analysis. In total, of 81 switches with no access issues, 49 (60%) were found to be operable. Data loggers were installed to collect data from these 49 switches.

Figure 1: Reasons for Unsuccessful Logger Installation

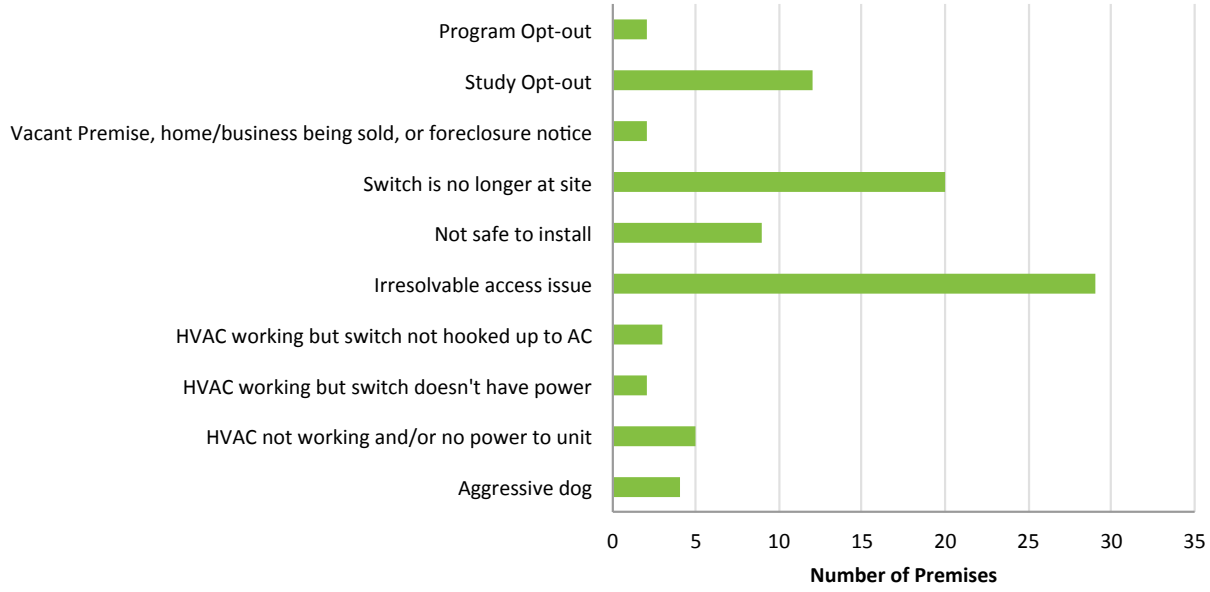
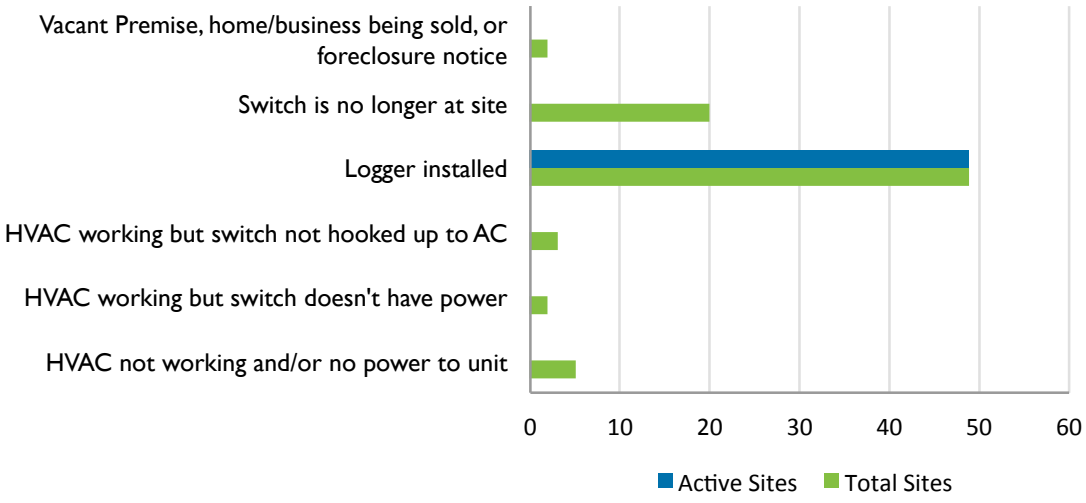


Figure 2: Implications for Field Operability

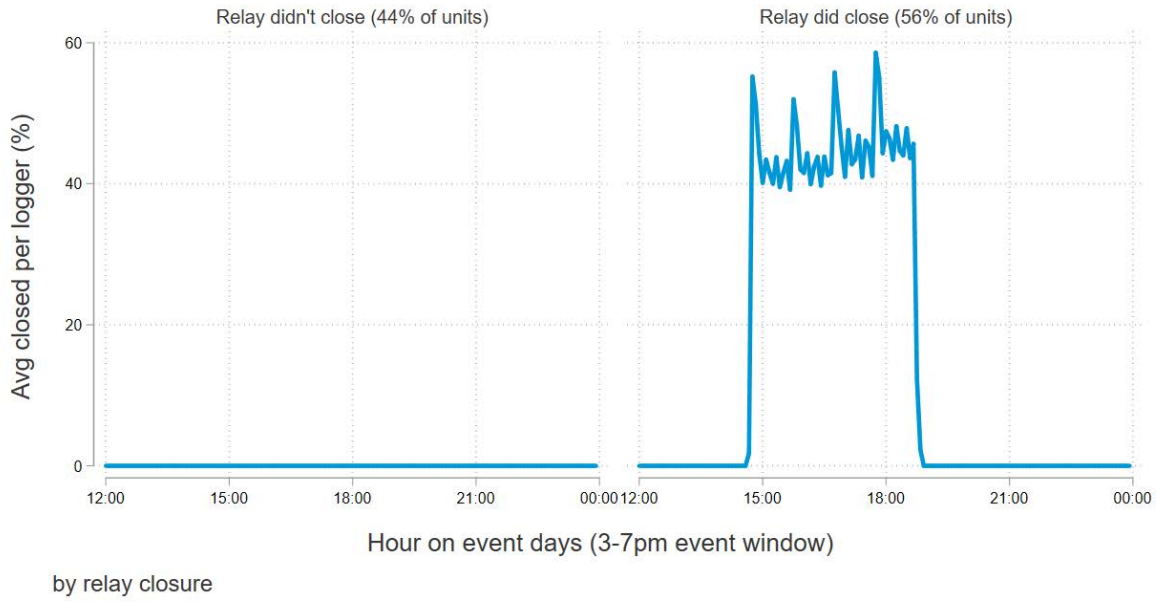


In addition to operability rates, another observed factor affecting load reductions is switch closure rates. An active switch controls an AC unit when the switch relay closes, but load reductions are zero for inactive switches with switch relays that don't close. Analysis of switch status interval data revealed that about half of units functioned during at least one event, while the remainder did not[3]. Inactive switches were found in all cities, but were somewhat overrepresented in the cities of Hobbs and Roswell. Further exploration of radio signal strength and coverage may help address switch inactivity.

The implication for the impact analysis is that demand reductions were dampened by the inactive switches. Figure 3 shows the five-minute interval closure rates for the inactive switches (left) and for the active switches (right). Notably, switch closure rates for the active switches is in the 40-60% range, appearing to reflect a 50% cycling strategy. In contrast, closure rates during events were 20-30% for all switches, averaged across active and inactive switches.

[3] Average active rates per event were lower--42%--because activity for some switches varied by events.

Figure 3: Switch Relay Closures



1.3 *Ex Post* Event Load Impacts

Event impacts for Saver's Switch events are the baseline load less the observed event day load. Figure 4 shows average[4] baseline loads (grey), observed event day loads (blue), and estimated reductions (orange) for logged switches including those deemed to be inactive. Load reductions are the most substantial in the first hour and mild snapback is observed post event. Notably, peak AC load is estimated at about 1.5 kW during the average event and load reductions are about 0.2 kW during the event, or about 13%. Recall that these average impacts include inactive switches, which lessen the reductions.

[4] Includes loads for the four successful events (Aug 23, Aug 28, Sep 13, Sep 25). Excludes loads for the two events with communication issues and the event with unseasonably cold whether.

Figure 4: Load Impacts for Operable Switches (Active and Inactive)

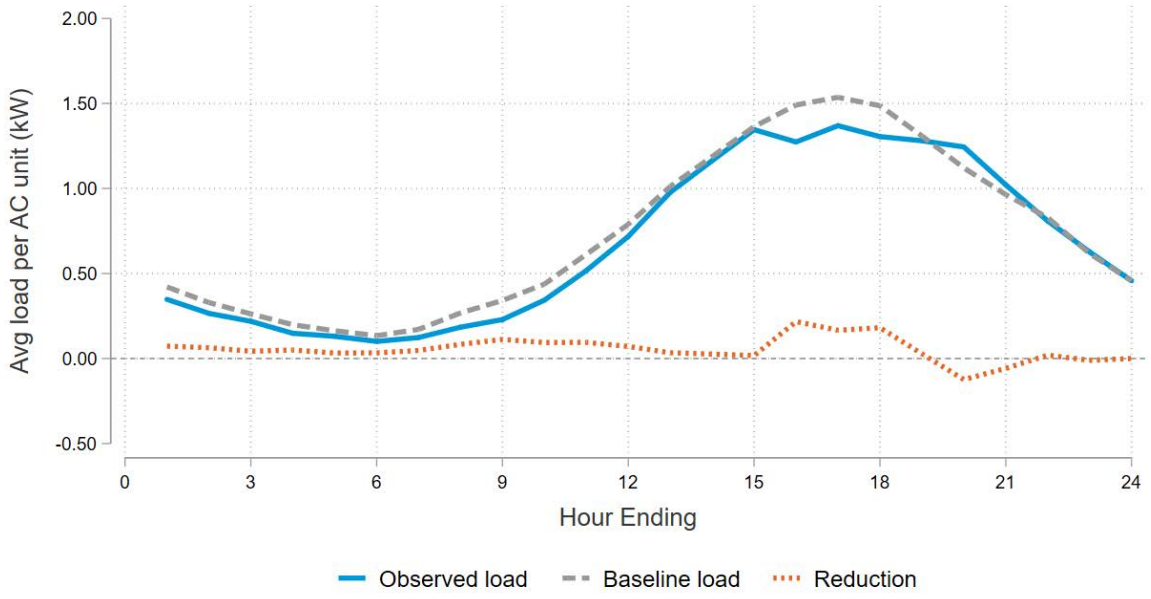


Table 5 and Table 6 show the hourly and average event reductions for each event per dispatched switch and per active switch, respectively. These summaries quantify the differences in first hour reductions and snap back observed in the load shape image above. These summaries also highlight the effect of switch inactivity on load reductions: since about 58% of dispatched switches were inactive, average load reductions across dispatched switches (0.15 kW) are also about 58% lower than load reductions for active switches only (0.36 kW). The snapback observed in post-event hours minimizes any small energy savings due to the program.

Table 5: Hourly Reductions per Dispatched Device

Date	% of Devices Active	Reduction per Dispatched Device (kW), Hour Beginning (MDT)					
		3:00 p.m.	4:00 p.m.	5:00 p.m.	6:00 p.m.	7:00 p.m. (post event)	Average 3:00 – 7:00 p.m.
22-Aug	42%	0.28	0.05	0.06	-0.09	-0.04	0.07
27-Aug	40%	0.33	0.18	0.23	0.04	-0.51	0.19
12-Sep	42%	0.21	0.26	0.29	0.05	0.01	0.20
24-Sep	43%	0.05	0.18	0.14	0.11	0.04	0.12
Average	**42%**	**0.22**	**0.17**	**0.18**	**0.03**	**-0.12**	**0.15**

Table 6: Hourly Reductions per Active Device

Date	% of Devices Active	Reduction per Active Device (kW), Hour Beginning (MDT)					
		3:00 p.m.	4:00 p.m.	5:00 p.m.	6:00 p.m.	7:00 p.m. (post event)	Average 3:00 – 7:00 p.m.
22-Aug	42%	0.67	0.12	0.15	-0.21	-0.09	0.18
27-Aug	40%	0.84	0.45	0.58	0.10	-1.29	0.49
12-Sep	42%	0.49	0.61	0.69	0.12	0.02	0.48
24-Sep	43%	0.12	0.42	0.33	0.26	0.10	0.28
Average	**42%**	**0.52**	**0.40**	**0.44**	**0.07**	**-0.30**	**0.36**

1.4 *Ex Ante* Program Impacts

To produce an *ex ante* impact estimate, the Evergreen team analyzed the relationship between temperature and impacts to derive a relationship. Figure 5Figure 5: Hourly Impacts against Outdoor Temperature (F) compares the load reduction estimate for each event hour (e.g. the hourly data points in Table 5) with the outdoor air temperature for that hour. Weather data, which was provided by the Evergreen team from the NOAA website[5], comes from weather station KROW in Roswell. Figure 5Figure 5: Hourly Impacts against Outdoor Temperature (F) shows a weak but positive correlation between load

[5] ftp://ftp3.ncdc.noaa.gov/pub/data/noaa/

reductions and temperature – the hotter it is outside, the greater the impacts tend to be (note the trend line equation in the legend). Predicted load reductions for the first hour would be 0.25 kW at 100F (-0.6984 + 0.0095 * 100).

Figure 5: Hourly Impacts against Outdoor Temperature (F) – all hours

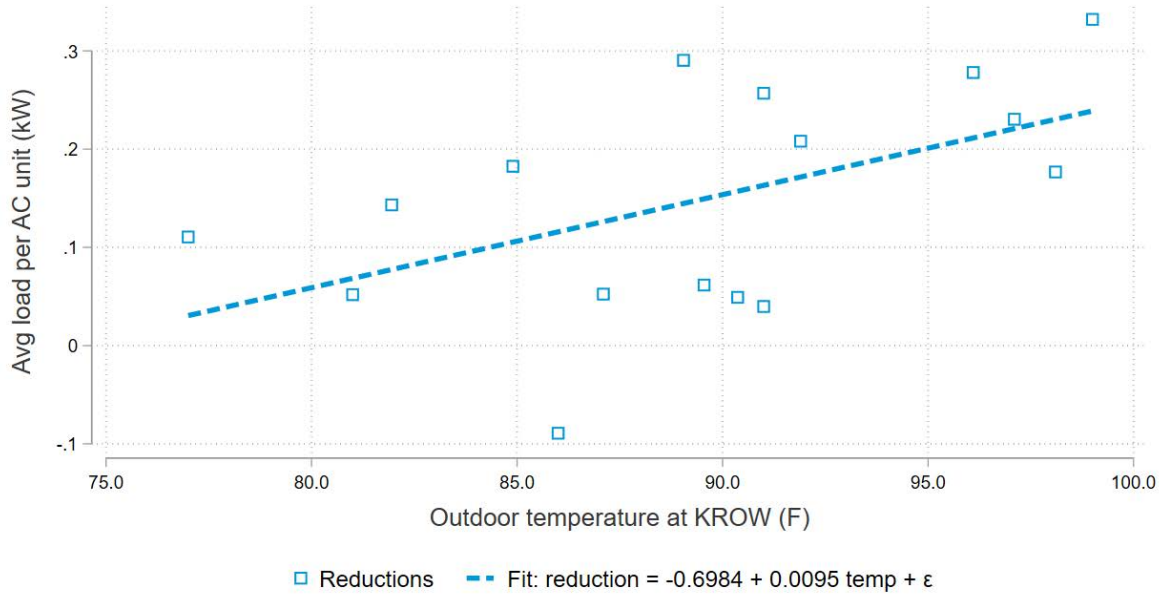


Figure 6 portrays the same data points as in Figure 5, but splits them into four panels by hour of day.Figure 5: Hourly Impacts against Outdoor Temperature (F) There is a clear trend in the figure for the first event hour. Predicted load reductions for the first hour would be 0.37 kW at 100F (-1.9418 + 0.0231 * 100). However, the relationship is less clear in subsequent hours. This makes sense given that the impacts were estimated to be much greater in the first one or two hours of an event than in subsequent hours. Because of this, using a simple linear temperature-impact model to predict *ex ante* impacts will not be as accurate as an approach that also takes into account event hour.

Figure 6: Hourly Impacts against Outdoor Temperature (F) – by hour

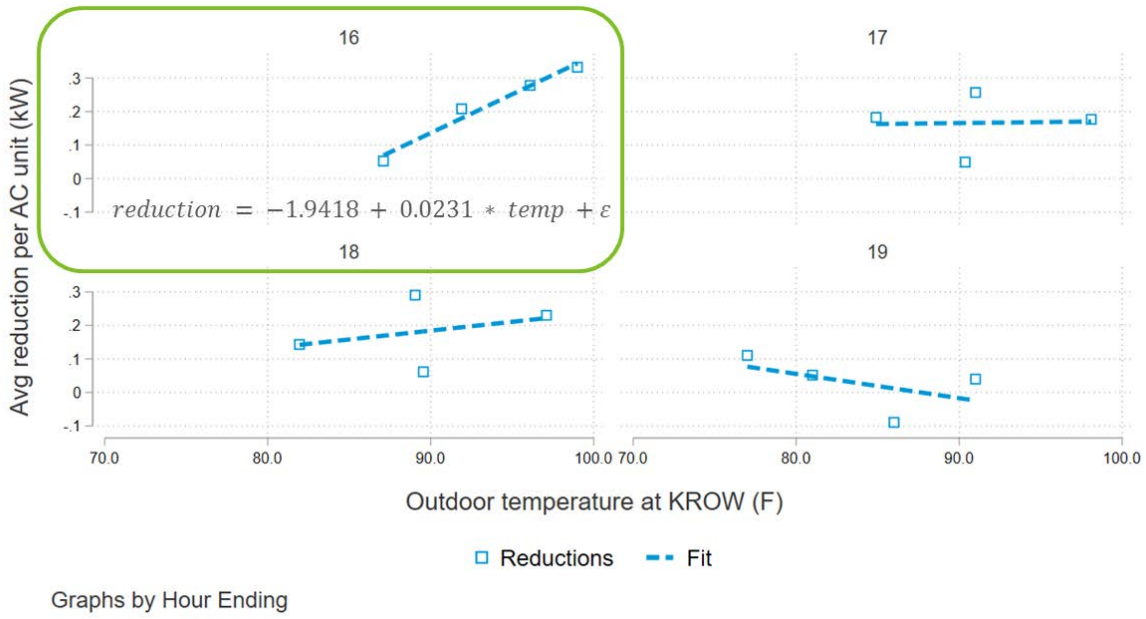


Figure 7 shows the steps used to predict the hourly impacts of a future Saver's Switch event on a day when temperatures reach 100 degrees and emergency load relief is needed. Load reductions for the average event hour and for the first event hour are included. The figure summarizes the elements measured in this evaluation and discussed above: operability rate (60%), reduction-temperature correlation values, and the portion of switches actively communicating (42%). To get an idea of what the Saver's Switch resource is worth on aggregate these factors are then applied to the total number of program participants.

Figure 7: *Ex Ante* Calculation Steps

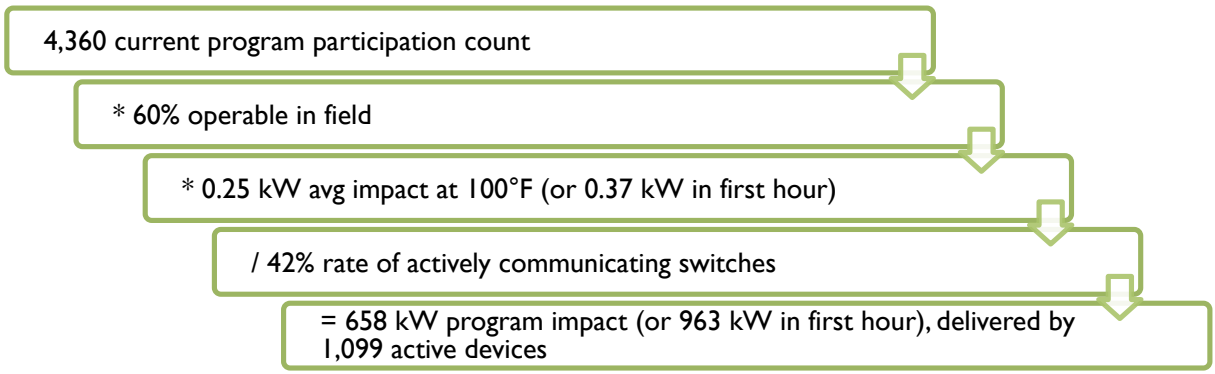


Table 7 summarizes the calculations laid out above. It shows the number of active switches, operable switches, and total program switches as well as the first hour and average event hour load reductions for each type of device.

Table 7: *Ex Ante* Impacts per Device

Avg Temp 3:00 – 7:00 p.m. at KROW (°F)	Program Total Devices	% Operable (Field)	% Communicating (Logged)	per Active Device (kW)	per Operable Device (kW)	per Program Device (kW)
				Number of Devices		
				1,099	2,616	4,360
				Average Reduction		
100	4,360	60%	42%	0.60	0.25	0.15
				First Hour Reduction		
				0.88	0.37	0.22

1.5 Program Considerations

The Evergreen team determined there are three key findings that limit program impacts for Saver's Switch. Table 8 summarizes these findings and provides an assessment of how and to what extent each finding could be addressed.

Table 8: Program Findings and How to Address

Finding	How to Address
The "adaptive" dispatch approach used during events appears to function similarly to a 50 percent cycling strategy. In practice, this may be limiting impacts on cooler days when AC units typically do not run for more than 30 minutes per hour.	**Definitely possible to address:** Reductions are greatest in the first hour on hot days (when AC units run more often) and can be maximized by only calling events under these conditions. A more aggressive 66 percent or 100 percent cycling strategy should yield higher results.
Communication issues were observed among operable switches to which loggers were deployed in the field: • Widespread communication issues for all switches occurred on July 20 and Aug 6. • On average, 42 percent of switches were effectively receiving control signals during events.	**May be possible to address:** Switch activity rates may be a result of radio signal coverage or strength. A communication rate strategy could be developed by investigating the signals coming off pager towers to make sure the communication infrastructure is all working as intended and the radio signals are at least going out with adequate coverage.
A 60 percent operability rate was observed for sampled switches during the field study.	**Likely cost-prohibitive to address:** Without advanced metering infrastructure (AMI), it is not possible to detect which program homes likely have inoperable switches. Rolling trucks to check and reconnect switches is likely cost-prohibitive.

Appendix F – Business Comprehensive and Home Energy Services Desk Review Detailed Results

Project ID	OID2781113	OID2918688	OID3088203
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Custom Efficiency - NM	Cooling - NM	Custom Efficiency - NM
Project Description		Replacement of 7 RTUs on a church	VFDs and new pump motors being installed
Building Type	Retail - Small	Assembly	Other:
Other Building Type			Oil Pump
Site Visit Being Conducted	No	No	Yes
Gross Reported kWh	2,341	3,677	284,859
Gross Reported kW	1.20	7.29	32.52
Gross Verified kWh	2,593	10,461	284,859
Gross Verified kW	1.16	5.25	32.52
kWh Realization Rate	111%	285%	100%
kW Realization Rate	96%	72%	100%
Calculation Assessment	Ex ante savings calculated using Xcel Energy lighting sheet on Custom Efficiency spreadsheet tool. Gross savings match ex post calculation method but interactive effects do not match, so overall ex post and ex ante savings to not match. Ex post savings calculated using NM TRM 6.0 interactive effects and method.	Unclear, since no ex ante savings calculations were provided.	This custom analysis was very thorough. It included calculating the baseline average demand by taking into account the parameters of operating frequency, average daily fluid production, total dynamic head, flow, pump efficiency, motor efficiency, and hydraulic horse power. For the efficient case, about a month of trend data in 15 minute intervals was provided and the average demand over this period was taken to be representative of year round consumption. This assumption is a good one to make as the operation of these pumps are process related, although oil production can fluctuate that is outside of the control of the operators. In recent years the oil production has been constant, especially for these (2) pumps. The operating hours are year round, but the hours used were 8640 reflecting a 5 day shut down for pump maintenance. The coincidence factor due to this was 99%. The evaluator agrees with the custom methodology used to calculate the savings.
TRM/Workpaper Assessment	None	None	
Reasons for RR(s) <> 1	Ex post savings calculated using NM TRM methodology. Ex ante calculate using Xcel Custom Efficiency tool which handles interactive effects differently.	Unclear, as no ex ante calculations provided. Cannot only be due to different EFLH value. Ex ante savings must have been calculated differently or using different inputs beyond just ELFH since <1 kW RR and >1 kWh RR.	
Include any other important observations here			

Project ID	OID3122534	OID3204392	OID3224671
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Cooling - NM	Cooling - NM	
Project Description	Replacement of 4 RTUs on small retail store (Walgreens)	Replacement of 3 RTUs and 1 ductless minisplit on church in Artesia NM	Motors and Drives
Building Type	Retail - Small	Assembly	Manufacturing - Light Industrial
Other Building Type			
Site Visit Being Conducted	No	Yes	No
Gross Reported kWh	2,819	31,295	118,126
Gross Reported kW	2.46	18.76	18.85
Gross Verified kWh	3,470	63,827	118,126
Gross Verified kW	2.31	19.24	18.85
kWh Realization Rate	123%	204%	100%
kW Realization Rate	94%	103%	100%
Calculation Assessment	Unclear, since no ex ante savings calculations were provided.	Assumed to follow Xcel Technical Assumptions.	Deemed savings value considered from the Technical Assumptions-deemed savings document.
TRM/Workpaper Assessment	None	Moving forward, CF should be added to cooling measures, and IEER should be used for kWh calculations for larger units. Reference the updated TRM.	
Reasons for RR(s) <> 1	Unclear, as no ex ante calculations provided. Cannot only be due to different EFLH value. Ex ante savings must have been calculated differently or using different inputs beyond just ELFH since <1 kW RR and >1 kWh RR.	Evaluator kWh savings are significantly higher, as kWh for units larger than 5.4 tons were calculated using IEER instead of EER, as IEER is a measure of part-load performance and is more representative of annual energy use. The difference between the efficient and baseline IEERs is greater than the difference between the efficient and baseline EERs. Source of slight difference in kW reduction is unknown.	
Include any other important observations here			

Project ID	OID3236919	OID3236958	OID3239054
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Motors Efficiency - NM		
Project Description	VFDs on pumps serving the oil wells (mostly cooling type pumps, on exterior	Motors and Drives	Motors and Drives
Building Type	Other:	Manufacturing - Light Industrial	Manufacturing - Light Industrial
Other Building Type	Industrail Oil Plant/ Refinery		
Site Visit Being Conducted	Yes	No	No
Gross Reported kWh	697,781	83,840	185,914
Gross Reported kW	111.56	11.54	29.66
Gross Verified kWh	1,339,934	83,840	185,914
Gross Verified kW	125.59	11.54	29.66
kWh Realization Rate	192%	100%	100%
kW Realization Rate	113%	100%	100%
Calculation Assessment	We used the equations listed in the technical assumptions documents for NM motor efficiency, however we used the actual motor efficiencies and the average HOU that were collected from trend data and the motor nameplates while onsite.	Deemed savings value considered from the Technical Assumptions-deemed savings document.	Deemed savings value considered from the Technical Assumptions-deemed savings document.
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Energy RR of 192%, using the deemed values we would arrive at 114% (not sure where the differences lie since the calculations are not provided) With communications that are documented in the analysis tab from the plant electrician these VFDs run nearly continuously. The are typically 3 pumps service an application and two are on/off direct line, while the VFD modulates to fill the load. If the load is small enough then the VFD takes the full load while the line motors are off. Due to the higher hours of operation in relation to the deemed values the RR for energy is very high. Demand RR sits at 113%. It is unknown why our savings are higher as many of the SS motor efficiencies were higher which would lead to fewer savings.	NA	NA
Include any other important observations here			

Project ID	OID3247919	OID3310731	OID3325990
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Custom Efficiency - NM	Computer Efficiency - NMx	Custom Efficiency - NM
Project Description		Installation of new high-efficiency servers and desktop PCs	
Building Type	Restaurant - Fast-Food		Retail - Small
Other Building Type			
Site Visit Being Conducted	No		No
Gross Reported kWh	3,567	2,928	33,703
Gross Reported kW	0.35	0.35	7.77
Gross Verified kWh	3,567	2,636	37,367
Gross Verified kW	0.47	0.30	7.50
kWh Realization Rate	100%	90%	111%
kW Realization Rate	133%	86%	97%
Calculation Assessment	Savings calculated using SPS lighting audit tool, assuming CF of 25%	Calculations are manageable with more data from project files	Ex ante calculation performed using Xcel Energy Custom Efficiency workbook - lighting sheet. Interactive effects handled differently in this workbook, but methodology matches ex post otherwise.
TRM/Workpaper Assessment	None	It is unknown if servers installed are High Performance or Bus Computing so it is impossible to calculate Load factor with certainty. Weighted average cooling interaction calculation should only use the peak kwh/ton cooling. HVAC system is unknown	None
Reasons for RR(s) <> 1	CF changed to 33%, as lights are on from 5-6pm, which is 1/3 of peak demand period of 3pm-6pm	several factors were unknown and assumed: (server type: high performance v bus computing - used 2%/98% split per SPS guidance); HVAC type (cooling interaction was averaged across all types in workpaper); Power Supply Server Wattage assumed to be an average value of it's boundaries i.e. 401 W - 600 W is averaged to 500 W etc	Proposed wattages changed to match DLC. Interactive effects used in ex post calculation come from NM TRM 2016.
Include any other important observations here			

Project ID	OID3328506	OID3328509	OID3329638
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Motors Efficiency - NM	Motors Efficiency - NM	Lighting
Project Description	VFDs on pumps serving the oil wells (mostly cooling type pumps, on exterior	VFDs on pumps serving the oil wells (mostly cooling type pumps, on exterior	Lighting retrofit
Building Type	Other:	Other:	Assembly
Other Building Type	Industrail Oil Plant/ Refinery	Industrail Oil Plant/ Refinery	
Site Visit Being Conducted	Yes	Yes	No
Gross Reported kWh	632,115	1,090,666	61,613
Gross Reported kW	97.39	163.75	12.96
Gross Verified kWh	553,521	1,320,295	51,443
Gross Verified kW	86.37	174.44	15.47
kWh Realization Rate	88%	121%	83%
kW Realization Rate	89%	107%	119%
Calculation Assessment	We used the equations listed in the technical assumptions documents for NM motor efficiency, and also the deemed values as the motors were inaccesible do to a a blow out that happened in proximity to the refinery	We used the equations listed in the technical assumptions documents for NM motor efficiency, however we used the actual motor efficiencies and the average HOU that were collected from trend data and the motor nameplates while onsite.	Reported savings are based on Warehouse building type. However, this is an event center/fairgrounds.
TRM/Workpaper Assessment	The application lists the VFD model number, but it would be good to include another field on the form to indicate what motor the VFD is serving. This helps organize the onsite, but also just to classify the type of pump/motor		Expand Technical assumptions to include other building types, per TRM.
Reasons for RR(s) <> 1	The RR for energy and demand would have been nearly 100%. However while onsite it was found that (2) of the (4) total 50 HP VFDs were not installed. Because of this discrepancy the energy RR was 88% and the demand RR was 89%.	Energy RR of 121%, in general the HOU provided from trend data were higher than the deemed assumptions HOU. The demand RR was 106%, the standard motor efficiencies were very similar to the efficiencies that were found onsite leading to a close RR on demand.	Evaluator calculations use hours for assembly and HVAC factors and CF for miscellaneous from TRM, as opposed to Warehouse values
Include any other important observations here			

Project ID	OID3332941	OID3333264	OID3333544
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Computer Efficiency - NMx	Lighting - NM	Lighting
Project Description	Installation of new high-efficiency servers and desktop PCs	Exterior MH HID to LED parking lot and wall packs on Walmart store	Lighting retrofit
Building Type		Retail - Single-Story Large	Retail - Single-Story Large
Other Building Type			
Site Visit Being Conducted		No	No
Gross Reported kWh	2,326	168,723	99,933
Gross Reported kW	0.30	0.00	0.00
Gross Verified kWh	2,245	176,025	98,872
Gross Verified kW	0.28	0.00	0.00
kWh Realization Rate	97%	104%	99%
kW Realization Rate	95%	100%	100%
Calculation Assessment	Calculations are manageable with more data from project files	Ex ante savings appears to use similar methodology to TRM, but no calculations were provided so this cannot be confirmed.	Number of hours, EF, DF and CF considered is according to TRM for exterior
TRM/Workpaper Assessment	It is unknown if servers installed are High Performance or Bus Computing so it is impossible to calculate Load factor with certainty. Weighted average cooling interaction calculation should only use the peak kwh/ton cooling. HVAC system is unknown	None	
Reasons for RR(s) <> 1	several factors were unknown and assumed: (server type: high performance v bus computing - used 2%/98% split per SPS guidance); HVAC type (cooling interaction was averaged across all types in workpaper); Power Supply Server Wattage assumed to be an average value of it's boundaries i.e. 401 W - 600 W is averaged to 500 W etc	Unknown, as ex ante savings calculations are not provided. Small non-1 RR may be due to small variations in baseline wattage or using nominal wattages, instead of DLC wattages, for retrofit fixtures.	Reason for slight difference unknown, as calculations were not provided
Include any other important observations here			

Project ID	OID3334050	OID3337049	OID3346705
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Custom Efficiency - NM	Lighting	Computer Efficiency - NMx
Project Description	Low-Flow Device	Lighting retrofit	Installation of new high-efficiency servers and desktop PCs
Building Type	Other:	Restaurant - Sit-Down	
Other Building Type	Commercial		
Site Visit Being Conducted	No	No	
Gross Reported kWh	38,135	3,424	1,417
Gross Reported kW	0.00	0.61	0.18
Gross Verified kWh	44,862	3,433	1,579
Gross Verified kW	0.00	0.61	0.20
kWh Realization Rate	118%	100%	111%
kW Realization Rate	100%	100%	110%
Calculation Assessment	Used data from TRM. Measured GPM used.	Number of hours, EF, DF and CF considered is according to TRM for "Retail" building type.	Calculations are manageable with more data from project files
TRM/Workpaper Assessment			It is unknown if servers installed are High Performance or Bus Computing so it is impossible to calculate Load factor with certainty. Weighted average cooling interaction calculation should only use the peak kwh/ton cooling. HVAC system is unknown
Reasons for RR(s) <> 1	Ex-ante savings are based on deemed assumptions. Ex-post savings use measured pre-retrofit flow rather than deemed pre-retrofit flow.	Likely due to rounding	several factors were unknown and assumed: (server type: high performance v bus computing - used 2%/98% split per SPS guidance); HVAC type (cooling interaction was averaged across all types in workpaper); Power Supply Server Wattage assumed to be an average value of it's boundaries i.e. 401 W - 600 W is averaged to 500 W etc
Include any other important observations here			

Project ID	OID3369345	OID3376165	OID3376232
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Custom Efficiency - NM	Custom Efficiency - NM	Custom Efficiency - NM
Project Description		Full retrofit of Home Depot store lighting to LED	Full retrofit of Home Depot store lighting to LED
Building Type	Assembly	Retail - Single-Story Large	Retail - Single-Story Large
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	27,319	643,126	667,555
Gross Reported kW	6.69	120.90	125.65
Gross Verified kWh	30,125	675,131	701,563
Gross Verified kW	6.28	101.70	105.96
kWh Realization Rate	110%	105%	105%
kW Realization Rate	94%	84%	84%
Calculation Assessment	Ex ante calculation performed using Xcel Energy Custom Efficiency workbook - lighting sheet using accurate inputs aside from calculating interactive effects differently from NM TRM.	Ex ante calculation performed using Xcel Energy Lighting Efficiency workbook - lighting sheet uses accurate inputs aside from calculating interactive effects differently from NM TRM. Proposed sales floor lights were erroneously grouped into "Space 4" and so did not have HVAC interactive effects applied.	Ex ante calculation performed using Xcel Energy Lighting Efficiency workbook - lighting sheet uses accurate inputs aside from calculating interactive effects differently from NM TRM. Proposed sales floor lights were erroneously grouped into "Space 4" and so did not have HVAC interactive effects applied.
TRM/Workpaper Assessment	None	None	None
Reasons for RR(s) <> 1	Interactive effects used in ex post calculation come from NM TRM 2016.	HVAC interactive factors were taken from NM TRM as source is more building-type specific, and were applied to both baseline and proposed sales floor lights. Proposed wattages updated per DLC certificates	HVAC interactive factors were taken from NM TRM as source is more building-type specific, and were applied to both baseline and proposed sales floor lights. Proposed wattages updated per DLC certificates
Include any other important observations here			

Project ID	OID3382644	OID3385699	OID3391324
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Lighting	Computer Efficiency - NMx	Cooling - NM
Project Description	Lighting retrofit	Installation of new high-efficiency servers and desktop PCs	Replacement of 2 RTUs on a bank in Carlsbad NM
Building Type	Office - Large		Office - Small
Other Building Type			
Site Visit Being Conducted	No		No
Gross Reported kWh	1,451	304	788
Gross Reported kW	0.42	0.04	0.72
Gross Verified kWh	1,424	298	788
Gross Verified kW	0.42	0.04	-0.09
kWh Realization Rate	98%	98%	100%
kW Realization Rate	99%	97%	-13%
Calculation Assessment	Number of hours, EF, DF and CF considered is according to TRM for "Retail" building type.	Calculations are manageable with more data from project files	Unclear, since no ex ante savings calculations were provided. kWh savings appears to match up exactly with TRM method. kW savings is negative using ex post calculation approach since EER value is worse than stipulated baseline for product size using TRM calculation.
TRM/Workpaper Assessment		It is unknown if servers installed are High Performance or Bus Computing so it is impossible to calculate Load factor with certainty. Weighted average cooling interaction calculation should only use the peak kwh/ton cooling. HVAC system is unknown	None
Reasons for RR(s) <> 1	Calculation sheets now provided - source of slight difference unknown.	several factors were unknown and assumed: (server type: high performance v bus computing - used 2%/98% split per SPS guidance); HVAC type (cooling interaction was averaged across all types in workpaper); Power Supply Server Wattage assumed to be an average value of it's boundaries i.e. 401 W - 600 W is averaged to 500 W etc	Unclear, as no ex ante calculations provided. RR of 100% for kWh savings suggests ex ante calculations follow TRM methodology with same EFLH selection. Ex post calculations showed negative kW savings due to 11 EER for proposed unit being 0.1 EER worse than stipulated baseline for cooling capacity of unit.
Include any other important observations here			

Project ID	OID3395526	OID3405258	OID3410147
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type		Lighting - NM	
Project Description	Motors and Drives	New Construction Library Lighting	Motors and Drives
Building Type	Manufacturing - Light Industrial	Other:	Storage - Refrigerated Warehouse
Other Building Type		Library	
Site Visit Being Conducted	No	No	No
Gross Reported kWh	13,868	275,628	109,782
Gross Reported kW	2.90	73.87	15.44
Gross Verified kWh	17,686	230,241	109,782
Gross Verified kW	3.03	75.68	15.44
kWh Realization Rate	128%	84%	100%
kW Realization Rate	105%	102%	100%
Calculation Assessment	Deemed savings value considered from the Technical Assumptions-deemed savings document.	It is not clear which specific parameters from the SPS TA were used to calculate savings.	Deemed savings value considered from the Technical Assumptions-deemed savings document. The savings are calculated assuming the fans replaced are supply fans. Usage of the fans are not indicated in the project documentation
TRM/Workpaper Assessment		n/a	
Reasons for RR(s) <> 1	Calculation sheet not provided.	Evaluator calculated savings using NM TRM paramters for College/University. The discrepancy seems to be related to operating hours, but it is not clear what building type was assumed by SPS when selecting operating hours.	
Include any other important observations here			

Project ID	OID3416835	OID3444427	OID3450384
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Lighting	Lighting - NM	Lighting - NM
Project Description	Lighting retrofit	Exterior MH HID to LED parking lot and wall packs on store	Exterior MH HID to LED parking lot and wall packs on Walmart store
Building Type	Retail - Single-Story Large	Retail - Single-Story Large	Retail - Single-Story Large
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	91,506	178,030	225,123
Gross Reported kW	23.63	0.00	0.00
Gross Verified kWh	86,366	83,504	239,834
Gross Verified kW	22.12	0.00	0.00
kWh Realization Rate	94%	47%	107%
kW Realization Rate	94%	100%	100%
Calculation Assessment	Number of hours, EF, DF and CF considered is according to TRM for "Retail" building type.	Ex ante savings appears to use similar methodology to TRM, but no calculations were provided so this cannot be confirmed. Possible incorrect annual operating hours used in ex ante calculation leading to nearly double gross reported energy savings.	Ex ante savings appears to use similar methodology to TRM, but no calculations were provided so this cannot be confirmed.
TRM/Workpaper Assessment		None	None
Reasons for RR(s) <> 1	Calculation sheets not provided.	Unclear, as no ex ante calculations provided. However, using 8,760 operating hours in ex post calculation provides nearly exact 100% realization rate. Lighting is for exterior parking lot and wall packs, so appropriate hours are 4,100, not 8,760.	Unclear, as no ex ante calculations provided. Slightly higher than 1 realization rate may suggest slight difference in baseline or retrofit fixture wattage: nominal vs. tested/actual, not accounting for ballast efficiency, and so on.
Include any other important observations here			

Project ID	OID3451623	OID3452061	OID3453418
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Lighting - NM	Cooling - NM	
Project Description	Exterior MH HID to LED parking lot and wall packs on Walmart store	Replacement of 1 RTU on a bank in Carlsbad NM	Several EC motors, LED strips, 36 RTUs and some walk in refrigerators and freezers
Building Type	Retail - Single-Story Large	Office - Small	grocery
Other Building Type			
Site Visit Being Conducted	No	No	Yes
Gross Reported kWh	232,872	3,075	741,003
Gross Reported kW	0.00	0.41	124.07
Gross Verified kWh	251,600	3,075	837,301
Gross Verified kW	0.00	0.44	134.27
kWh Realization Rate	108%	100%	113%
kW Realization Rate	100%	106%	108%
Calculation Assessment	Ex ante savings appears to use similar methodology to TRM, but no calculations were provided so this cannot be confirmed.	Ex ante savings appear to be calculated using appropriate inputs. 8,760 was used for EFLH, and SPS confirmed that the customer installed this unit in data center space which would need continuous cooling.	It was difficult to recreate the savings appropriately because the ECMs had quantities listed for them, but that did not always match the quantity installed. For example there could be EC motors replaced for a medium temp refrigerator but the replacement was for 4,5,and 6' coolers. These were all grouped into one quantity making the baseline difficult to determine and the individual type quantities throughout were not easily located or reported. In the future it would be good for a project of this size to have a clean version, and for any sub measures to be listed separately as unique ECMs not grouped under one similar category. Additionally these items were difficult to verify while onsite because of the organization of the project. The manager that was escorting us around the store was not familiar with where everything was installed, making verification in a timely manner difficult.
TRM/Workpaper Assessment	None	None	
Reasons for RR(s) <> 1	Unclear, as no ex ante calculations provided. Slightly higher than 1 realization rate may suggest slight difference in baseline or retrofit fixture wattage: nominal vs. tested/actual, not accounting for ballast efficiency, and so on.	Slight difference in kW - reason unknown as no ex-ante calculations provided.	Without the actual savings provided it is difficult to know where the differences lie. Overall the RR for energy and demand are fairly close.
Include any other important observations here			

Project ID	OID3461048	OID3467158	OID3473433
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Computer Efficiency - NMx	Lighting	Custom Efficiency - NM
Project Description	Installation of new high-efficiency servers and desktop PCs	Lighting retrofit	Custom lighting upgrade from linear fluorescent to linear LED
Building Type		Office - Large	Office - Small
Other Building Type			
Site Visit Being Conducted		No	No
Gross Reported kWh	489	6,694	121,951
Gross Reported kW	0.06	1.96	48.71
Gross Verified kWh	480	6,626	137,772
Gross Verified kW	0.06	1.96	50.32
kWh Realization Rate	98%	99%	113%
kW Realization Rate	97%	100%	103%
Calculation Assessment	Calculations are manageable with more data from project files	Number of hours, EF, DF and CF considered is according to TRM for "Office - Large" building type.	Ex ante savings calculated using Xcel Energy lighting sheet on Custom Efficiency spreadsheet tool. Gross savings match ex post calculation method but interactive effects do not match, so overall ex post and ex ante savings to not match. Ex post savings calculated using NM TRM 6.0 interactive effects and method.
TRM/Workpaper Assessment	It is unknown if servers installed are High Performance or Bus Computing so it is impossible to calculate Load factor with certainty. Weighted average cooling interaction calculation should only use the peak kwh/ton cooling. HVAC system is unknown		None
Reasons for RR(s) <> 1	several factors were unknown and assumed: (server type: high performance v bus computing - used 2%/98% split per SPS guidance); HVAC type (cooling interaction was averaged across all types in workpaper); Power Supply Server Wattage assumed to be an average value of it's boundaries i.e. 401 W - 600 W is averaged to 500 W etc	Slight difference likely due to rounding	Ex post savings calculated using NM TRM methodology. Ex ante calculate using Xcel Custom Efficiency tool which handles interactive effects differently.
Include any other important observations here			

Project ID	OID3478308	OID3484762	OID3485908
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Lighting - NM	Lighting	Lighting
Project Description	Exterior Lighting Retrofit	Lighting retrofit	Lighting retrofit
Building Type	Retail - Small	Other:	Other:
Other Building Type		Exterior	Exterior
Site Visit Being Conducted	No	No	No
Gross Reported kWh	58,318	101,926	1,845
Gross Reported kW	0.00	0.00	0.00
Gross Verified kWh	59,838	101,891	3,266
Gross Verified kW	0.00	0.00	0.00
kWh Realization Rate	103%	100%	177%
kW Realization Rate	100%	100%	100%
Calculation Assessment	Savings calculated correctly - baseline wattages from input wattage guide and under/over methodology; proposed wattages from DLC certificates. Quantities verified with invoices.	Number of hours, EF, DF and CF considered is according to TRM for "Exterior" building type.	Number of hours, EF, DF and CF considered is according to TRM for "Exterior" building type.
TRM/Workpaper Assessment	When under/over/not-listed approach is taken for baseline fixtures, the baseline wattage used should be clearly documented to support verification.		
Reasons for RR(s) <> 1	Evaluator used different dusk-to-dawn lighting hours based on a NM-specific calculation, leading to a slight increase in savings.		Source of difference is unknown, as calculations were not submitted. Likely due to differences in baseline fixture wattage selection.
Include any other important observations here			

Project ID	OID3498322	OID3502544	OID3508275
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type			
Project Description	Motors and Drives	Motors and Drives	Motors and Drives
Building Type	Manufacturing - Light Industrial	Manufacturing - Light Industrial	Manufacturing - Light Industrial
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	125,190	168,762	5,344
Gross Reported kW	19.05	23.23	1.04
Gross Verified kWh	125,190	168,762	5,298
Gross Verified kW	19.05	23.23	1.03
kWh Realization Rate	100%	100%	99%
kW Realization Rate	100%	100%	99%
Calculation Assessment	Deemed savings value considered from the Technical Assumptions-deemed savings document.	Deemed savings value considered from the Technical Assumptions-deemed savings document.	Deemed savings value considered from the Technical Assumptions-deemed savings document.
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	NA		Source of slight discrepancy is unknown as calculations were not provided. Evaluator calculations use well water VFD algorithms and inputs from Xcel Technical Assumptions
Include any other important observations here			

Project ID	OID3509174	OID3509316	OID3546922
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Lighting - NM	Cooling - NM	Computer Efficiency - NMx
Project Description	LED Retrofit	Chiller Replacement	Installation of new high-efficiency servers and desktop PCs
Building Type	Office - Small	Office - Small	
Other Building Type			
Site Visit Being Conducted	No	No	
Gross Reported kWh	6,694	67,803	1,574
Gross Reported kW	1.96	17.92	0.19
Gross Verified kWh	7,319	68,012	1,315
Gross Verified kW	2.14	14.54	0.15
kWh Realization Rate	109%	100%	84%
kW Realization Rate	109%	81%	79%
Calculation Assessment	Calculation approach is correct, but unclear what baseline wattage was used.	Calculations accurately followed the Xcel Technical Assumptions for air-cooled chillers.	Calculations are manageable with more data from project files
TRM/Workpaper Assessment	n/a	The Xcel Technical Assumptions assume the same EFLH for all cooling equipment. However, chillers are expected to differ from RTUs, for example, in operation. Reference the updated NM TRM for future savings assumptions specific to chillers, as this measure has been added to the TRM.	It is unknown if servers installed are High Performance or Bus Computing so it is impossible to calculate Load factor with certainty. Weighted average cooling interaction calculation should only use the peak kwh/ton cooling. HVAC system is unknown
Reasons for RR(s) <> 1	It appears that the ex-ante calculations use a different baseline wattage than what was selected by the evaluator. The evaluator used 110W per the Xcel Input Wattage Guide	Evaluator used an updated value for EFLH and CF based on a recent analysis of chiller measures, resulting in a slight increase in kWh and slight decrease in kW.	several factors were unknown and assumed: (server type: high performance v bus computing - used 2%/98% split per SPS guidance); HVAC type (cooling interaction was averaged across all types in workpaper); Power Supply Server Wattage assumed to be an average value of it's boundaries i.e. 401 W - 600 W is averaged to 500 W etc
Include any other important observations here			

Project ID	OID3557564	OID3557656	OID3567845
Utility	SPS	SPS	SPS
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type			Lighting - NM
Project Description	Motors and Drives	Motors and Drives	LED lighting retrofit
Building Type	Manufacturing - Light Industrial	Manufacturing - Light Industrial	Education - Secondary School
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	1,445,510	1,445,510	128,018
Gross Reported kW	198.96	198.96	34.35
Gross Verified kWh	1,445,510	1,445,510	110,379
Gross Verified kW	198.96	198.96	29.62
kWh Realization Rate	100%	100%	86%
kW Realization Rate	100%	100%	86%
Calculation Assessment	Deemed savings value considered from the Technical Assumptions-deemed savings document.	Deemed savings value considered from the Technical Assumptions-deemed savings document.	Calculations appear to have been performed correctly, however there appears to be a discrepancy in wattages used as kWh and kW realization rate are equal.
TRM/Workpaper Assessment			n/a
Reasons for RR(s) <> 1			The evaluator selected baseline wattages using the Xcel input wattage guide, which matches wattages listed in the application under "Ballast Factor" and proposed wattages based on DLC certificate. There appears to be a discrepancy in wattages used as kWh and kW realization rate are equal, however specific discrepancy is unknown as no documentation of calculations was available.
Include any other important observations here			

Project ID	OID3568274	OID3618485	OIS3264420
Utility	SPS	SPS	PNM
Program	Business Comprehensive	Business Comprehensive	Business Comprehensive
Measure Type	Lighting - NM	Lighting - NM	Lighting
Project Description	LED Retrofit	LED Retrofit	New Construction lighting
Building Type	Education - Secondary School	Retail - Small	Retail - Single-Story Large
Other Building Type	Junior High - Treated as Secondary School by SPS		
Site Visit Being Conducted	No	No	No
Gross Reported kWh	82,658	79,594	51,445
Gross Reported kW	22.18	20.56	8.71
Gross Verified kWh	70,893	76,532	50,803
Gross Verified kW	19.02	19.77	8.75
kWh Realization Rate	86%	96%	99%
kW Realization Rate	86%	96%	101%
Calculation Assessment	Calculations appear to have been performed correctly, however there appears to be a discrepancy in wattages used as kWh and kW realization rate are equal.	Calculations appear to have been performed correctly, however there appears to be a discrepancy in wattages used as kWh and kW realization rate are equal.	Number of hours, EF, DF and CF considered is according to TRM guidelines. DLC/Energy star certification checked for a few fixtures.
TRM/Workpaper Assessment	n/a	n/a	
Reasons for RR(s) <> 1	The evaluator selected baseline wattages using the Xcel input wattage guide, which matches wattages listed in the application under "Ballast Factor" and proposed wattages based on DLC certificate. There appears to be a discrepancy in wattages used as kWh and kW realization rate are equal, however specific discrepancy is unknown as no documentation of calculations was available.	The evaluator selected baseline wattages using the Xcel input wattage guide and proposed wattages based on DLC certificate. There appears to be a discrepancy in wattages used as kWh and kW realization rate are equal, however specific discrepancy is unknown as no documentation of calculations was available.	Difference is due to slight differences in interactive factors between Technical Assumptions and tracking database, as confirmed by SPS. Evaluator used values from Technical Assumptions
Include any other important observations here			

Project ID	2637	2679	2687
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Ceiling Insultation	Ceiling Insultation and duct efficiency	Ceiling Insulation
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	4,903	4,721	2,167
Gross Reported kW	0.33	0.42	0.28
Gross Verified kWh	6,560	7,645	2,716
Gross Verified kW	0.53	0.70	0.45
kWh Realization Rate	134%	162%	125%
kW Realization Rate	162%	169%	162%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation.	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation. Source of savings discrepancy for duct sealing is unknown, as calculations were not provided.	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation.
Include any other important observations here			

Project ID	2819	2846	2879
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Ceiling Insultation and Duct Efficiency	Duct Efficiency	Duct Efficiency
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	13,870	4,110	7,641
Gross Reported kW	0.70	0.31	0.39
Gross Verified kWh	15,773	4,110	9,389
Gross Verified kW	0.93	0.31	0.37
kWh Realization Rate	114%	100%	123%
kW Realization Rate	133%	100%	96%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation. Source of savings discrepancy for duct sealing is unknown, as calculations were not provided.	Calculation sheets not available	Source of discrepancy is unknown, as project-specific calculations were not provided
Include any other important observations here			

Project ID	2890	2910	2999
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Duct Efficiency, LED	Duct Efficiency, LED	Thermostat
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	622	430	1,011
Gross Reported kW	0.44	0.32	0.12
Gross Verified kWh	516	494	413
Gross Verified kW	0.28	0.26	0.08
kWh Realization Rate	83%	115%	41%
kW Realization Rate	63%	81%	66%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Cooling efficiency of installed unit (model number listed in field notes) used to calculate savings	Unsure of source of discrepancy, as calculations not provided	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.
Include any other important observations here			

Project ID	3079	3120	3324
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Ceiling Insultation	Air Filteration, Duct Efficiency, LED	HP
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	1,853	1,145	4,425
Gross Reported kW	0.12	0.76	1.31
Gross Verified kWh	2,479	1,445	2,670
Gross Verified kW	0.20	0.86	0.98
kWh Realization Rate	134%	126%	60%
kW Realization Rate	162%	114%	75%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation.	Differences are for duct sealing and LEDs. However, since no calculations were submitted, specific sources of discrepancies cannot be identified.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.
Include any other important observations here			

Project ID	3365	3542	3619
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Ceiling Insultation and Duct Efficiency	HP, Thermostat	Air Filteration, Duct Efficiency
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	6,192	3,162	8,223
Gross Reported kW	0.53	1.05	0.34
Gross Verified kWh	7,897	1,680	4,380
Gross Verified kW	0.70	0.60	0.39
kWh Realization Rate	128%	53%	53%
kW Realization Rate	133%	57%	112%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings	Deemed savings value considered from the TRM. The location is closest to Roswell
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation. Source of savings discrepancy for duct sealing is unknown, as calculations were not provided.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.	Ex-ante savings were calculated based on electric resistance heating. However, the model number listed in the implementation report is a model number for a heat pump. Heat pump heating is more efficient than electric resistance heating, and so heating savings are lower.
Include any other important observations here			

Project ID	3694	3726	4372
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Air Filteration, Duct Efficiency, Low Flow Shower Heads	Duct Efficiency, LED	Duct Efficiency
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	6,222	8,063	5,432
Gross Reported kW	0.48	0.40	0.22
Gross Verified kWh	6,270	8,831	10,967
Gross Verified kW	0.50	0.45	0.43
kWh Realization Rate	101%	110%	202%
kW Realization Rate	104%	112%	201%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Calculation sheet not provided.	Source of discrepancy is not known as calculations were not provided	Calculation sheets not available. Not sure regaridng the high RR for this project.
Include any other important observations here			

Project ID	4419	4428	4479
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Central AC, Thermostat	Central AC, Thermostat	Central AC, Thermostat
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	3,055	3,055	2,329
Gross Reported kW	1.37	1.37	0.91
Gross Verified kWh	1,316	2,275	627
Gross Verified kW	0.54	1.02	0.17
kWh Realization Rate	43%	74%	27%
kW Realization Rate	39%	74%	19%
Calculation Assessment	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.
Include any other important observations here			

Project ID	4494	4549	4559
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Ceiling Insultation and Duct Efficiency	HP, Thermostat	Central AC, Thermostat
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	10,937	2,806	2,169
Gross Reported kW	0.51	1.10	0.84
Gross Verified kWh	19,123	1,553	627
Gross Verified kW	1.09	0.40	0.17
kWh Realization Rate	175%	55%	29%
kW Realization Rate	216%	36%	20%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. Heat Pump upgrade option is considered.	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Ex-ante calculations for ceiling insulation used the TRM, which groups baseline cases into bins. Evaluator created a new savings calculation accounting for the actual baseline and proposed insulation levels as shown in project documentation. Source of savings discrepancy for duct sealing is unknown, as calculations were not provided.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.
Include any other important observations here			

Project ID	4605	4630	4642
Utility	SPS	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type			
Project Description	Duct Efficiency	Duct Sealing, Infiltration Reduction, LEDs	Air Filteration, Duct Efficiency, LED
Building Type	Residential - Single Family	Residential - Single Family	Residential - Single Family
Other Building Type			
Site Visit Being Conducted	No	No	No
Gross Reported kWh	4,982	7,239	690
Gross Reported kW	0.33	0.39	0.48
Gross Verified kWh	5,382	7,281	884
Gross Verified kW	0.85	0.33	0.54
kWh Realization Rate	108%	101%	128%
kW Realization Rate	257%	85%	111%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM. The location is closest to Roswell
TRM/Workpaper Assessment			
Reasons for RR(s) <> 1	Source of savings discrepancy is unknown, as calculations were not provided.	Discrepancy is for LED savings - specific source is unknown as project-specific calculations were not available for evaluator review.	Calculations performed using rated cooling efficiency of installed unit noted in field notes, instead of assumptions based on home age.
Include any other important observations here			

Project ID	4653	4734
Utility	SPS	SPS
Program	Home Energy Serves (Res & Low Income)	Home Energy Serves (Res & Low Income)
Measure Type		
Project Description	Air Filteration, Duct Efficiency, LED	HP, Thermostat
Building Type	Residential - Single Family	Residential - Single Family
Other Building Type		
Site Visit Being Conducted	No	No
Gross Reported kWh	9,865	5,149
Gross Reported kW	0.61	1.57
Gross Verified kWh	10,235	3,083
Gross Verified kW	0.55	1.06
kWh Realization Rate	104%	60%
kW Realization Rate	90%	67%
Calculation Assessment	Deemed savings value considered from the TRM. The location is closest to Roswell	Deemed savings value considered from the TRM and Technical Assumptions-deemed savings. The maximum HSPF is 9.6 in TRM, same value is used for savings calculation. Also, the default heat pump retrofit is considered as "Heat Pump Upgrade"
TRM/Workpaper Assessment		
Reasons for RR(s) <> 1	Calculation sheet not provided. No data provided for LED retrofit.	SPS confirmed that Frontier was using incorrect savings that did not agree with Xcel Technical Assumptions. Savings from Technical assumptions used by evaluator.
Include any other important observations here		

Appendix G – Additional Tables for SPS Annual Report

Table 9: PY2018 Participation, Savings, and Costs by Program/Category

Program	Participants or Units	Annual Net Savings (kWh)	Annual Net Savings (kW)	Lifetime Net Savings (kWh)	Total Program Costs
Home Lighting & Recycling	323,139	9,588,220	1,302	105,994,354	$1,893,165
Residential Cooling	58	52,151	11	925,527	$49,427
Home Energy Services	1,455	6,667,463	574	119,916,548	$1,805,330
Home Energy Services - LI	1,634	6,115,398	574	101,748,266	$1,991,654
Energy Feedback	37,438	4,161,260	1,075	4,161,260	$128,600
Business Comprehensive - Computer Efficiency	10	9,278	1	46,390	$12,058
Business Comprehensive - Cooling	21	808,349	159	11,842,961	$601,907
Business Comprehensive - Custom Efficiency	19	1,560,935	258	23,432,851	$999,410
Business Comprehensive - Lighting	94	2,387,324	310	35,286,823	$782,359
Business Comprehensive - Motors Efficiency	83	10,480,974	1,348	156,520,809	$1,951,246
Business Comprehensive - Retrocommissioning	0	0	0	0	$8,944
Business ICO	0	0	0	0	$1,076
Saver's Switch	4,360	0	658	0	$236,580
Saver's Stat	528	3,151	1,234	3,151	$77,145
School Education Kits	2,427	1,006,950	35	11,319,790	$151,213
Other Admin Costs	0	0	0	0	$310,185
Total	**371,266**	**42,841,453**	**7,539**	**571,198,731**	**$11,000,297**

Table 10: PY2018 Net-to-Gross Ratios by Program

Program	NTG Ratio
Home Lighting & Recycling	0.7100
Residential Cooling	0.6600
Home Energy Services	0.9455
Home Energy Services - LI	1.0000
Energy Feedback	1.0678
Business Comprehensive - Computer Efficiency	0.8800
Business Comprehensive - Cooling	0.7825
Business Comprehensive - Custom Efficiency	0.7825
Business Comprehensive - Lighting	0.7825
Business Comprehensive - Motors Efficiency	0.7825
Business Comprehensive - Retrocommissioning	N/A
Business ICO	N/A
Saver's Switch	1.0000
Saver's Stat	1.0000
School Education Kits	1.0000

Table 11: PY2018 Economic Benefits by Program/Category

Program/Category	Participants or Units	Cost per kWh Saved (Lifetime)	2018 Economic Benefits	Total Economic Benefits
Home Lighting & Recycling	323,139	$0.02	$557,805	$6,166,331
Residential Cooling	58	$0.05	$2,199	$39,033
Home Energy Services	1,455	$0.02	$246,788	$4,438,561
Home Energy Services - LI	1,634	$0.02	$246,505	$4,101,358
Energy Feedback	37,438	$0.03	$265,923	$265,923
Business Comprehensive - Computer Efficiency	10	$0.26	$420	$2,099
Business Comprehensive - Cooling	21	$0.05	$38,826	$568,840
Business Comprehensive - Custom Efficiency	19	$0.04	$67,952	$1,020,099
Business Comprehensive - Lighting	94	$0.02	$117,345	$1,734,473
Business Comprehensive - Motors Efficiency	83	$0.01	$430,875	$6,434,607
Business Comprehensive - Retrocommissioning	0	N/A	$0	$0
Business ICO	0	N/A	$0	$0
Saver's Switch	4,360	N/A	$133,031	$133,031
Saver's Stat	528	$24.48	$249,592	$249,592
School Education Kits	2,427	$0.01	$33,317	$374,542
Other Admin Costs	0	N/A	$0	$0
Total	**371,266**	**$0.02**	**$1,914,705.90**	**$25,528,488**

Table 12: PY2018 Detailed Costs by Program/Category

Program/Category	Avoided Energy Production Costs	Avoided Capacity Expansion Costs	Low-Income Non-Energy Benefits	Administration Costs	Incentives
Home Lighting & Recycling	$4,663,463	$1,502,868	$0	$1,298,881	$594,284
Residential Cooling	$24,154	$14,879	$0	$36,657	$12,770
Home Energy Services	$3,503,217	$935,344	$0	$274,227	$1,531,103
Home Energy Services - LI	$3,013,701	$906,381	$181,276	$278,373	$1,713,281
Energy Feedback	$127,430	$138,493	$0	$128,600	$0
Business Comprehensive - Computer Efficiency	$1,475	$624	$0	$11,438	$620
Business Comprehensive - Cooling	$350,848	$217,991	$0	$450,330	$151,577
Business Comprehensive - Custom Efficiency	$664,586	$355,513	$0	$718,354	$281,056
Business Comprehensive - Lighting	$1,335,847	$398,626	$0	$477,386	$304,973
Business Comprehensive - Motors Efficiency	$4,581,486	$1,853,121	$0	$864,220	$1,087,026
Business Comprehensive - Retrocommissioning	$0	$0	$0	$8,944	$0
Business ICO	$0	$0	$0	$1,076	$0
Saver's Switch	$0	$133,031	$0	$72,080	$164,500
Saver's Stat	$108	$249,484	$0	$72,672	$4,473
School Education Kits	$311,802	$62,740	$0	$96,682	$54,531
Other Admin Costs	$0	$0	$0	$310,185	$0
Total	**$18,578,118**	**$6,769,094**	**$181,276**	**$5,100,104**	**$5,900,193**

BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF SOUTHWESTERN PUBLIC SERVICE COMPANY'S ENERGY EFFICIENCY COMPLIANCE APPLICATION THAT REQUESTS AUTHORIZATION TO: (1) PER APPROVED VARIANCE, CONTINUE ITS: (A) 2017 ENERGY EFFICIENCY AND LOAD MANAGEMENT PROGRAMS FOR PLAN YEAR 2018; (B) 2017 ENERGY SAVINGS GOAL FOR PLAN YEAR 2018; (C) ENERGY EFFICIENCY TARIFF RIDER TO RECOVER THE THREE PERCENT FUNDING LEVEL FOR PLAN YEAR 2018 AND RECONCILIATION OF 2016 EXPENDITURES AND COLLECTIONS; AND (D) 2017 FINANCIAL INCENTIVE FOR PLAN YEAR 2018 AND RECOVER THE INCENTIVE THROUGH ITS ENERGY EFFICIENCY TARIFF RIDER; AND (2) RECOVER THE 2016 RECONCILED FINANCIAL INCENTIVE THROUGH ITS ENERGY EFFICIENCY TARIFF RIDER.	)	CASE NO. 17-00159-UT
SOUTHWESTERN PUBLIC SERVICE COMPANY,	)	
APPLICANT.	)	

CERTIFICATE OF SERVICE

I certify that a true and correct copy of *Southwestern Public Service Company's 2018 Energy Efficiency and Load Management Annual Report* was electronically served and sent via Federal Express or hand-delivery, as indicated below, to each of the following on this 15th day of May, 2019:

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