2022 ANNUAL REPORT FOR ENERGY EFFICIENCY PROGRAMS
PROGRAM YEAR 2021

NMPRC EFFICIENT USE OF ENERGY RULE 17.7.2 NMAC

JUNE 1, 2022

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Section I. Executive Summary

Introduction

El Paso Electric Company ("EPE") submits its annual report on the performance of EPE's Energy Efficiency Programs for calendar year 2021 ("2021 Programs"). This Annual Report for Energy Efficiency Programs ("Annual Report") covers the program period from January 1, 2021, through December 31, 2021, and relies on the statewide independent evaluator's report, *Evaluation of the 2021 El Paso Electric Energy Efficiency Programs* ("M&V Report") prepared by Evergreen Economics ("Evergreen"). The M&V Report is included as Attachment A. The programs evaluated in this Annual Report were approved by the New Mexico Public Regulation Commission ("NMPRC" or "Commission") as part of EPE's 2019-2021 Energy Efficiency and Load Management Plan ("EE/LM Plan") in accordance with 17.7.2.8(A) NMAC. See Final Order Adopting Recommended Decision in Case No. 18-00116-UT (March 6, 2019) ("Final Order"). In addition, El Paso Electric Company modified its 2019-2021 EE/LM Plan with the addition of a new Residential Load Management Program. See Order Granting EPE's Motion to Modify Its EE/LM Plan by Approving a New Residential Load Management Program (July 22, 2020).

Summary of Results

The following 2021 Programs are included in this Annual Report:

- LivingWise® Program
- Residential Comprehensive Program
- Residential Lighting Program
- ENERGY STAR® New Homes Program
- Residential Load Management Program
- NM EnergySaver (Low Income) Program
- Commercial Comprehensive Program
- SCORE Plus Program
- Commercial Load Management Program

Results are based upon the M&V Report by Evergreen.

The following is a short summary of the overall results[1]:

- EPE's 2021 EE/LM Portfolio achieved cost effectiveness of 1.40 as measured by the Utility Cost Test ("UCT").[2] The majority of the 2021 Programs were cost effective.
- The total annual net energy savings were 12,520,086 kilowatt-hours ("kWh") at the customer meter.
- The total 2021 Programs expenditures were $4,439,079.
- The total amount collected through Rate No. 17 – Efficient Use of Energy Recovery Factor ("EUERF") was $5,378,692.

[1] Totals in tables may not tie due to rounding.
[2] A UCT of greater than or equal to one indicates the cost effectiveness of the energy efficiency portfolio or program.

Table 1 shows the total number of participants or units, the verified annual demand and energy savings, the lifetime energy savings, and the total program costs for the 2021 Programs.

Table 1 - Verified 2021 Results Summary

Program	Participants or Units	Annual Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)	Total Program Expenses
Educational					
LivingWise Program	2,439	15	289,114	3,787,874	$ 77,683
Residential					
Residential Comprehensive Program	912	711	1,281,215	19,849,529	$ 618,628
Residential Lighting Program	153,508	557	3,301,471	66,029,412	$ 364,175
ENERGY STAR New Homes Program	361	275	589,113	12,921,188	$ 539,778
Residential Load Management	2,274	1,392	522,407	5,224,066	$ 373,070
Low Income					
NM EnergySaver Program	1,177	590	1,078,078	16,173,375	$ 581,162
Commercial					
Commercial Comprehensive Program	110	282	1,479,738	23,654,901	$ 395,941
SCORE Plus Program	292	550	3,968,875	69,628,056	$ 1,323,205
Commercial Load Management	7	793	10,075	10,075	$ 165,438
TOTAL	**161,080**	**5,165**	**12,520,086**	**217,278,477**	**$ 4,439,079**

*Total Program Expenses include EPE's internal administration costs of $227,942 recovered through base rates, therefore those costs are not recovered in Rate No. 17 - EUERF.

Table 2 presents the 2021 Benefit-Cost Analysis by Program based on the net present value ("NPV") of the 2021 Programs' benefits, expenses, and the program and portfolio UCT ratios. In accordance with the New Mexico Efficient Use of Energy Act ("EUEA") NMSA 1978 Section 62-17-5, EPE's portfolio of programs meets the UCT cost-effectiveness standard.

Table 2 - 2021 Benefit-Cost Analysis by Program

Program	NPV of Benefits (a)	NPV of Expenses (b)	UCT (a ÷ b)
Educational			
LivingWise Program	$ 61,091	$ 77,683	0.79
Residential			
Residential Comprehensive Program	$ 1,023,345	$ 618,628	1.65
Residential Lighting Program	$ 1,396,779	$ 364,175	3.84
ENERGY STAR New Homes Program	$ 474,716	$ 539,778	0.88
Residential Load Management	$ 221,224	$ 373,070	0.59
Low Income			
NM EnergySaver Program	$ 1,009,070	$ 581,162	1.74
Commercial			
Commercial Comprehensive Program	$ 585,428	$ 395,941	1.48
SCORE Plus Program	$ 1,374,292	$ 1,323,205	1.04
Commercial Load Management Program	$ 87,212	$ 165,438	0.53
PORTFOLIO UCT	**$ 6,233,155**	**$ 4,439,079**	**1.40**

*NPV is provided by Evergreen Economics in their independent evaluation results in Attachment A.

2021 Cumulative Program Goals

Table 3 provides the annual and cumulative energy savings achieved from 2008 through 2021. The EUEA required that EPE achieve cumulative savings of 65,815,596 kWh by 2014, which was equal to five percent (5%) of EPE's 2005 retail sales, and 105,304,953 kWh by 2020, which was equal to eight percent (8%) of EPE's 2005 retail sales. By the end of 2021, EPE had achieved a total cumulative savings of 176,037,245 kWh. This exceeds the 2020 statutory goal by about 67 percent.

The 2021 cumulative savings includes all annual savings for program years 2008 through 2021, less the expired 2008 and 2009 kWh savings. The 2009 kWh savings were removed once they expired in 2020.

Table 3 - 2021 Cumulative Energy Savings

Year	Portfolio EUL	Annual kWh Savings	Annual Expired	Cumulative kWh Savings	EUEA Goal
2008	7	**855,912**		855,912	
2009	11	4,667,928		5,523,840	
2010	13	5,169,908		10,693,748	
2011	13	14,728,590		25,422,338	
2012	13	13,537,655		38,959,993	
2013	11	12,832,995		51,792,988	
2014	13	20,692,228		72,485,216	65,815,596
2015	13	15,729,342		88,214,558	
2008 Expired			(855,912)	87,358,646	
2016	13	18,213,422		105,572,068	
2017	14	12,729,242		118,301,310	
2018	14	17,216,718		135,518,028	
2019	17	16,549,072		152,067,100	
2020	16	16,117,987		168,185,087	105,304,953
2009 Expired			(4,667,928)	163,517,159	
2021	17	12,520,086		176,037,245	

Section II. Program Descriptions

Educational Program

LivingWise® Program

The LivingWise® Program is an educational program that teaches fifth grade students to use energy more efficiently in their homes. The program is available at no cost to the teacher, school district or to the students and serves as an effective community outreach program to improve energy efficiency awareness. The program identifies and enrolls students and teachers and provides them with a LivingWise® kit that contains energy and water saving devices and educational materials. Students install the devices in their home, and with the help of their parents, complete a home energy audit report. EPE contracted with AM Conservation Group, Inc. to implement and manage this program. AM Conservation Group identified and enrolled teachers for the 2021 fall semester and EPE distributed 2,439 kits that achieved a net savings of 289,114 kWh.

Residential Programs

Residential Comprehensive Program

The Residential Comprehensive Program offers rebates for building envelope and weatherization measures to include air infiltration, duct sealing, ceiling and floor insulation, solar screens, evaporative coolers, refrigerated air conditioners, heat pumps, HVAC Tune-Ups, as well as ENERGY STAR® cool roofs, windows, smart thermostats, and pool pumps. The rebates are paid directly to the customer, or upon customer approval, can be paid to the contractors that perform the installation. EPE contracted with Frontier Energy, Inc. to administer the rebate process. EPE promoted this program through various outreach methods including television advertising, customer newsletters and targeted outreach to contractors that install these measures. In 2021, a total of 912 rebates were processed with a net savings of 1,281,215 kWh.

Residential Lighting Program

The Residential Lighting Program provides incentives in the form of markdowns at retail locations. The program encourages customers to replace their existing inefficient light bulbs with more energy efficient Light Emitting Diodes (“LED”) lighting. EPE contracted with CLEAResult Consulting, Inc. to provide outreach and administration for this program. A total of 27 retail locations participated in this program. EPE promoted the Residential Lighting Program through social media, and point-of-purchase displays in stores.

Pursuant to the Commission’s Final Order in Case No. 18-00116-UT, page 5, paragraph 13, EPE reviewed the cost effectiveness of the Residential Lighting Program employing the UCT shown in Tables 2 and 13. EPE determined that 100% of the lighting products distributed through the Residential Lighting Program in 2021 were LEDs. Therefore, there is no difference between the cost effectiveness of the total program and the cost effectiveness of LED lighting alone. A total of 153,508 bulbs were sold and distributed through this program, with a net savings of 3,301,471 kWh.

ENERGY STAR® New Homes Program

The ENERGY STAR® New Homes Program provides incentives for homebuilders to construct energy efficient homes that exceed 2009 International Energy Conservation Code (“IECC”)

standards. At the end of March 2021, the new 2018 IECC standards were put into place. EPE offered homebuilders two incentive paths depending on which best fits their needs. The Performance Path provides tiered incentive levels for new homes that exceed the current IECC building code goals by ten percent. The Prescriptive Path provides incentives for measures that exceed building code requirements. The installation of a combination of measures includes ENERGY STAR® lighting, refrigerators, radiant barriers, insulation, and refrigerated air conditioning. EPE contracted with ICF, Inc. to implement and manage this program. EPE promoted this program through virtual informational training sessions for homebuilders and real estate agents in the area. EPE provided yard signs for homes in the Performance Path, advertising that their homes were more energy efficient than other homes in the area. EPE targeted its marketing efforts through the Las Cruces Home Builders Association and its trade magazine. In 2021, 361 homes participated in this program and had a net savings of 589,113 kWh.

Residential Load Management Program

The Residential Load Management Program provides incentives to participating residential customers that provide voluntary load curtailment during the peak demand season of June 1 through September 30. EPE has the capability of remotely adjusting participating customers' internet-enabled smart thermostats during load management events to relieve peak load. Customers receive a $25 incentive for the purchase and enrollment of a new internet enabled smart thermostat or for registering an existing qualifying unit. Customers may also receive an additional $50 rebate for the purchase and enrollment of a new internet enabled smart thermostat through EPE's online microsite. EPE and Uplight, Inc., the program implementer, targeted customers through online advertisements, email, direct mail, and social media. There were 2,274 units that participated in the load management season with a net savings of 522,407 kWh and 1,392 kW.

The times and durations of the residential load curtailment events are shown in Table 4.

Table 4 - Residential Load Management Events

Event Date	Start Time	End Time	Duration (Hr)
6/11/2021	4:00 PM	5:00 PM	1.0
8/10/2021	3:00 PM	5:00 PM	2.0
8/23/2021	3:00 PM	5:00 PM	2.0
8/25/2021	3:00 PM	5:00 PM	2.0
9/14/2021	3:30 PM	5:30 PM	2.0
5	**Events in 2021**		**9.0**

Low Income Program

New Mexico EnergySaver Program

The New Mexico EnergySaver Program offers income-qualified customers a variety of energy efficiency measures at no cost. Qualification for the Program is based on an annual household income at or below 200 percent of the federal poverty guidelines. Frontier Energy, Inc. administered and tracked the results of this program, and EnergyWorks identified customers and implemented the direct installs. Homes with refrigerated air conditioning qualified for LEDs, attic

insulation, air infiltration, duct sealing, advanced power strips and smart thermostats. Homes with evaporative coolers qualified for LEDs, advanced power strips and installation of a high-efficiency evaporative cooler replacement. In 2021, EPE continued to expand our efforts to help low-income customers by installing 227 evaporative coolers. Of those homes eligible for an evaporative cooler upgrade that had natural gas heat, ceiling insulation was also added. Homes with electric water heaters also qualified for low flow kitchen and bathroom faucet aerators, low-flow showerheads, and water heater pipe and tank insulation. Advanced power strips, smart thermostats and evaporative cooler upgrades, water heater pipe and tank insulation were measures added in 2019. EnergyWorks collaborated with a variety of community organizations, church groups, and low-income service providers, and continued to combine energy efficiency services with New Mexico Gas Company and Zia Natural Gas Company when possible to provide customers a more comprehensive energy efficiency service approach. EPE promoted this program through outreach utilizing referrals, radio and newspaper advertising and customer newsletters. EPE and EnergyWorks also targeted customers with ability to pay issues through community educational events at EPE Payment Centers.

The Final Order in Case No. 18-00116-UT directed EPE and its Measurement & Verification ("M&V") Evaluator to:

- devise more comprehensive and meaningful measures of the program's effectiveness and to include such measures in EPE's next annual report and thereafter.

The results are shown in Table 5.

Table 5 - 2021 NM EnergySaver Program Summary

	Unique Home Count	Home Count*	Measure Count **	Expected Gross kW Savings***	Expected Gross kWh Savings***
Building Envelope (Evap. Coolers, Insulation, Air Infiltration, Duct Efficiency)		331	246	577	924,479
Water Heating (Low Flow Showerheads, Aerators, Pipe Wrap, Water Heater Jackets)		255	389	4	64,192
LED Lighting		471	5,291	9	71,267
Small Energy Devices (Advanced Power Strips, Smart Thermostats)		120	131	1	18,140
Total	**358**	**1,177**	**6,057**	**590**	**1,078,078**

* Home Count - Homes may have multiple measures installed and thus counted more than once in this sum.
** Measure Count - Number of units based on measure type, i.e., individual bulbs, aerators, showerheads, etc. Ceiling insulation count = sq. ft. insulated, pipe wrap count = total feet of pipe wrapped.
*** Reference the M&V Report in Attachment A.

This program had 358 participants and had a net savings of 1,078,078 kWh.

Commercial Programs

Commercial Comprehensive Program

The Commercial Comprehensive Program provides energy efficiency incentives and rebates for commercial customers whose annual average of monthly peak demand is up to and including 100

kilowatts ("kW"). Incentives and rebates are offered for lighting, lighting controls, heating, ventilation, and air conditioning ("HVAC"), HVAC controls, and more, as well as custom projects. EPE contracted with Frontier Energy, Inc. to implement the program, administer the incentive and rebate process, and track the results of the program. EPE advertised the Commercial Comprehensive Program through television, print, digital, and business events. To further promote this program, EPE and Frontier Energy, Inc. reached out to electrical and HVAC contractors and distributors, and property managers. A program kick-off meeting was organized to provide interested participants with program information.

Pursuant to the Commission's Final Order in Case No. 18-00116-UT, page 5, paragraph 13, EPE reviewed the cost effectiveness of the Commercial Comprehensive Program employing the UCT shown in Tables 2 and 13. All of the lighting products distributed through the Commercial Comprehensive Program in 2021 were LEDs or controls for LED fixtures. Therefore, there is no difference between the cost effectiveness of the total program and the cost effectiveness of LED lighting alone.

Table 6 shows the participation rates for each type of light in the program below.

Table 6 - 2021 Commercial Comprehensive Lighting Participation Rates

Fixture Type	Expected Gross kWh Savings*	%
Halogen	-	0.0%
High Intensity Discharge (HID)	-	0.0%
Integrated-ballast CFL Lamps	-	0.0%
Integrated-ballast CCFL Lamps	-	0.0%
Modular CFL and CCFL Fixtures	-	0.0%
Integrated-ballast LED Lamps	216,953	12.4%
Light Emitting Diode (LED)	1,472,410	84.4%
Linear Fluorescent	-	0.0%
Lighting Controls	55,589	3.2%
Total	**1,744,952**	**100.0%**

* Expected Gross kWh savings are only for the lighting and controls components of the Program.

The Commercial Comprehensive Program had 110 projects and had a net savings of 1,479,738 kWh.

SCORE Plus Program

The SCORE Plus Program offers customer incentives, technical support, and outreach services to commercial customers with an annual average of monthly peak demand greater than 100 kW, as well as schools and government facilities, regardless of their average demand. This program offers incentives for a range of energy efficiency measures including lighting, lighting controls, HVAC upgrades, HVAC controls, and more, as well as custom projects. EPE contracted with CLEAResult Consulting, Inc. to actively recruit eligible customers and to identify energy efficiency improvements that could be made to their facilities. CLEAResult also assisted customers in the program application process. EPE promoted this program through direct customer and contractor contact. In 2021, a total of 292 projects had net energy and demand savings of 3,968,875 kWh through various energy efficiency measures.

Commercial Load Management Program

The Commercial Load Management Program provides incentives to participating commercial customers that provide voluntary load curtailment during the peak demand season of June 1 through September 30. Incentives are based on verified demand savings that customers achieve for participating in load management events called by EPE. EPE contracted with Trane U.S. Inc. to actively recruit eligible customers and provide a detailed evaluation of building operations to estimate optimal load shedding options, installation and integration of controls as needed, enabling real-time energy use monitoring. Trane calculates and verifies demand savings and dispenses incentive payments. The 2021 load management season had two participants with seven sites that had net savings of 10,075 kWh and a total demand reduction of 793 kW.

The times and durations of the load curtailment events are shown in Table 7 below.

Table 7 - Commercial Load Management Events

Event Date	Start Time	End Time	Duration (Hr)
6/11/2021	4:00 PM	5:00 PM	1.0
8/25/2021	3:00 PM	5:00 PM	2.0
9/14/2021	3:30 PM	5:30 PM	2.0
3	**Events in 2021**		**5.0**

Effect of COVID-19 on Programs

The COVID-19 pandemic continued to have a detrimental effect on EPE's energy efficiency programs. Program participation was limited due to mandated business closures and quarantines. The program implementers and contractors continued to use strategies and procedures for safe inspections and audits, some utilizing apps and cameras on smart phones to conduct virtual inspections. However, strategies developed in the prior program year, did not prepare implementers and contractors for the unanticipated labor shortages and supply chain issues experienced in 2021. As such, some programs did not do as well during 2021, even with the outreach that the contractors and EPE staff conducted.

The LivingWise Program was negatively affected by the COVID-19 pandemic due to school closures, mandatory quarantines, and virtual learning. The pandemic caused a high attrition rate with teachers leaving schools and new teachers coming in. This made it more difficult to get new teachers to enroll in the program, whereas before, seasoned teachers had implemented the program year over year. One lesson learned was to provide program materials digitally through a teacher portal so that teachers could provide the program remotely. The pandemic also increased student absenteeism which negatively impacted student participation in the program.

The EnergyStar New Homes® Program was impacted by supply chain challenges, material and labor shortages, and price instability for products such as HVAC systems, PVC, concrete, lumber, copper, garage doors and rails, electrical boxes, outlets, and appliances, which resulted in home completion delays from six to nine months.

Covid-19 diminished the performance of the Commercial Load Management Program because most buildings were unoccupied or operating at lower-than-normal occupancy levels. The result was that baseline energy usage was significantly lower than in a typical summer and limited the ability for sites to curtail demand below an already reduced baseline. Additionally, an enrolled

participant with the largest committed capacity in the program was unable to participate at all due to equipment failure. They intended to utilize their power generation resource for curtailment but were unable to do so in part due to Covid-19-related challenges in securing needed repairs to operate the generator.

Section III. Energy Efficiency Rule Reporting Requirements

Section III of the Annual Report provides program information to comply with the EUEA as required by the NMPRC Energy Efficiency Rule 17.7.2.14.

Documentation of Program Expenditures

Table 8 shows the 2021 expenses by program. The Commission approved EPE's 2021 Program budget in accordance with 17.7.2.8(A) NMAC. All 2021 Program expenses were tracked through a unique work order number. Likewise, all revenue collected through EPE's EUERF was booked to a separate work order number. The total 2021 program expenses were $4,439,079 of the approved $5,113,645 budget or about 87 percent of the budget.

Table 8 - 2021 Program Expenditures

Programs	Administration*	Marketing and R&D	M&V	Customer Incentives	Total Program Expenses
Educational					
LivingWise Program	$ 12,380	$ 2,599	$ 6,836	$ 55,869	$ 77,683
Residential					
Residential Comprehensive Progran	$ 206,769	$ 18,144	$ 13,673	$ 380,042	$ 618,628
Residential Lighting Program	$ 128,802	$ 644	$ -	$ 234,729	$ 364,175
ENERGY STAR New Homes Program	$ 207,218	$ 8,607	$ 7,362	$ 316,591	$ 539,778
Residential Load Management	$ 242,187	$ 32,307	$ 7,900	$ 90,675	$ 373,070
Low Income					
NM EnergySaver Program	$ 103,228	$ 8,464	$ -	$ 469,470	$ 581,162
Commercial					
Commercial Comprehensive	$ 124,835	$ 2,146	$ 20,015	$ 248,945	$ 395,941
SCORE Plus Program	$ 572,707	$ 2,384	$ 18,961	$ 729,153	$ 1,323,205
Commercial Load Management	$ 125,061	$ 48	$ 10,534	$ 29,796	$ 165,438
TOTAL	**$ 1,723,186**	**$ 75,344**	**$ 85,281**	**$ 2,555,269**	**$ 4,439,079**

* Administration includes EPE's internal administration costs of $227,942 recovered through base rates, therefore those costs are not recovered in Rate No. 17 - EUERF.

Table 9 shows the breakdown of customer incentives by rate class.

Table 9 - Customer Incentives by Rate Class

Program	Residential NMRT01	Small Commercial NMRT03	General Service NMRT04	Irrigation Service NMRT05	City and County NMRT07	Large Power NMRT09	Purchased Power NMRT16	Outdoor Lighting NMRT25	Interruptible NMRT29	Total Participant Incentives
Educational										
LivingWise Program	$ 55,869	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,869
Residential										
Residential Comprehensive Program	$ 380,042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 380,042
Residential Lighting Program	$ 234,729	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 234,729
ENERGY STAR New Homes Program	$ 316,591	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 316,591
Residential Load Management	$ 90,675	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 90,675
Low Income										
NM EnergySaver Program	$ 469,470	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 469,470
Commercial										
Commercial Comprehensive	$ -	$ 175,330	$ 64,941	$ 8,674	$ -	$ -	$ -	$ -	$ -	$ 248,945
SCORE Plus Program	$ -	$ 81,085	$ 146,559	$ -	$ 222,729	$ 237,993	$ 28,697	$ 3,131	$ 8,958	$ 729,152
Commercial Load Management	$ -	$ -	$ -	$ -	$ 29,796	$ -	$ -	$ -	$ -	$ 29,796
TOTAL	**$ 1,547,376**	**$ 256,415**	**$ 211,500**	**$ 8,674**	**$ 252,525**	**$ 237,993**	**$ 28,697**	**$ 3,131**	**$ 8,958**	**$ 2,555,269**

EPE did not make any adjustments to expenditures in plan year 2021. Table 10 shows the budgeted amounts, the program expenditures, and the variances for each program during 2021. The variances in individual program costs from the budgeted amounts were primarily due to customer participation being lower or higher than projected.

Table 10 - Budget Variances

Program	2021 Approved Budget	2021 Actual Expenses	Variance %
Educational			
LivingWise Program	$ 84,665	$ 77,683	-8%
Residential			
Residential Comprehensive Program	$ 881,641	$ 618,628	-30%
Residential Lighting Program	$ 482,586	$ 364,175	-25%
ENERGY STAR New Homes Program	$ 450,816	$ 539,778	20%
Residential Load Management	$ 350,000	$ 373,070	7%
Low Income			
NM EnergySaver Program	$ 537,215	$ 581,162	8%
Commercial			
Commercial Comprehensive Program	$ 464,685	$ 395,941	-15%
SCORE Plus Program	$ 1,475,758	$ 1,323,205	-10%
Commercial Load Management Program	$ 386,279	$ 165,438	-57%
TOTAL	**$ 5,113,645**	**$ 4,439,079**	**-13%**

Estimated and Actual Customer Participation and Savings Levels

Table 11 presents the estimated and actual customer participation levels, annual energy savings, and annual peak demand savings for each program.

Table 11 - Estimated vs. Actual

Program	Estimated Participants or Units	Actual Participants or Units	Estimated Savings (kWh)	Actual Savings (kWh)	Estimated Savings (kW)	Actual Savings (kW)
Educational						
LivingWise Program	3,050	2,439	863,634	289,114	10	15
Residential Comprehensive Program	1,384	912	1,687,734	1,281,215	978	711
Residential Lighting Program	155,000	153,508	2,443,373	3,301,471	154	557
ENERGY STAR New Homes Program	300	361	587,895	589,113	285	275
Residential Load Management	5,000	2,274	654,572	522,407	4,736	1,392
NM EnergySaver Program	1,600*	1,177	1,790,780	1,078,078	239	590
Commercial Comprehensive Program	152	110	1,970,618	1,479,738	362	282
SCORE Plus Program	157	292	4,917,478	3,968,875	1,154	550
Commercial Load Management	15	7	40,903	10,075	4,083	793
TOTAL	**166,658**	**161,080**	**14,956,989**	**12,520,086**	**12,000**	**5,165**

* NM EnergySaver Program Estimated Participants or Units = Home count. Homes may have multiple measures installed and thus counted more than once in this sum. EPE's 2019-2021 EE/LM Plan, Case No. 18-00116-UT, included an estimated participation count of 42,656 which represented the number of units based on measure type, i.e., individual bulbs, aerators, showerheads, etc.

Estimated and Actual Costs (Expenses) and Avoided Costs (Benefits)

Table 12 presents the net present value of estimated and actual monetary expenses and benefits for each program.

Table 12 - Estimated and Actual Costs (Expenses) and Avoided Costs (Benefits)

	Estimated NPV of Monetary Costs	Actual NPV of Monetary Costs	Estimated NPV of Monetary Benefits	Actual NPV of Monetary Benefits
Educational				
LivingWise Program	$ 84,665	$ 77,683	$ 94,274	$ 61,091
Residential				
Residential Comprehensive Program	$ 881,641	$ 618,628	$ 1,260,706	$ 1,023,345
Residential Lighting Program	$ 482,586	$ 364,175	$ 638,388	$ 1,396,779
ENERGY STAR New Homes Program	$ 450,816	$ 539,778	$ 463,488	$ 474,716
Residential Load Management	$ 350,000	$ 373,070	$ 543,329	$ 221,224
Low Income				
NM EnergySaver Program	$ 537,215	$ 581,162	$ 597,316	$ 1,009,070
Commercial				
Commercial Comprehensive Program	$ 464,685	$ 395,941	$ 411,472	$ 585,428
SCORE Plus Program	$ 1,475,758	$ 1,323,205	$ 626,536	$ 1,374,292
Commercial Load Management	$ 386,279	$ 165,438	$ 1,910,548	$ 87,212
TOTAL	**$ 5,113,645**	**$ 4,439,079**	**$ 6,546,058**	**$ 6,233,155**

Cost Effectiveness Evaluation

Table 13 presents the UCT for each program for 2021. The UCT of the total portfolio of programs was 1.40. A UCT of greater than one indicates the cost effectiveness of the energy efficiency portfolio or program. UCTs are based on the weighted average cost of capital and avoided costs authorized by the Commission's Final Order in Case No. 18-00116-UT. EPE's 2021 total portfolio of programs passed cost effectiveness.

Table 13 - Cost Effectiveness by Program

Program	UCT
Educational	
LivingWise Program	0.79
Residential	
Residential Comprehensive Program	1.65
Residential Lighting Program	3.84
ENERGY STAR New Homes Program	0.88
Residential Load Management	0.59
Low Income	
NM EnergySaver Program	1.74
Commercial	
Commercial Comprehensive Program	1.48
SCORE Plus Program	1.04
Commercial Load Management	0.53
PORTFOLIO UCT	**1.40**

Self-Directed Program Participation

EPE did not receive any applications for customer self-directed programs in 2021.

Independent Measurement and Verification Report

The statewide independent evaluator, Evergreen, was selected by the NMPRC. EPE contracted with Evergreen to conduct the independent evaluation of its 2021 Programs. The M&V Report is included as Attachment A to this report and includes:

- Documentation of expenses at both the individual and total portfolio program levels;
- Measured and verified energy and demand savings;
- Cost-effectiveness of all 2021 Programs;
- Deemed savings and other assumptions used by Evergreen; and,
- Description of the M&V process used by Evergreen.

Program Expenditures Not Covered in the Independent M&V Report

All program-related expenditures are included in the M&V Report.

Annual Economic Benefits by Program

Table 14 presents the annual and lifetime energy savings, estimated useful life ("EUL"), and annual economic benefits for the 2021 Programs. The average EUL is calculated by dividing the total lifetime energy savings by the annual energy savings, resulting in an average estimate of how long measures will continue to provide savings.

Table 14 - Annual Economic Benefits

Program	Annual Energy Savings (kWh)	Lifetime Energy Savings (kWh)	Estimated Useful Life	Annual Benefits
Educational				
LivingWise Program	289,114	3,787,874	13	$ 4,663
Residential				
Residential Comprehensive Program	1,281,215	19,849,529	15	$ 66,053
Residential Lighting Program	3,301,471	66,029,412	20	$ 69,839
ENERGY STAR New Homes Program	589,113	12,921,188	22	$ 21,644
Residential Load Management	522,407	5,224,066	10	$ 22,122
Low Income				
NM EnergySaver Program	1,078,078	16,173,375	15	$ 67,262
Commercial				
Commercial Comprehensive Program	1,479,738	23,654,901	16	$ 36,622
SCORE Plus Program	3,968,875	69,628,056	18	$ 78,336
Commercial Load Management	10,075	10,075	1	$ 87,212
TOTAL	**12,520,086**	**217,278,477**		**$ 453,753**

Non-Energy Benefits

Table 15 shows the estimated emissions savings, and Table 16 shows the estimated water savings associated with the 2021 Programs. The annual and lifetime avoided emissions are determined by multiplying the emission rates times the annual and lifetime megawatt-hours ("MWh") saved. The water savings are determined by multiplying EPE's average portfolio water consumption per MWh times the annual and lifetime energy savings.

Table 15 - Emissions Savings

Emission Type	Avoided Electric Emmision Rate (lbs/MWh)	Annual Avoided Emissions (tons)	Lifetime Avoided Emissions (tons)
SO_2	0.0050	0.03	0.53
NO_X	1.06	6.65	112.67
CO_2	1,187	7,430	125,983
Particles	0.0916	0.57	9.72

Table 16 - Water Savings

Water Impact	EPE Portfolio Water Consumption (gal/MWh)	Annual Water Saved (gal)	Lifetime Water Saved (gal)
Water Saved	563.3	7,052,555	119,576,304

Tariff Reconciliation

Table 17 presents the calculation for EPE's 2021 tariff reconciliation based on the 2021 program expenditures plus the approved 2021 utility incentive, less EPE's internal administration costs, and less the cost recovery through EPE's EUERF from January through December 2021. The costs recovered through the EUERF are therefore not recovered through EPE's base rates.

EPE's 2021 utility incentive is based on its costs and satisfactory performance of measures and programs. Utilizing the sliding scale utility incentive approved by the Final Order (7.1 percent for verified annual savings of at least 12 gigawatt-hours ("GWh") with an adder incentive of 0.075 percent for each 1.0 GWh of additional energy savings, up to a maximum of 7.6657 percent), EPE earned a profit incentive of 7.1 percent for its verified annual energy savings of 12.52 GWh.

Table 17 - Energy Efficiency Historical (Underage)/Overage Recovery

Description	Total Program Expenses	7.1% Utility Incentive	Internal Admin Costs Recovered Through Base Rates	EUERF Recovery	(Underage)/ Overage
Beg. Bal. (PY2018-2020)					$ 902,001
2021 Energy Efficiency Activity	$ 4,439,079	$ 315,173	$ 227,942	$ 5,378,692	$ 49,619
Ending Balance					**$ 49,619**

EPE's beginning balance originated from an overage of $902,001 due to activities from Program Years 2018 to 2020, with carrying charges for Program Years 2019 and 2020. The total program expenses ($4,439,079 + $315,173 utility incentive = $4,754,252) exceeded the revenues collected ($227,942 + $5,378,692 = $5,606,634) in 2021, resulting in a cumulative overage amount of $49,619.

Table 18 presents the month-by-month reconciliation of EPE's tariff reconciliation.

Table 18 - EPE Tariff Reconciliation

Month	Total Program Expenses	7.1% Utility Incentive	Internal Admin Costs Recovered Through Base Rates	EUERF Recovery	(Underage)/ Overage of Expenses
Beg. Bal. (PY2018-2020)					902,001
Jan 2021	$ 75,626	$ 5,369	$ 18,995	$ 451,411	$ 512,590
Feb 2021	$ 89,613	$ 6,363	$ 18,995	$ 380,840	$ 208,731
Mar 2021	$ 192,315	$ 13,654	$ 18,995	$ 320,502	$ 75,203
Apr 2021	$ 335,537	$ 23,823	$ 18,995	$ 328,616	$ 86,952
May 2021	$ 233,877	$ 16,605	$ 18,995	$ 394,496	$ (76,057)
Jun 2021	$ 380,443	$ 27,011	$ 18,995	$ 517,389	$ (204,987)
Jul 2021	$ 400,823	$ 28,458	$ 18,995	$ 700,969	$ (495,670)
Aug 2021	$ 220,690	$ 15,669	$ 18,995	$ 684,827	$ (963,133)
Sep 2021	$ 253,808	$ 18,020	$ 18,995	$ 578,101	$ (1,288,401)
Oct 2021	$ 369,834	$ 26,258	$ 18,995	$ 382,858	$ (1,294,162)
Nov 2021	$ 406,825	$ 28,885	$ 18,995	$ 300,541	$ (1,177,988)
Dec 2021	$ 1,479,688	$ 105,058	$ 18,997	$ 338,142	$ 49,619
Total	**$ 4,439,079**	**$ 315,173**	**$ 227,942**	**$ 5,378,692**	

Estimated Program Expenditures Expected in 2022

Table 19 shows estimated program expenditures for 2022. EPE's Program Year 2022 budget of $6,226,213 is pending approval in NMPRC Case No. 21-00114-UT.

Table 19 - Estimated Program Expenditures Expected in 2022

2022 Program	Budget
Educational	
Smart Students Program	$ 134,991
Residential	
Residential Comprehensive Program	$ 1,093,830
Residential Lighting Program	$ 409,844
ENERGY STAR New Homes Program	$ 404,329
Marketplace Program	$ 277,028
Residential Load Management	$ 321,606
Low Income	
EnergySaver Program	$ 888,694
Energy$mart Program	$ 225,773
Commercial	
Commercial Comprehensive Program	$ 501,990
SCORE Plus Program	$ 1,600,007
Commercial Load Management	$ 368,119
TOTAL	**$ 6,226,213**

Evaluation of the 2021 El Paso Electric Energy Efficiency Programs

Final Report

May 17, 2022

EVERGREEN ECONOMICS

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

ECOMETRIC

RESEARCH & POLLING INC

Table of Contents

Executive Summary

This report presents the independent evaluation results for the El Paso Electric (EPE) energy efficiency programs for program year 2021 (PY2021).

The EPE 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, EPE 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. 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 EPE's savings estimates;
- **Demand Side Analytics** conducted the impact evaluation of the Commercial and Residential Load Management programs; and
- **Research & Polling** fielded all the phone surveys.

For PY2021, the following EPE programs were evaluated:

- Small Business Comprehensive
- SCORE Plus
- Residential Lighting

[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

- NM EnergySaver
- Residential Load Management
- Commercial Load Management

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. Brief process evaluations were also conducted for the Small Business Comprehensive and SCORE Plus programs.

A summary of the analysis methods for each of the PY2021 programs that were evaluated is included below.

Small Business Comprehensive. The measures eligible for the Small Business Comprehensive program are prescriptive in nature, and as such the evaluation included a deemed savings review, phone survey verification, and project desk reviews. The deemed savings review focused on verifying that the appropriate savings values were applied based on the equipment installed and per the referenced source of savings, whether that was the New Mexico Technical Reference Manual (TRM) or another source. The phone survey was used to verify that program-rebated measures were still installed and functional as well as to gather information to calculate a free ridership rate. Finally, desk reviews were used to examine the savings assumptions and calculations specific to each project that was included in the review sample.

SCORE Plus. The SCORE Plus program evaluation approach was similar to the approach for the Small Business Comprehensive program and included desk reviews for a representative sample of projects and phone surveys with program participants.

Residential Lighting. The Residential Lighting program utilized an elasticity model to estimate net impacts based on the observed changes in bulb sales at different retail price points. The model was then used to estimate the effect that the program rebate is having on bulb sales, which was used to estimate free ridership for the program. The deemed savings for each bulb type were also reviewed as part of the gross impact analysis.

NM EnergySaver. The NM EnergySaver program provides weatherization and other efficiency improvements at no cost to low-income customers. Other measures provided include LEDs and water conservation measures for customers with electric water heaters. These are prescriptive measures, and as such, the focus of the evaluation for this program was a deemed savings review. This included a review of the source of deemed savings, whether that was the New Mexico TRM or another source, as well as verification that the deemed savings were applied correctly in the tracking data.

Residential Load Management. This program provides incentives to residential customers that allow EPE the ability to remotely adjust participating customers' internet-enabled smart

thermostats during load management events. The impacts from this program were calculated by comparing the actual energy use with estimated baseline usage during the load control events.

Commercial Load Management. The Commercial Load Management program allows participating customers to provide on-call, voluntary curtailment of electric consumption during peak demand periods in return for incentives. The impacts from this program were calculated by comparing the actual energy use with estimated baseline usage during the load control events.

Table 1 summarizes the PY2021 evaluation methods.

Table 1: Summary of PY2021 Evaluation Methods by Program

Program	Deemed Savings Review	Phone Survey / Interviews	Engineering Desk Reviews	Billing Regression	Elasticity Model
Residential Lighting	◆				◆
NM EnergySaver	◆				
Residential Load Management	◆			◆	
Commercial Load Management				◆	
Small Business Comprehensive	◆	◆	◆		
SCORE Plus		◆	◆		

The results of the PY2021 impact evaluation are shown in Table 2 (kWh) and Table 3 (kW), with the programs evaluated in 2021 highlighted in blue.

Table 2: PY2021 Savings Summary – kWh

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Residential Lighting	153,508	4,927,568	1.0000	4,927,568	0.6700	3,301,471
LivingWise	2,439	289,114	1.0000	289,114	1.0000	289,114
ENERGY STAR New Homes	361	803,373	1.0000	803,373	0.7333	589,113
NM EnergySaver	1,177	1,078,078	1.0000	1,078,078	1.0000	1,078,078

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Residential Comprehensive	912	2,011,958	1.0000	2,011,958	0.6368	1,281,215
Residential Load Management	2,274	522,407	1.0000	522,407	1.0000	522,407
SCORE Plus	292	5,950,853	0.9966	5,930,776	0.6692	3,968,875
Small Business Comprehensive	110	1,802,028	1.0001	1,802,141	0.8211	1,479,738
Commercial Load Management	7	10,075	1.0000	10,075	1.0000	10,075
Total	**161,080**	**17,395,454**		**17,375,490**		**12,520,086**

Table 3: PY2021 Savings Summary – kW

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Residential Lighting	153,508	831	1.0000	831	0.6700	557
LivingWise	2,439	15	1.0000	15	1.0000	15
ENERGY STAR New Homes	361	375	1.0000	375	0.7333	275
NM EnergySaver	1,177	590	1.0000	590	1.0000	590
Residential Comprehensive	912	1,117	1.0000	1,117	0.6368	711
Residential Load Management	2,274	1,392	1.0000	1,392	1.0000	1,392
SCORE Plus	292	825	0.9963	822	0.6692	550
Small Business Comprehensive	110	343	1.0003	343	0.8211	282

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Commercial Load Management	7	745	1.0644	793	1.0000	793
Total	**161,080**	**6,233**		**6,278**		**5,165**

Beginning in 2021 for the impact evaluation, we shifted to applying new net-to-gross (NTG) ratios prospectively for future years, rather than retrospectively as had been done in prior years. As a consequence, the same NTG ratios applied in PY2020 were also being used for PY2021. For the PY2021 evaluation, the only updates to the NTG ratios occurred with the Small Business Comprehensive, Residential Lighting, and SCORE Plus programs, and these new ratios will be applied beginning in PY2022. For the Small Business Comprehensive program, the ratios will change from 0.8211 to 0.8919, and for Residential Lighting, the ratio will change from 0.6700 to 0.6000. Due to the relatively low number of respondents for the SCORE Plus program, the survey results from both the PY2020 and PY2021 evaluations were averaged with the PY2019 ratio to get an updated rate of 0.6088. This new value will be used for the SCORE Plus program beginning in PY2022.

Table 4 summarizes the updates to the NTG ratios for PY2022, with the updated values shaded in green.

Table 4: Net-to-Gross Ratio Updates for PY2022

Program	PY2021 NTG Ratio	PY2022 NTG Ratio
Residential Lighting	0.6700	0.6000
LivingWise	1.0000	1.0000
ENERGY STAR New Homes	0.7333	0.7333
NM EnergySaver	1.0000	1.0000
Residential Comprehensive	0.6368	0.6368
Residential Load Management	1.0000	1.0000
SCORE Plus	0.6692	0.6088

Program	PY2021 NTG Ratio	PY2022 NTG Ratio
Small Business Comprehensive	0.8211	0.8919
Commercial Load Management	1.0000	1.0000

Using net realized savings from this evaluation and cost information provided by EPE, the evaluation team calculated the ratio of benefits to costs for each of EPE'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.[2] The evaluation team conducted this test in a manner consistent with the California Energy Efficiency Policy Manual.[3] The results of the UCT are shown below in Table 5. The portfolio overall was found to be cost effective with a UCT ratio of 1.40.

Table 5: PY2021 Cost Effectiveness

Program	Utility Cost Test (UCT)
Small Business Comprehensive	1.48
SCORE Plus	1.04
Residential Lighting	3.84
Residential Comprehensive	1.65
ENERGY STAR New Homes	0.88
NM EnergySaver	1.74
LivingWise	0.79
Commercial Load Management	0.53
Residential Load Management	0.59
Overall Portfolio	**1.40**

[2] The Utility Cost Test is sometimes referred to as the Program Administrator Cost Test, or PACT.
[3] California Public Utilities Commission. 2020. *California Energy Efficiency Policy Manual – Version 6*. https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf

The process evaluation activities included phone surveys with Small Business Comprehensive and SCORE Plus participants and an interview with an NM EnergySaver participating contractor. Based on the data collection and analysis conducted for this evaluation, the evaluation team found that overall, EPE is operating programs that are resulting in energy and demand savings and satisfied participants. In terms of cost effectiveness, the UCT test was used and found that five of the nine programs were cost effective.

1 Evaluation Methods

The analysis methods used for the evaluated PY2021 programs are summarized as follows:

Small Business Comprehensive. The measures eligible for the Small Business Comprehensive program are prescriptive in nature, and as such the evaluation included a deemed savings review, phone survey verification, and project desk reviews. The deemed savings review focused on verifying that the appropriate savings values were applied based on the equipment installed and per the referenced source of savings, whether that was the New Mexico TRM or another source. The phone survey was used to verify that program-rebated measures are still installed and functional as well as to gather information to calculate a free ridership rate. Finally, desk reviews were used to examine the savings assumptions and calculations specific to each project that was included in the review sample.

SCORE Plus. The SCORE Plus program evaluation approach was similar to the approach for the Small Business Comprehensive program and included desk reviews for a representative sample of projects and phone surveys with program participants.

Residential Lighting. The Residential Lighting program utilized an elasticity model to estimate net impacts based on the observed changes in bulb sales at different retail price points. The model was then used to estimate the effect that the program rebate is having on bulb sales, which is used to estimate free ridership for the program. The deemed savings for each bulb type was also reviewed as part of the gross impact analysis.

NM EnergySaver. The NM EnergySaver program provides weatherization and other efficiency improvements at no cost to low-income customers. Other measures provided include LEDs and water conservation measures for customers with electric water heaters. These are prescriptive measures, and as such, the focus of the evaluation for this program was a deemed savings review. This included a review of the source of deemed savings, whether that was the New Mexico TRM or another source, as well as verification that the deemed savings were applied correctly in the tracking data.

Residential Load Management. This program provides incentives to residential customers that allow EPE the ability to remotely adjust participating customers' internet-enabled smart thermostats during load management events. The impacts from this program were calculated by comparing the actual energy use with estimated baseline usage during the load control events.

Commercial Load Management. The Commercial Load Management program allows participating customers to provide on-call, voluntary curtailment of electric consumption during peak demand periods in return for incentives. The impacts from this program were calculated by comparing the actual energy use with estimated baseline usage during the load control events.

Additional detail on each of these evaluation methods is included in the remainder of this section.

1.1 Phone Surveys

Phone surveys were fielded in March 2022 for participants in the Small Business Comprehensive and SCORE Plus programs. The phone surveys ranged from 15 to 20 minutes in length and covered the following topics:

- Verification of measures included in EPE'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.

Secondary 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 both the Small Business Comprehensive and SCORE Plus programs, the original goal was to complete as many surveys as possible, and a census of participants was contacted for these programs. Ultimately, 26 surveys were completed with Small Business Comprehensive participants and 4 surveys were completed with SCORE Plus participants. Table 6 shows the distribution of completed surveys.

Table 6: EPE Phone Survey Summary

Program	Customers with Valid Contact Info	Target # of Completes	Completed Surveys
Small Business Comprehensive	37	35	26
SCORE Plus	16	15	4
Total	**53**	**50**	**30**

The final survey instruments for the Small Business Comprehensive and SCORE Plus programs are included in Appendix A and Appendix B.

1.2 Engineering Desk Reviews and Deemed Savings Reviews

To verify gross savings estimates, the evaluation team conducted engineering desk reviews for a sample of the projects in the Small Business Comprehensive and SCORE Plus programs. The goal of the desk reviews was to verify equipment installation, operational parameters, and estimated savings. Reviews of the deemed savings values were also completed for those program measures

that used prescriptive savings values. For PY2021, deemed savings reviews were completed for the Residential Load Management, NM EnergySaver, and Residential Lighting programs, as well as for the prescriptive measures (e.g., lighting) included in the other programs.

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 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 those programs and projects that used deemed savings values, the review process included the following:

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

1.3 Load Management Impact Estimation

For the Commercial Load Management program, as part of the PY2021 evaluation, the evaluation team worked closely with EPE and Trane to reach an agreement on the mechanics of the demand response performance calculation mechanism. This calculation centers on the baseline or estimate of what load would have been in the participating facilities on event days if demand response had not been called. The settlement calculations called for a "high 8-of-10" baseline with a capped, symmetric day-of adjustment. Only non-event, non-holiday weekdays were eligible to be baseline days. For each event window, the method for the settlement calculations was as follows:

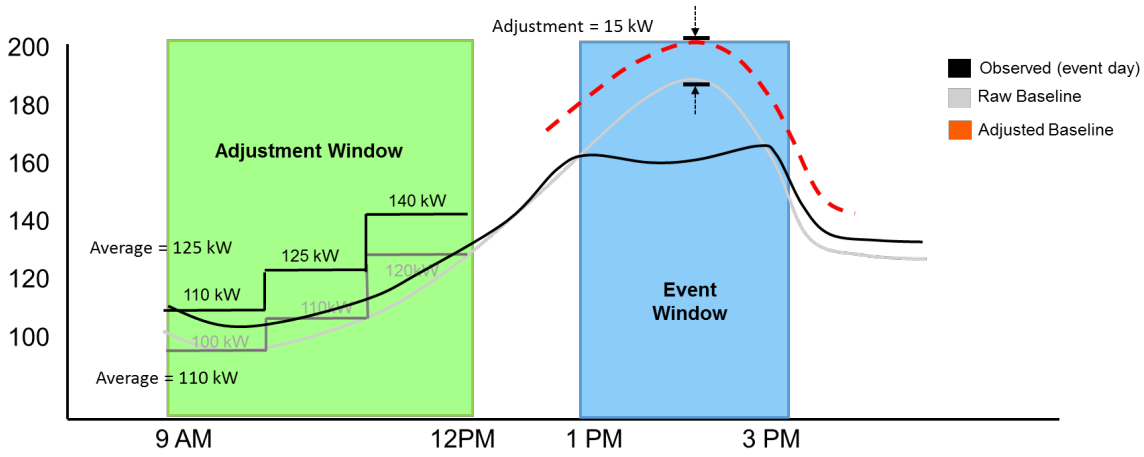
1. Select the last ten non-event, non-holiday weekdays.
2. Select the eight days (out of ten) with the highest average load during the event window, using the 15-minute interval load data.
3. For each 15-minute interval, calculate the average load of the eight selected baseline days. This is known as the "raw baseline."

After the raw baseline was calculated, a day-of "Adjustment Factor" was calculated and applied to the raw baseline to create the "Adjusted Baseline," as follows:

- Designate the three hours prior to the event, excluding the hour immediately prior to the event, as the "Adjustment Window."
- Calculate the average observed load on the event day during the Adjustment Window (single value).
- Calculate the average load of the three baseline days during the Adjustment Window (single value).
- For each interval in the event window, add/subtract an Adjustment Factor to/from the raw baseline to calculate the Adjusted Baseline. The Adjustment Factor (single value) is defined as the difference of the average observed load and the average load of baseline days, capped at +/- 20 percent of the corresponding baseline average load.

A hypothetical sample calculation is illustrated in Figure 1. In this example, the adjusted baseline is 15 kW higher than the raw baseline during the event window, because the actual average observed load during the adjustment window was 15 kW higher on the event day (125 kW) compared to the baseline days (110 kW).

Figure 1: Illustration of Adjusted Baseline Calculation



For the Residential Load Management program, the impact analysis utilized a within-subjects regression analysis. The analysis uses hourly smart thermostat runtime data provided by the three participating device manufacturers—Nest, Emerson, and Ecobee. In the analysis, average baseline runtime was estimated for each hour of the five event days.

The baseline was estimated using within-subjects regression. For each event day and hour, the non-event day data for each of the devices used to predict the average runtime without demand response. The average predicted runtime across all experimental devices on each event day was used as the baseline. Only non-event, non-holiday weekdays were used in the regression model.

The raw runtime impacts were then estimated by subtracting the actual runtime from the baseline runtime estimate in each event hour, where runtime is expressed as the number of minutes that the HVAC system is running that hour. The cooling runtime impacts were then converted to cooling load impacts (in KW), using the connected load assumptions in the New Mexico TRM (Equation 1).

Equation 1: New Mexico TRM Smart Thermostat Connected Load

$$HVAC\ Capacity\ (kW) = \frac{Capacity_{cool}}{1000\frac{W}{kW}} x \frac{1}{EER} = \frac{36{,}000\frac{Btu}{h}}{1000\frac{W}{kW}} x \frac{1}{11.18\frac{Btu}{Wh}} = 3.22\ kW$$

$$where\ EER = -0.02 * SEER^2 + 1.12 * SEER = -0.02 * 13^2 + 1.12 * 13 = 11.18$$

For each event hour, the reduction in cooling runtime per hour was multiplied by the estimated HVAC system capacity. This represents the demand impact per treatment device per hour, which was averaged across the event hours to provide the impact per demand response device for each event. This number was then used to provide a picture of the overall program impact delivered, as well as load reduction capability.

Additional details on the impact methods and results for the Commercial Load Management and the Residential Load Management programs are provided in Appendix D and Appendix E.

1.4 Net Impact Analysis

1.4.1 Self-Report Approach

The evaluation team estimated net impacts for most 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 the 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 (i.e., 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 (e.g., would less efficient equipment have been installed, would the project have been delayed)?
- Were there other program or utility interactions that affected the decision to choose high efficiency equipment (e.g., was 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 NTG ratio) using the self-report approach is based on the 2017 Illinois Statewide TRM.[4] For the EPE programs, questions regarding free ridership were divided into several primary components:

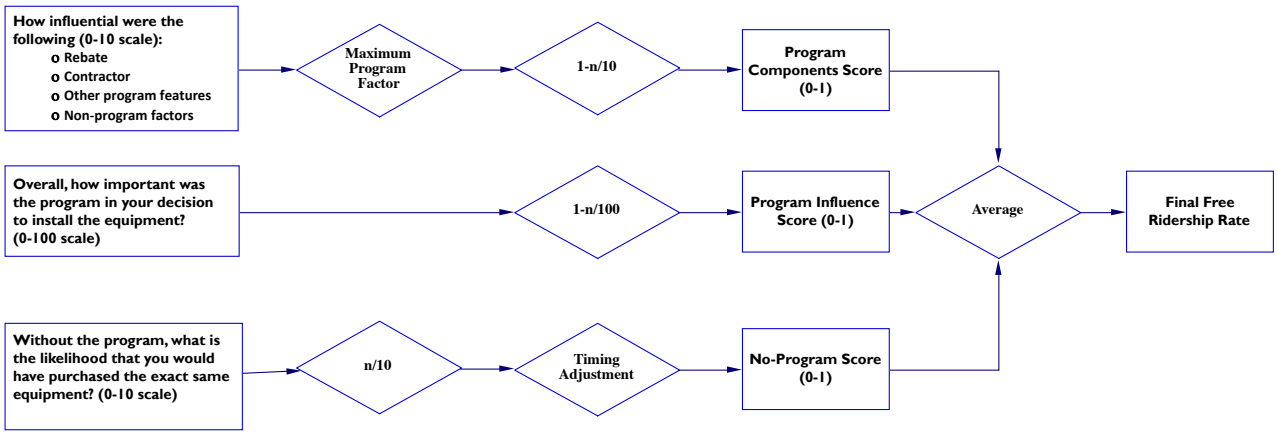
- A ***Program Component*** series of questions that asked about the influence of specific program activities (rebate, customer account rep, contractor recommendations, other assistance offered) on the decision to install energy efficient equipment;
- A ***Program Influence*** question, where the respondent 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 2 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 accomplished, the three question components were averaged to obtain the final free ridership score.

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

Figure 2: 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 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 2, 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 Component Questions

A separate battery of ***No-Program Component*** questions was designed to understand what the customer might have done if the EPE 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 EPE.

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 Component questions were analyzed and combined with a timing adjustment to calculate the No-Program score, as shown in Figure 2. 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:

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

Beginning in 2021, any updates to program NTG ratios will be applied prospectively. As a result, the new NTG ratios for Small Business Comprehensive, SCORE Plus, and Residential Lighting developed in the PY2021 evaluation will be used beginning in PY2022. The realized net impacts discussed in this report were calculated using the existing NTG ratios from PY2020.

1.4.2 Elasticity Model

The evaluation team leveraged a statistical elasticity model to estimate free ridership (and ultimately net impacts) for EPE's upstream Residential Lighting program. An elasticity model is an econometric model that estimates how a change in price affects the demand for a good or service. Evergreen developed the elasticity model using PY2021 data to estimate how rebates offered through EPE's Residential Lighting program affect customer demand for LED bulbs. The results of the elasticity model allowed us to develop estimates of the price elasticity of demand for LED bulbs, which is simply the percentage increase in the number of bulbs purchased by residential customers associated with a 1 percent decrease in the price of LED bulbs due to the rebates offered by EPE. The elasticity model approach was used for two primary reasons:

1. Customer-specific purchase information is not tracked for the bulbs bought through the program. This is common for upstream programs, where the rebate is provided to the retailer rather than to the customer. To promote sales, ease of use for the customer is emphasized over burdening the customer with requests for additional information.
2. The elasticity model is based on observed market behavior and utilizes all the light bulb sales data from the program. This is in contrast to the alternative net impact methods (either phone surveys or store intercept surveys) that only cover a small portion of program bulb sales. Since all the sales data are used in the model, the results will be more representative. The data also reflect actual market decisions (revealed preferences) rather than the hypothetical purchase scenarios that would be obtained using the surveys (stated preferences).

The purpose of the elasticity model is to estimate how sensitive customers are to price changes for the energy efficient lighting options rebated through the program. By calculating the price elasticity, we create an estimate of how much demand will change with a change in price. Once this relationship is established, we can estimate how much the price reduction through the program is influencing overall lighting sales.

A variety of different model specifications were explored; the final elasticity model is as follows:

$$Bulbs_{i,t,s} = InvoicePeriod_{i,t,s} * e^{(\alpha+\beta_1 \mathrm{Price}_{i,t,s}+\beta_2 Watts_i+\beta_3 Char_i+\varepsilon_{i,t,s})}$$

$$Where:$$

$$Bulbs_{i,t,s} = \text{Number of bulbs sold by product type i, during period t, at store s}$$

$$\mathrm{Price}_{i,t,s} = \text{Rebated price for product type i, during period t, at store s}$$

$$Watts_i = \text{Wattage for bulb type i}$$

$$Char_i = \text{Indicator variables describing particular characteristics of bulb type i}$$

$$InvoicePeriod_{i,t,s} = \text{Number of days each bulb type i was offered for sale during period t at store s}$$

With this model specification and *Price* as an independent variable, the coefficient estimate on the *Price* variable multiplied by the average price of a rebated bulb is an elasticity. In this case, the elasticity reflects the percentage change in lighting demand due to a 1 percent change in lighting price. A value less than 1.0 indicates that lighting purchases are relatively insensitive to price changes, while a value greater than 1.0 indicates that customers are sensitive to prices and therefore the program will have a greater impact in the lighting market (i.e., lower free ridership).

Once the elasticity is estimated, net program bulb sales are estimated using the following steps:

1. The total number of bulbs sold through the program is totaled from the program sales data (**Gross Program Sales**).
2. The average price per bulb ***without*** the rebate is calculated from the sales data (i.e., the rebate cost is added back to the bulb price).
3. The elasticity value is used to estimate how much bulb sales would decrease if the price were increased by the amount of the rebate (mimicking the sales if the rebate had not been available). The change in bulb sales due to the price increase is the **Net Program Sales,** as this is the amount of total bulb sales that are being driven by the rebate.
4. The **Free Rider Sales** are calculated by subtracting **Net Program Sales** from **Gross Program Sales.**
5. The free ridership rate and final NTG ratio are calculated using the following equation:

$$Free\ Ridership\ Rate = \frac{Free\ Rider\ Sales}{Gross\ Program\ Sales}$$

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

There are several important advantages to using the elasticity model rather than a phone survey to estimate net impacts:

- **The elasticity model is based on real world behavior.** The model is estimated based on market data from actual lighting purchases, which is the best indicator of customers' sensitivity to price. This is preferable to a self-report survey where we would first need to locate lighting purchasers in the general population and then ask them what type of lighting purchases they would have made if the price had not been reduced. These hypothetical 'stated preference' data are generally less preferred than actual market data, but sometimes they are the only data available.
- **A larger sample size is available at lower cost.** Because the model can be estimated based on data that are already tracked by the program, an additional customer survey is not needed. This reduces the cost of the evaluation significantly. Similarly, because we can use the entire lighting dataset (not just a subset of those customers surveyed), the evaluation has a larger amount of data that should lead to more accurate estimates of net impacts.
- **The elasticity model approach has been applied successfully in other territories.** This approach is gaining wider use in other regions, for the reasons given above. This has allowed the elasticity model to be tested and refined over time.

The Uniform Methods Project (UMP)[5] discusses the elasticity model as an appendix to its larger chapter on recommended methods for estimating net impacts.[6]

1.5 Gross and Net Realized Savings Calculations

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

[5] The UMP is sponsored by the National Renewable Energy Laboratory (NREL) and provides documentation of current energy efficiency program evaluation practices. The purpose of the UMP is to promote consistent and straightforward methods for estimating gross and net savings based on current best practices.

[6] See https://www.nrel.gov/docs/fy17osti/68578.pdf for the full UMP net impacts discussion. The discussion of elasticity model is included in Appendix A. Daniel Voilette and P. Rathbun. "Chapter 21: Estimating Net Savings – Common Practices." *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* Prepared for NREL, October 2017.

through the phone surveys) and an **Engineering Adjustment** factor (based on the engineering analysis, desk reviews, etc.):

$$\text{Gross Realized Savings} = (\textit{Ex Ante}\ \text{Savings})*(\text{Installation Adjustment})*(\text{Engineering Adjustment Factor})$$

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

$$\text{Net Realized Savings} = (\text{Net-to-Gross Ratio})*(\text{Gross Realized Savings})$$

1.6 Cost Effectiveness

The cost effectiveness of EPE's 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. To perform the cost effectiveness analysis, the evaluation team requested the following from EPE:

- 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;
- Any assumed non-energy benefits; and
- Administrative costs (all non-incentive expenditures associated with program delivery).

In response to this data request, EPE provided its annual average avoided costs, discount rate, line loss factors, and program costs. EPE does not explicitly quantify separate avoided costs of CO2 emissions or transmission and distribution, instead including these factors in the avoided costs of energy and capacity.

For all programs, the evaluation team took the energy savings and effective useful life values from the final PY2021 tracking data submitted by EPE. 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 EPE were reasonable. The final cost-effectiveness analysis uses net verified impacts, which take into account NTG ratios and engineering adjustment 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. The evaluation team applied this 20 percent benefit adder to the benefits calculated for EPE's NM EnergySaver program.

2 Impact Evaluation Results

The results of the PY2021 impact evaluation are shown in Table 7 (kWh) and Table 8 (kW), with the programs evaluated in 2021 highlighted in blue.

As noted previously, each program is required to be evaluated a minimum of once every three years. For PY2021, the evaluated programs covered 82 percent of the total *ex ante* kWh savings and 76 percent of the total *ex ante* kW savings.

Table 7: PY2021 Savings Summary - kWh

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Residential Lighting	153,508	4,927,568	1.0000	4,927,568	0.6700	3,301,471
LivingWise	2,439	289,114	1.0000	289,114	1.0000	289,114
ENERGY STAR New Homes	361	803,373	1.0000	803,373	0.7333	589,113
NM EnergySaver	1,177	1,078,078	1.0000	1,078,078	1.0000	1,078,078
Residential Comprehensive	912	2,011,958	1.0000	2,011,958	0.6368	1,281,215
Residential Load Management	2,274	522,407	1.0000	522,407	1.0000	522,407
SCORE Plus	292	5,950,853	0.9966	5,930,776	0.6692	3,968,875
Small Business Comprehensive	110	1,802,028	1.0001	1,802,141	0.8211	1,479,738
Commercial Load Management	7	10,075	1.0000	10,075	1.0000	10,075
Total	**161,080**	**17,395,454**		**17,375,490**		**12,520,086**

Table 8: PY2021 Savings Summary - kW

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Residential Lighting	153,508	831	1.0000	831	0.6700	557
LivingWise	2,439	15	1.0000	15	1.0000	15
ENERGY STAR New Homes	361	375	1.0000	375	0.7333	275
NM EnergySaver	1,177	590	1.0000	590	1.0000	590
Residential Comprehensive	912	1,117	1.0000	1,117	0.6368	711
Residential Load Management	2,274	1,392	1.0000	1,392	1.0000	1,392
SCORE Plus	292	825	0.9963	822	0.6692	550
Small Business Comprehensive	110	343	1.0003	343	0.8211	282
Commercial Load Management	7	745	1.0644	793	1.0000	793
Total	**161,080**	**6,233**		**6,278**		**5,165**

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 Small Business Comprehensive Program

3.1 Small Business Comprehensive Gross Impacts

The *ex ante* PY2021 impacts for the Small Business Comprehensive program are summarized in Table 9. In total, the Small Business Comprehensive program accounted for 10 percent of the *ex ante* energy impacts in EPE's overall portfolio.

Table 9: PY2021 Small Business Comprehensive Savings Summary

Program	# of Projects	Expected Gross kWh Savings	Expected Gross kW Savings
Small Business Comprehensive	110	1,802,028	343

The majority of the gross impact evaluation activities were devoted to engineering desk reviews of a sample of projects. 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 measure group. 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 10. The resulting sample achieved a relative precision of 90/0.1 overall.

Table 10: Small Business Comprehensive Desk Review Sample

Measure Group	Stratum	Count	Average kWh	Total kWh Savings	% of Savings	Final Sample
Lighting	0	3	222,635	628,208	35%	3
Lighting	1	13	47,866	622,255	35%	4
Lighting	2	51	9,696	494,489	27%	3
Other	0	8	9,961	38,352	2%	6
Other	1	18	1,040	18,724	1%	8
Total		**93**	**58,240**	**1,802,028**	**100%**	**24**

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

EPE has developed Excel-based calculators to estimate savings for lighting and HVAC projects. The factors and assumptions used in these calculators were reviewed by the evaluation team and compared to the New Mexico TRM. The EPE Excel-based calculators appear to be in alignment with the New Mexico TRM.

For the projects that received engineering desk reviews, the evaluation team made very few adjustments to the original savings values; this is evidenced by the engineering adjustment factors all having values close to 1.0.

For one project, an adjustment was made for the following reason:

- The evaluation team increased the kWh savings for one cooling project, which resulted in a 1.1347 realization rate for kWh savings and a 1.0000 realization rate for kW savings. For this project, the evaluation team accounted for both the cooling and heating savings for the installation of heat pumps, which is consistent with the methodology in the New Mexico TRM. The *ex ante* savings appear to only account for the cooling savings.

Table 11 shows the results of the desk reviews and how the resulting engineering adjustments were used to calculate realized savings. For the Small Business Comprehensive program overall, these adjustments resulted in average engineering adjustment factors of 1.0001 for kWh and 1.0003 for kW.

Table 11: PY2021 Small Business Comprehensive Gross Impact Summary

Small Business Comprehensive	# of Projects	Expected Gross Savings	Engineering Adjustment Factor	Realized Gross Savings
kWh Savings	110	1,802,028	1.0001	1,802,141
kW Savings	110	343	1.0003	343

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

3.2 Small Business Comprehensive Net Impacts

Net impacts for the Small Business Comprehensive program were developed using the self-report method described in the *Evaluation Methods* section and based on participant phone survey data. The resulting program-level NTG ratio is 0.8211. In PY2022, the NTG ratio will change from 0.8211 to 0.8919.

Small Business Comprehensive survey respondents acknowledged the assistance they received from EPE and generally enjoyed working with the program. As the expanded survey questions relating to free ridership make clear, however, the program is only one of several factors that are affecting customers' choices regarding energy efficiency. While the program is having a positive effect, factors unrelated to EPE involvement (e.g., corporate or management directives to install energy efficient equipment and age or condition of old equipment) are also driving these equipment choices.

Table 12 summarizes the PY2021 net impact calculations for the Small Business Comprehensive program using the NTG ratio described above. Net realized savings for the program overall are 1,479,738 kWh, and net realized demand savings are 282 kW.

Table 12: PY2021 Small Business Comprehensive Net Impact Summary

Small Business Comprehensive	# of Projects	Realized Gross Savings	NTG Ratio	Realized Net Savings
kWh Savings	110	1,802,141	0.8211	1,479,738
kW Savings	110	343	0.8211	282

3.3 Participant Surveys

As part of the evaluation, the evaluation team conducted telephone surveys with representatives from 26 participating companies that received rebates through the EPE Small Business Comprehensive program. These surveys were completed in March 2022 and ranged from 15 to 20 minutes in length.

The participant survey was designed to cover the following topics:

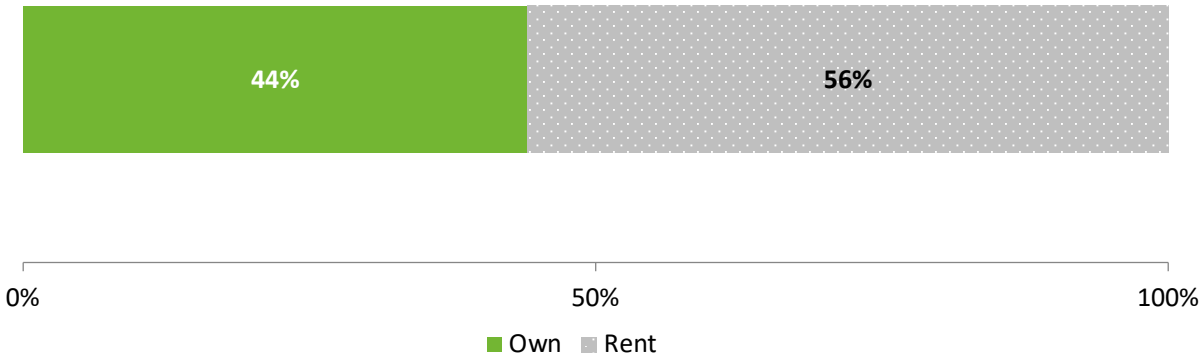
- Verifying the installation of measures included in the program tracking database;
- Collecting information on participants' satisfaction with the program experience;
- Survey responses for use in the free ridership calculations;
- Baseline data on energy use and/or equipment holdings;
- Participant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

EPE provided program data on the Small Business Comprehensive participant projects, which allowed the evaluation team to select a sample for surveys. The evaluation team randomly selected and recruited program participants from the entire population of Small Business Comprehensive participants that had valid contact information.

3.3.1 Company Demographics

We asked the participants whether their company owns or leases the building where the project was completed. Figure 3 shows that 44 percent of participants own the building where the measures were installed compared to 56 percent of respondents who lease or rent.

Figure 3: Participant Own or Rent (n=25)



The following two figures summarize the survey respondents' building size and number of employees. Figure 4 and Figure 5 both show that the majority of participant firms are mid-sized to large-sized businesses. Thirty-seven percent of participating firms reported occupying buildings between 10,000 square feet and 49,999 square feet, while 33 percent occupied buildings of more than 50,000 square feet. Additionally, 46 percent of participants reported having between 50 and 99 full-time employees.

Figure 4: Participant Building Size (n=17)

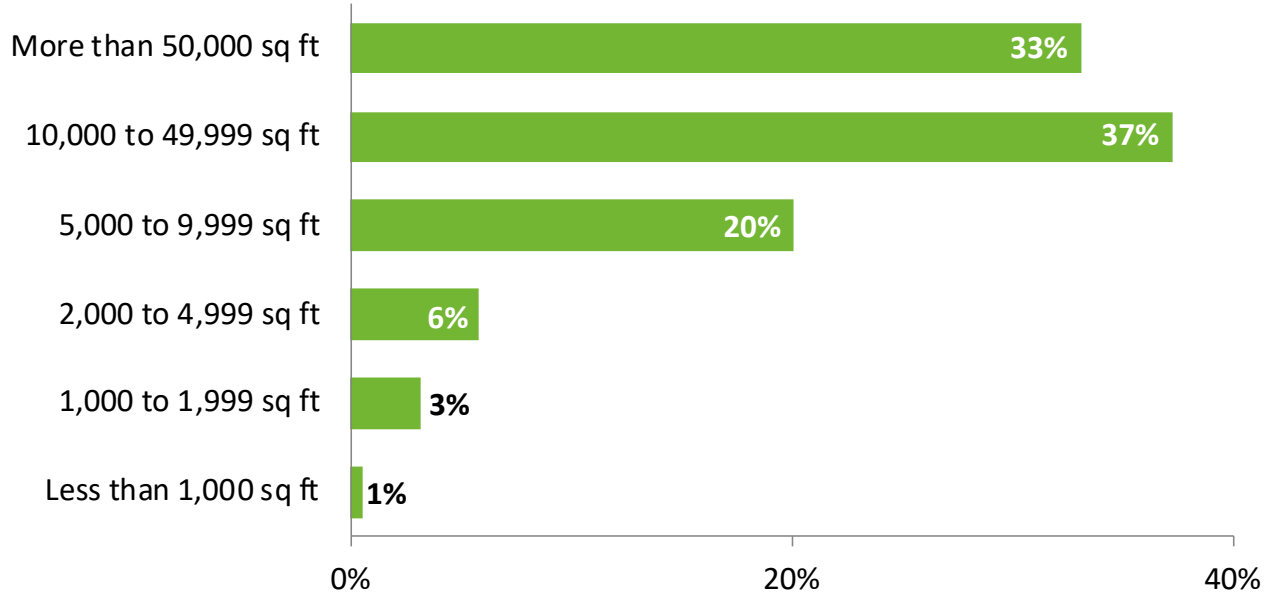
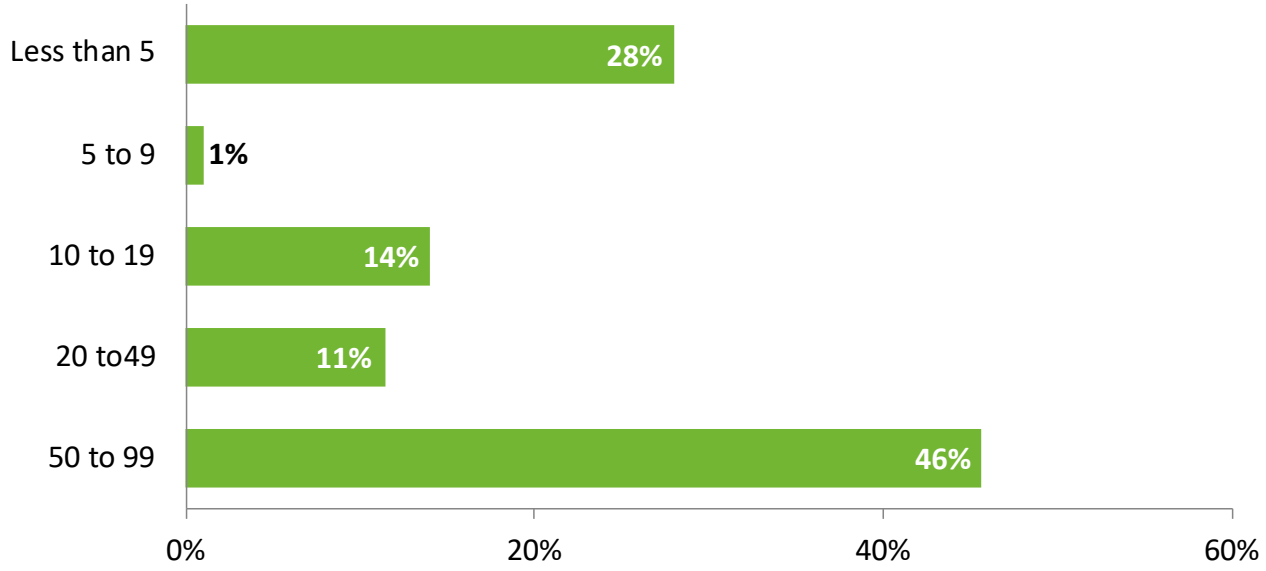
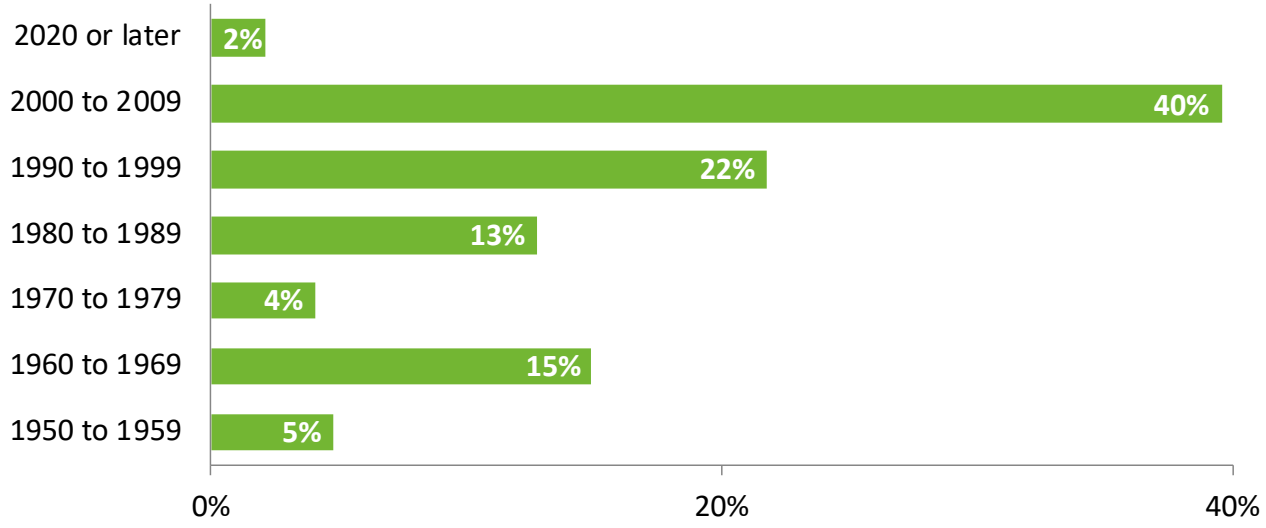


Figure 5: Participant Number of Employees (n=19)



Additionally, Figure 6 shows that there was a wide range of newer and older buildings that participated in PY2021. The majority (62%) of participants' buildings were built between 1990 and 2009, while only 37 percent of buildings were built before 1990. This suggests that the program is doing an adequate job at targeting both older buildings, where the potential for significant energy savings is the greatest, and newer buildings.

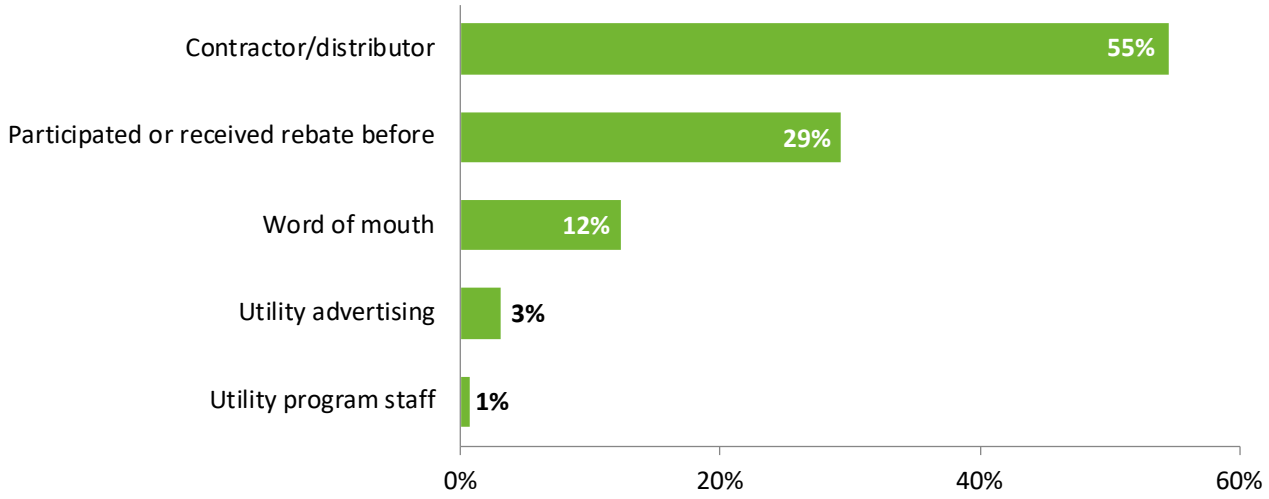
Figure 6: Participant Building Age (n=22)



3.3.2 Sources of Awareness

Participants became aware of the program rebates and assistance through a variety of channels including contractors and/or distributors, word of mouth, EPE marketing and outreach, events (conferences, seminars, or workshops), and previous participation in an EPE rebate program. As shown in Figure 7, 55 percent of participants learned about the program offerings through contractors or distributors, and 29 percent of participants knew about the program through previous participation in the program or by receiving the rebate before.

Figure 7: Initial Source of Awareness (n=26)



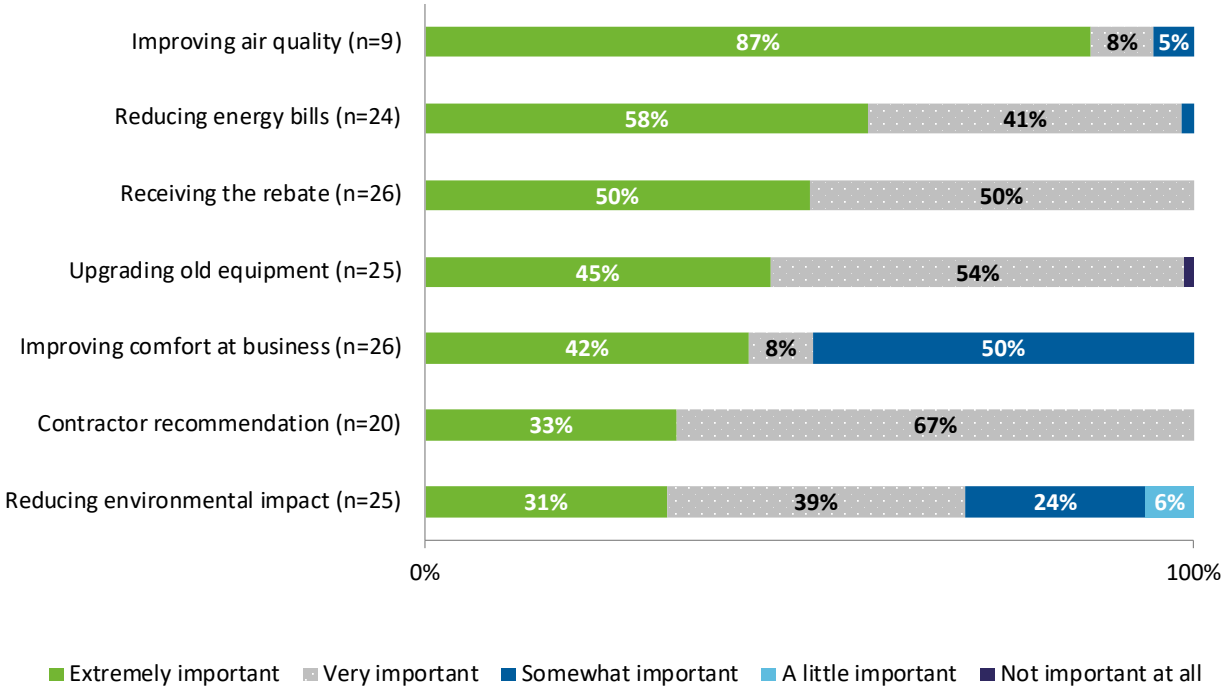
3.3.3 Motivations for Participation

Figure 8 shows the level of importance placed by respondents on a variety of factors that might be influencing customers to participate in the program.

Factors that participants reported as being important included reducing energy bills, receiving the rebate, and upgrading old equipment. Eighty-seven percent of respondents reported that improving air quality was extremely important in their decision to participate in the program; however, this was only asked among HVAC measure participants (n=9).

Reducing environmental impact was the least important factor in the decision by respondents to participate in the program, with 31 percent of respondents saying it was extremely important in their decision to participate. Contractor recommendation was the second least important factor in the decision by respondents to participate, with only 33 percent reporting it to be extremely important in their decision making. This finding combined with the awareness question responses discussed above suggests that the real value of the contractors is to introduce the program to participants.

Figure 8: Motivations for Participation



In addition to being asked about their 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.[7] As shown in Figure 9, the majority of respondents rated the contractor who performed the work and previous participation in an EPE program as the most important factors in their decision to determine how energy efficient their equipment would be. Recommendation from a vendor or distributor was the least important factor in the participants' decision to determine how energy efficient their project would be, with 52 percent saying it was extremely important to their decision.

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

Figure 9: Importance of Program Factors

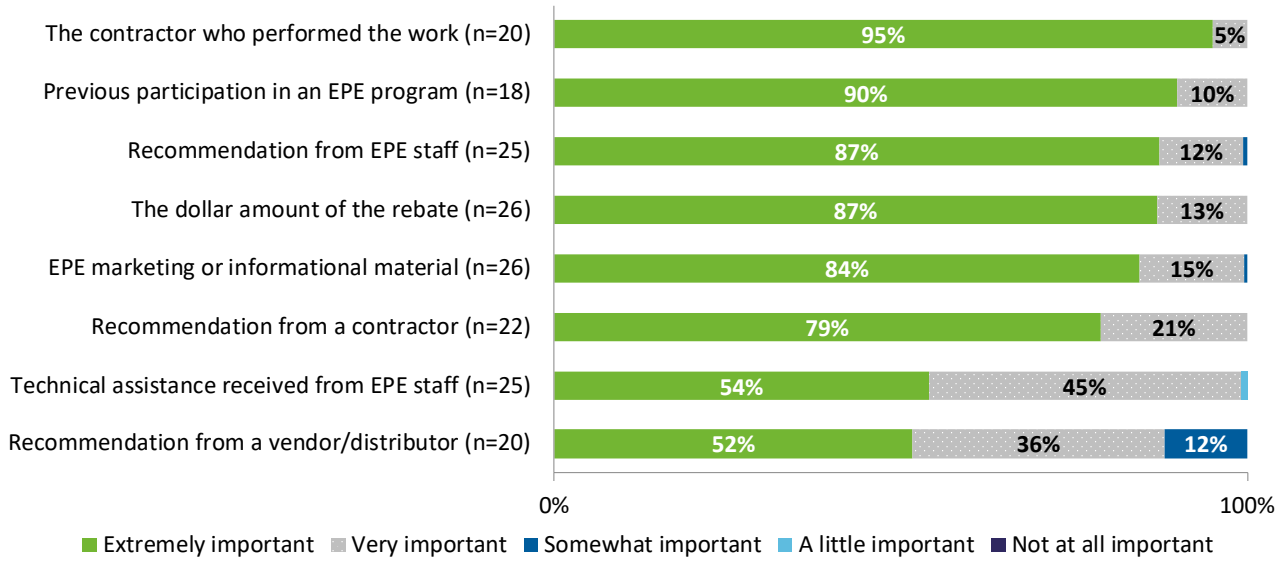
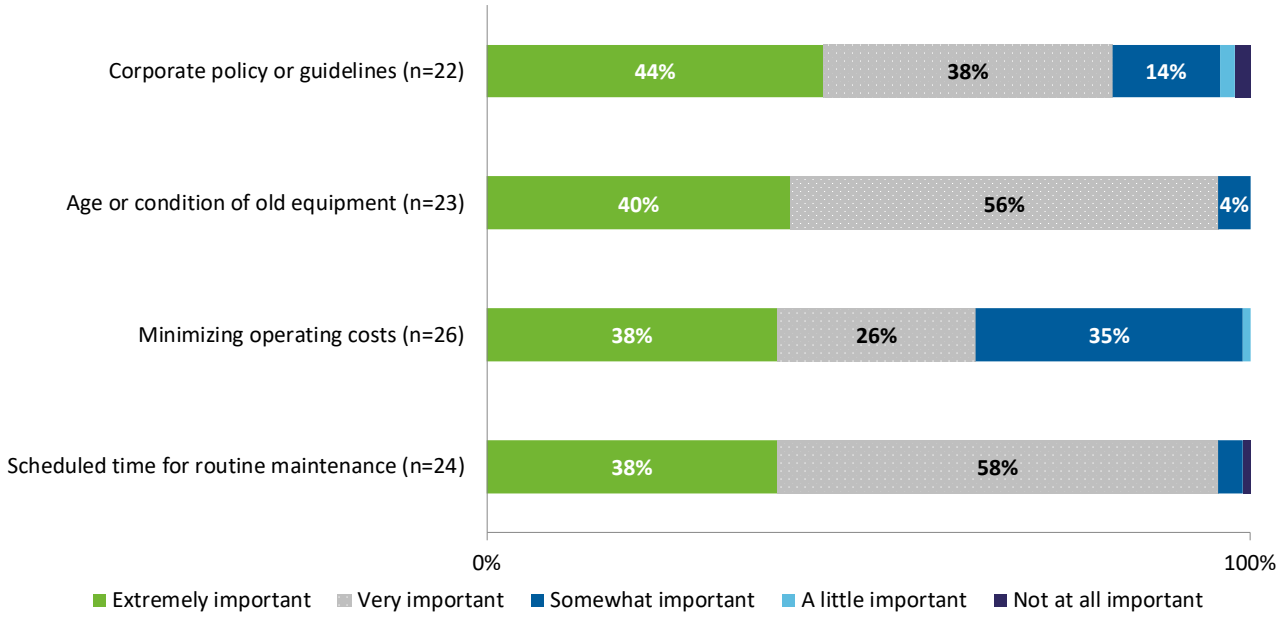


Figure 10 shows that the majority of participants rated all non-program factors as either extremely or very important in their decision to determine how energy efficient their project would be.

Figure 10: Importance of Non-Program Factors



Respondents were asked if the equipment installed through the program was intended to replace existing equipment and if existing equipment was functional or in need of repairs prior to replacement. Ninety-six percent of respondents reported that all equipment installed through the program replaced existing equipment (Figure 11). Only 1 percent of respondents reported that all equipment installed through the program was an addition to existing equipment. Respondents were then asked about the state of the replaced equipment (Figure 12). The majority of respondents (86%) reported that the equipment replaced through the program was functional but in need of minor repairs, while 7 percent reported that the replaced equipment was functional but in need of major repairs.

Figure 11: Rebated Equipment Intended to Replace Existing Equipment (n=26)

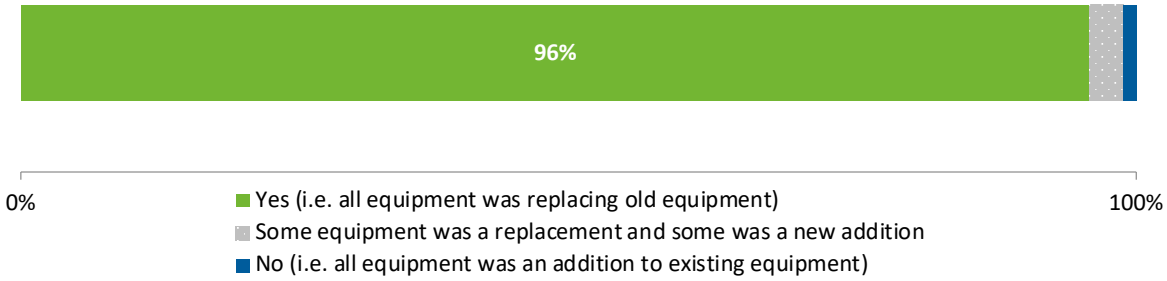
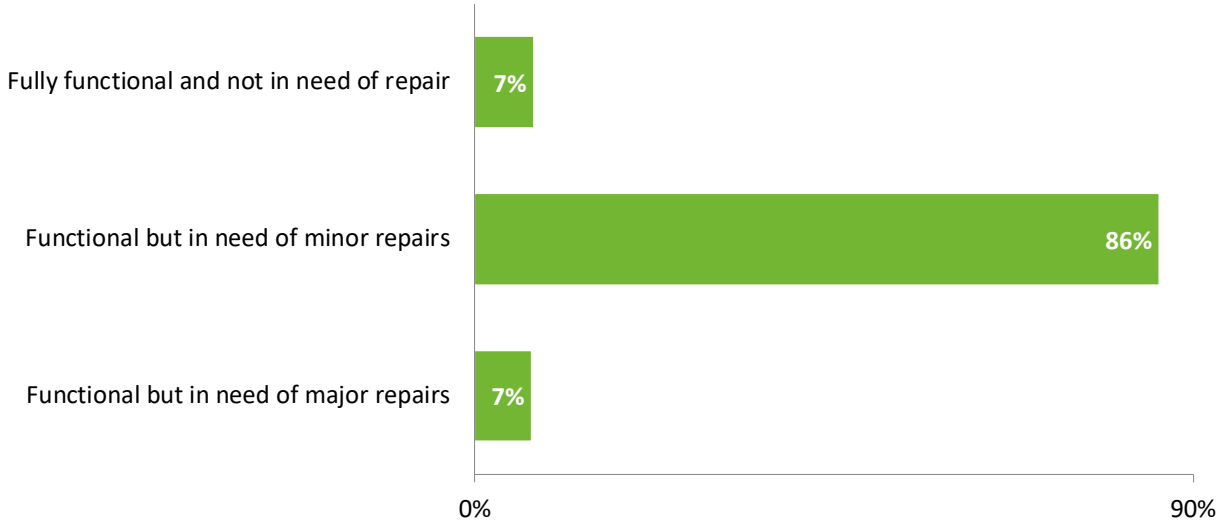


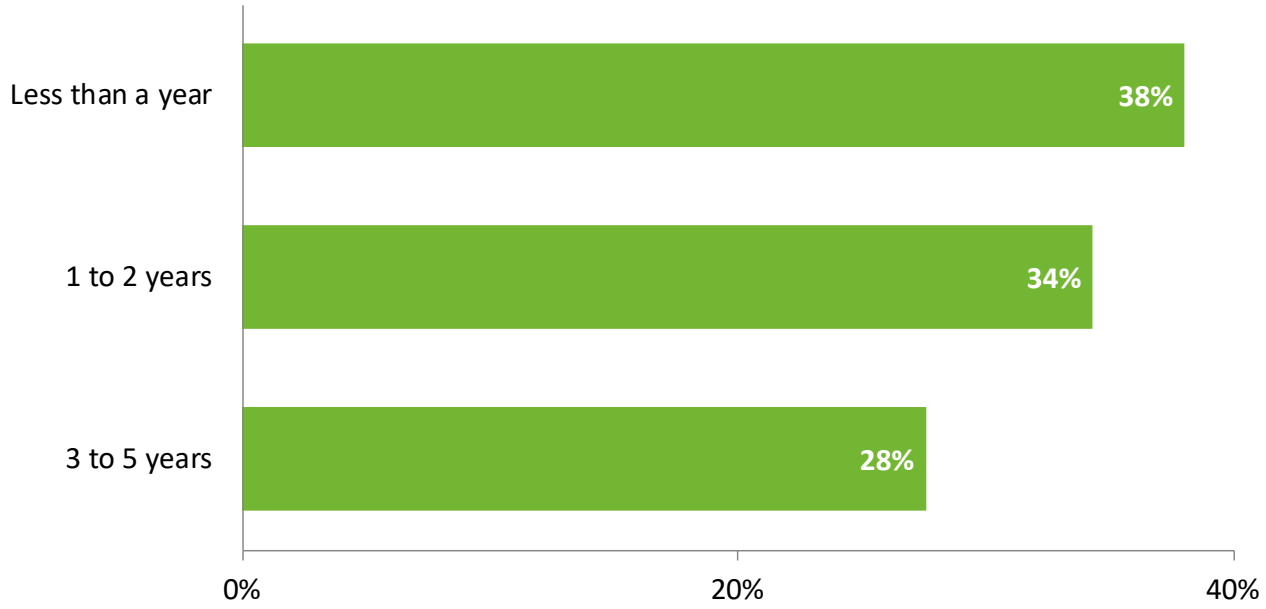
Figure 12: State of Replaced Equipment (n=23)



To allow the evaluation team to get a sense of the condition of the existing equipment, respondents were asked approximately how much longer the equipment would have lasted if it had not been replaced. Figure 13 shows that the majority of respondents (62%) believed their equipment would last at least one more year. However, the largest share of participating customers reported that they believed their equipment would have lasted less than a year (38%).

While this raises concerns about potential free ridership, the fact that most of the sample estimated the remaining life of their equipment to be more than 1 year 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 (i.e., potential free riders).

Figure 13: Equipment Remaining Life (n=20)

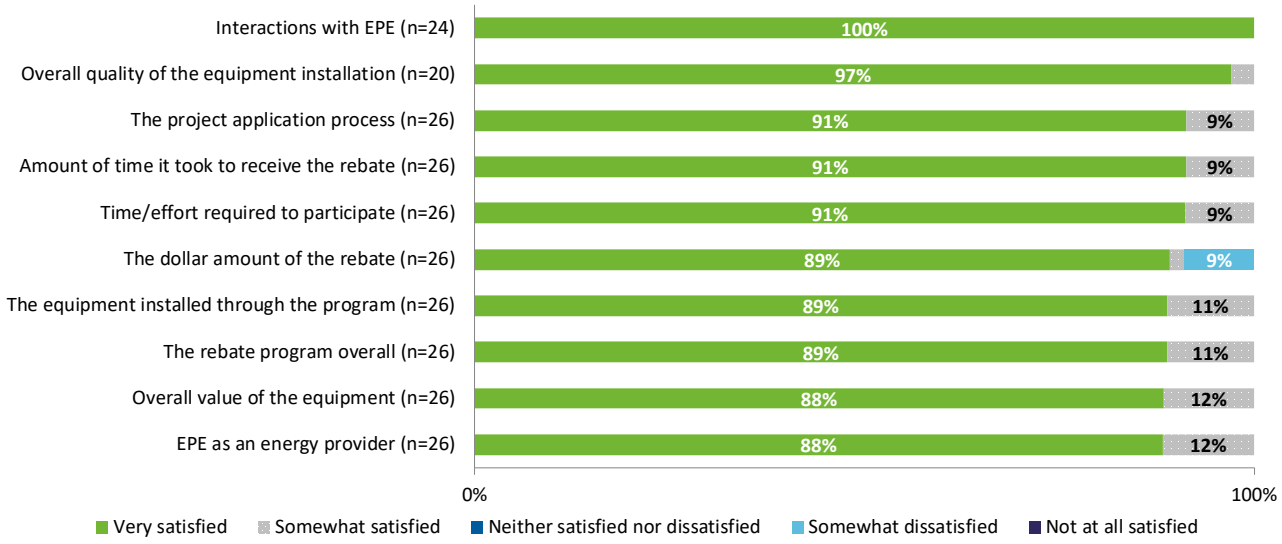


3.3.4 Participant Satisfaction

The participants evaluated their satisfaction with various components of the 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 on are summarized in the figure below.

Overall, surveyed program participants expressed high levels of satisfaction with the program components. As shown in Figure 14, the majority of participants reported that they were “very satisfied” with all of the program components. One hundred percent reported being “very satisfied” with their interactions with EPE, and 89 percent were “very satisfied” with the dollar amount of the rebate. The overall value of the equipment and EPE as an energy provider received the lowest satisfaction rating from participants, but they were still quite satisfied, with 88 percent of respondents indicating being “very satisfied” with either program component.

Figure 14: Participant Program Satisfaction



4 SCORE Plus Program

4.1 SCORE Plus Gross Impacts

The *ex ante* PY2021 impacts for the SCORE Plus program are summarized in Table 13. In total, the SCORE Plus program accounted for 34 percent of the *ex ante* energy impacts in EPE's overall portfolio.

Table 13: PY2021 SCORE Plus Savings Summary

Program	# of Projects	Expected Gross kWh Savings	Expected Gross kW Savings
SCORE Plus	292	5,950,853	825

The majority of the gross impact evaluation activities were devoted to engineering desk reviews of a sample of projects. 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 measure group. 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 14. The resulting sample achieved a relative precision of 90/1.6 overall.

Table 14: SCORE Plus Desk Review Sample

Measure Group	Stratum	Count	Average kWh	Total kWh Savings	% of Savings	Final Sample
Lighting	1	6	289,750	1,738,503	29%	4
Lighting	2	10	101,199	1,011,989	17%	3
Lighting	3	72	14,682	1,057,081	18%	3
Other	Certainty	5	356,520	1,677,357	28%	5
Other	1	22	21,178	465,923	8%	5
Total		**14**	**156,666**	**5,950,853**	**100%**	**20**

As discussed in the *Evaluation Methods* section, the evaluation team determined gross realized impacts for the SCORE Plus program by performing engineering desk reviews on the sample of projects.

EPE has developed Excel-based calculators to estimate savings for lighting and HVAC projects. The factors and assumptions used in these calculators were reviewed by the evaluation team and compared to the New Mexico TRM. The EPE Excel-based calculators appear to be in alignment with the New Mexico TRM.

For the projects that received engineering desk reviews, the evaluation team made very few adjustments to the original savings values; this is evidenced by the engineering adjustment factors all having values close to 1.0.

For two projects, adjustments were made to savings for the following reasons:

- The evaluation team updated the savings for one HVAC project. The *ex ante* calculations appear to use a seasonal energy efficiency ratio (SEER) instead of an energy efficiency ratio (EER) when calculating energy savings for split AC units with capacities between 5.4 tons and 20 tons. The New Mexico TRM stipulates that the energy savings should use the EER for units in that capacity range. This adjustment decreased energy (kWh) and peak demand (kW) savings, resulting in realization rates of 0.3625 and 0.7862, respectively.
- The evaluation team found one lighting project that did not include the correct post installation fixture quantities. The evaluator reviewed the supplied photos and found photographic evidence that four exterior lamp fixtures were installed. This adjustment decreased energy (kWh) and peak demand (kW) savings, resulting in realization rates of 0.9206 and 0.9916, respectively.

Table 15 shows the results of the desk reviews and how the resulting engineering adjustments were used to calculate realized savings. For the SCORE Plus program overall, these adjustments resulted in average engineering adjustment factors of 0.9966 for kWh and 0.9963 for kW.

Table 15: PY2021 SCORE Plus Gross Impact Summary

SCORE Plus	# of Projects	Expected Gross Savings	Engineering Adjustment Factor	Realized Gross Savings
kWh Savings	292	5,950,853	0.9966	5,930,776
kW Savings	292	825	0.9963	822

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

4.2 SCORE Plus Net Impacts

Net impacts for the SCORE Plus program were developed using the self-report method described in the *Evaluation Methods* chapter and based on participant phone survey data from the PY2020 evaluation. The resulting program-level NTG ratio is 0.6692, which is being applied to the PY2021 savings. As noted previously, due to small sample sizes, the survey results from the PY2019, PY2020, and PY2021 evaluations were averaged to get an updated NTG ratio of 0.6088. This new value will be used for the SCORE Plus program beginning in PY2022.

Table 16 summarizes the PY2021 net impact calculations for the SCORE Plus program using the NTG ratio described above. Net realized savings for the program overall are 3,968,875 kWh, and net realized demand savings are 550 kW.

Table 16: PY2021 SCORE Plus Net Impact Summary

SCORE Plus	# of Projects	Realized Gross Savings	NTG Ratio	Realized Net Savings
kWh Savings	292	5,930,776	0.6692	3,968,875
kW Savings	292	822	0.6692	550

4.3 Participant Interviews

The evaluation team completed four in-depth interviews with PY2021 EPE SCORE Plus program participants. The interviewees had completed a variety of projects, all retrofit construction, as well

as lighting and non-lighting projects. Overall, the interviewees represented projects that accounted for 28 percent of PY2021 program kWh savings. Contacts were exhausted after three emails and two voicemails requesting an interview.

The interviews were completed in March of 2022 and focused on the following topics:

- Project context and background;
- Role of the utility program;
- Role and influence of the SCORE Plus program in the decision to make efficiency upgrades; and
- Program satisfaction.

4.3.1 Project Background

All four participants completed more than one project through the SCORE Plus program; the highest number of completed projects for any one participant was seven. While participants had varying levels of interaction with the SCORE Plus program directly, all four were familiar with the recorded project and played a significant role in their business's participation in the program. Interviewees included an energy management director, a public works director, a project manager, and a director of engineering.

Business types included a juvenile delinquent center, a medical center, a school, and a government building. Three of the four participants completed some type of lighting measure in their SCORE Plus projects—including LED fixtures and lighting controls —while two of the four completed some type of HVAC measure in their SCORE Plus projects. Three of the four participants stated that they used one or more contractors to complete their projects through the SCORE Plus program.

4.3.2 Program Satisfaction

SCORE Plus interview participants were asked a series of questions to quantify their level of satisfaction with various components of the program. Participants rated their satisfaction on a scale of 1 to 5, with 1 being "very unsatisfied" and 5 being "very satisfied." The program components included:

- EPE as an energy provider;
- The rebate program overall;
- The equipment installed through the program;
- The contractor who installed the equipment;
- The overall quality of the equipment;
- The amount of time it took to receive the rebate;
- The dollar amount of the rebate;

- Interactions with EPE;
- The overall value of the equipment for the price they paid;
- The amount of time and effort required to participate in the program; and
- The project application process.

Overall, participants expressed a high level of satisfaction across all program components, particularly with the rebate program overall, including the effort required to participate in the program, the project application process, and their interactions with EPE. No participants rated their level of satisfaction as less than a 3 for any of the factors provided, and the only factor rated a 3 was one participant's satisfaction with the rebate amount. The participant gave this factor a score of 3 because they felt the rebate should have been larger.

Given the relatively high level of satisfaction, participants did not share any direct suggestions for improving the SCORE Plus program. In fact, three participants requested that the rebate program continue and reiterated their satisfaction with the program. Two respondents also mentioned the positive impact the program has on the grid and on their community, though this was not directly asked about in the interviews.

Program Influence

The evaluation team also asked SCORE Plus interview participants a series of questions about how various factors—both internal to the program and independent of EPE—influenced their decision to install energy efficiency equipment. These questions were asked to gauge the level of influence that the SCORE Plus program had on the decision by participants to upgrade their equipment relative to the non-program factors. The quantitative components of these influence questions were subsequently used to estimate free ridership and a program-level NTG ratio that will be applied in PY2022, as outlined in the *Evaluation Methods* section of this report.

To gauge the influence of the program, interviewees were asked how influential factors such as the rebate, any technical assistance, recommendations or information from the utility, and their prior participation in EPE rebate programs were in their decision to make efficiency upgrades. In evaluating the influence of non-program factors, the evaluation team asked participants how factors such as the financial benefits of the efficiency upgrade through reduced operating costs and pre-existing corporate energy efficiency targets contributed to their efficiency upgrade.

Overall, two of the four participants rated the non-program factors as more influential than the program factors (with 90 or 80 points attributed to non-program factors and 10 or 20 points to program factors), one participant rated only the program factors as influential, and one participant did not understand the question and declined to respond. The non-respondent later answered that the program did not influence their decisions at all, and the rebate program was just a bonus to the operational savings they receive through the upgrades.

All participants stated that it was extremely likely that they would have completed the same efficiency upgrades even without the rebate in a similar timeframe. In general, participants were thankful for the presence of the rebate program and remarked that they enjoyed working with the program staff but view the rebates as a welcomed additional incentive to continue with upgrades.

5 Residential Lighting Program

The residential lighting market in the U.S. has experienced significant change over the past 15 years. Passage of the Energy Independence and Security Act of 2007 (EISA) began the phase-out of (energy inefficient) incandescent bulbs. Since then, consumers have become more aware of LEDs, and the purchase price of LEDs has become increasingly affordable. EPE's Residential Lighting program promotes adoption of energy efficient lighting by providing incentives to customers to replace less efficient light bulbs with LED bulbs through in-store rebates at participating retailers in EPE's service territory.

In total, 27 retail locations in EPE's service territory participated in the Residential Lighting program over the period analyzed (March 1, 2021 – December 31, 2021); these retailers sold 153,508 LED bulbs at a discounted price through a customer point-of-purchase rebate. One retailer with multiple retail locations sold 64,512 of the bulbs distributed through the program (42% of the total), the most of any retailer. The retailers that participated in the program differ with respect to retail channels (e.g., big box, discount, and warehouse club stores) and serve an array of customer income demographics. As shown in Table 17, the vast majority (87%) of bulbs were sold at big box or warehouse club stores, while only about 13 percent were sold at hardware stores or other retailers.

Table 17: Bulb Sales Through the EPE Residential Lighting Program, March – December 2021

Type of Retailer	Bulbs Sold or Given Away	Percentage of Bulbs
Big Box / Warehouse Club	134,138	87.4%
Hardware Store	8,680	5.7%
Other Retailers	10,690	7.0%
Total	**153,508**	**100%**

Note: Bulb sales by individual retailers have been aggregated to maintain confidentiality.
Bulbs with negative quantities in the tracking data are not accounted for in this table.

Table 18 shows summary statistics including the price per bulb before the rebate, as well as the rebate amounts. On average, bulbs sold through EPE's Residential Lighting program had a pre-rebate price of $12.54 and a median price of $9.98. Actual prices ranged from $3.24 to $49.97 per bulb. Rebates provided to consumers through EPE's Residential Lighting program ranged from $1.00 to $18.00 with a mean and median rebate of $6.58 and $6.00, respectively. In addition, in certain instances, rebates were also available, provided by either the bulb manufacturer or

retailer. These rebates cut the price paid per bulb by between 7 percent and 90 percent of the pre-rebate bulb price. On average, the rebate reduced the price by 38 percent.

Table 18: Summary Statistics on Bulb Prices and Rebates Through EPE Residential Lighting Program*

Statistic	Price Per Bulb Pre-Rebate	EPE Rebate Per Bulb	Other Rebate Per Bulb**	Rebate as % of Bulb Price***
Mean	$12.54	$6.58	$0.83	38%
Median	$9.98	$6.00	$0.00	40%
Minimum	$3.24	$1.00	$0.00	7%
Maximum	$49.97	$18.00	$13.00	90%
25th Percentile	$7.97	$5.00	$0.00	24%
75th Percentile	$9.98	$6.00	$0.00	52%

* Summary statistics weighted by bulb sales.
** For some invoices, there was an additional rebate offered through the manufacturer or retailer.
*** Computed at the retailer invoice level by dividing per-bulb rebate amount by per-bulb pre-rebate price weighted by bulb sales.

5.1 Residential Lighting Gross Impacts

For the Residential Lighting program, the gross impact analysis consisted of reviewing the per-unit savings values used for all the individual lighting measures covered by the program and then comparing these values with those in the New Mexico TRM for residential lighting. For each record, we replicated savings based on the baseline wattage values and hours of use. The evaluation team's replicated savings matched the *ex ante* tracking data savings; therefore, we are not recommending any changes to the *ex ante* savings values, and the engineering adjustment factor is equal to 1.00.

5.2 Residential Lighting Net Impacts

The evaluation team utilized an elasticity model to determine net impacts for the Residential Lighting program. As discussed in the *Evaluation Methods* section of this report, the elasticity model estimates the relationship between price paid and the number of bulbs sold. Once this relationship is established, it can be used to estimate the share of total bulbs sold that should be attributed to the price reductions offered by the program including those bulbs distributed to customers through giveaways.

The quantity of bulbs sold is inversely related to price—as the price of bulbs decreases, the number of bulbs sold increases. As Table 19 shows, about 37 percent of bulbs sold through EPE's Residential Lighting program were less than $2.00, nearly 28 percent were between $2.00 and

$4.99, and about 26 percent had a rebated price of between $5.00 and $9.99. Only about 9 percent of bulbs sold through the program had a rebated cost greater than $10.00. This trend was explored in more detail using the elasticity model, described below.

Table 19: Bulb Sales Through EPE Residential Lighting Program by Rebated Price of Bulb*

Rebated Price of Bulb	Average Pre-Rebate Price Per Bulb	EPE Rebate Per Bulb	Other Rebate Per Bulb**	Proportion of Bulbs Sold
Less than $2.00	$10.45	$6.73	$1.92	37.4%
$2.00 - $4.99	$9.78	$5.23	$0.42	27.8%
$5.00 - $9.99	$14.71	$7.24	$0.00	26.1%
$10.00 - $14.99	$19.89	$7.32	$0.00	5.2%
$15.00 - $24.99	$29.42	$9.64	$0.00	3.4%
$25.00 Plus	$39.73	$7.87	$0.00	0.1%

* Summary statistics weighted by bulb sales.
** For some invoices, there was an additional rebate offered through the manufacturer or retailer.

To develop the elasticity model, the evaluation team analyzed sales data for EPE's Residential Lighting program for PY2021 (March 1 – December 31) to understand the impact that direct (in-store) rebates have on the sale of residential LED lighting. Since a customer receives the rebate at the time of purchase (as opposed to a mail-in rebate or a rebate on a future purchase), the rebate acts to immediately lower the purchase price of the LED lighting.

To estimate the impact that price has on the sale of LED bulbs, the evaluation team specified and estimated a Poisson regression model. The Poisson model is preferable to standard ordinary least squares (OLS) regression because the response variable (i.e., bulb sales) only takes on non-negative (or positive) values. The OLS regression model is generally not an appropriate choice because it fails to account for the limited possible values of the response variable.[8] While there are other models that account for limitations of count data (e.g., negative binomial), the Poisson model is the most often-used approach.

The generalized log-linear Poisson model is specified as

$$Ln(\mu_i) = x_i'\beta$$

[8] The evaluation team did examine two alternative modeling approaches: fixed-effects and random-effects Poisson models. Results varied little between these models and the (standard) Poisson model.

Where, μ_i is the mean of the individual bulb sales across retailers and sales periods.

The empirical model the evaluation team estimated for the EPE Residential Lighting program is specified as:

$$Ln(Bulb\ Sales_{kit}) = \beta_0 + \beta_1(Rebated\ Price_{kit}) + \beta_k(Bulb\ Char_k)$$

Where

$Ln(Bulb\ Sales_{kit})$ is the natural logarithm of the average number of bulb type *k* sold per day by retailer *i* during time period *t*.

$Rebated\ Price_{kit}$ is the price after rebate for bulb type *k* sold by retailer *i* in time period *t*.

$Bulb\ Char_k$ one or more characteristics of the LED bulb, such as lumens or watts.

We estimated separate models for standard and specialty LED bulbs (two models in total). Our *a priori* assumption was that consumers are more sensitive to price when purchasing standard LED bulbs, which are applicable to a greater range of residential lighting fixtures and for which consumers may have a greater number of alternative lighting options (e.g., efficient incandescent, halogen, CFL). In comparison, as the name implies, there is a wide range of specialty LED bulbs available in the market, but not every specialty LED bulb is demanded by every consumer and, therefore, only those consumers who have a use for a particular specialty bulb—regardless of lighting option—will show any sensitivity to the price of the LED option.

Table 20 shows the estimates of price elasticity of demand for the two regression models and for the Residential Lighting program overall.[9] Price elasticities are assumed to be negative (i.e., as price goes up, demand for the good or service goes down); it is the magnitude of the elasticity (the "responsiveness") that is of primary interest.[10]

As Table 20 shows, the evaluation team found that the demand for LED bulbs is elastic for standard bulbs (price elasticity of demand of -1.64), but the demand for specialty LED bulbs is relatively inelastic (estimated elasticity of -0.44). Overall, when weighting by LED bulb sales from all retailers, the evaluation team estimated the price elasticity of demand for LED bulbs to be -1.37. Thus, a 10 percent *decrease* in the price of LED bulbs will result in a 13.7 percent *increase* in demand for LED bulbs, holding all else constant.

[9] The price elasticity of demand is a measure of the change in the demand for a good or service when the price of that good or service increases or decreases by a small amount (generally 1.0 percent).

[10] If the price elasticity for a good is greater than 1.0 in absolute value, demand for that good is referred to as elastic (more responsive). Similarly, when the price elasticity is less than 1.0 in absolute value, demand for that product is referred to as inelastic. When the price elasticity of demand is equal to 1.0, demand for that product is referred to as unit elastic.

Table 20 also shows estimates of the NTG ratio for EPE's Residential Lighting program using the elasticity model. The estimates of the NTG ratio differ substantially between the two bulb types, with standard LED bulbs having an estimated NTG of 0.70 and specialty LED bulbs substantially lower at 0.22. For the EPE Residential Lighting program overall, the evaluation team estimated the NTG ratio to be 0.60.

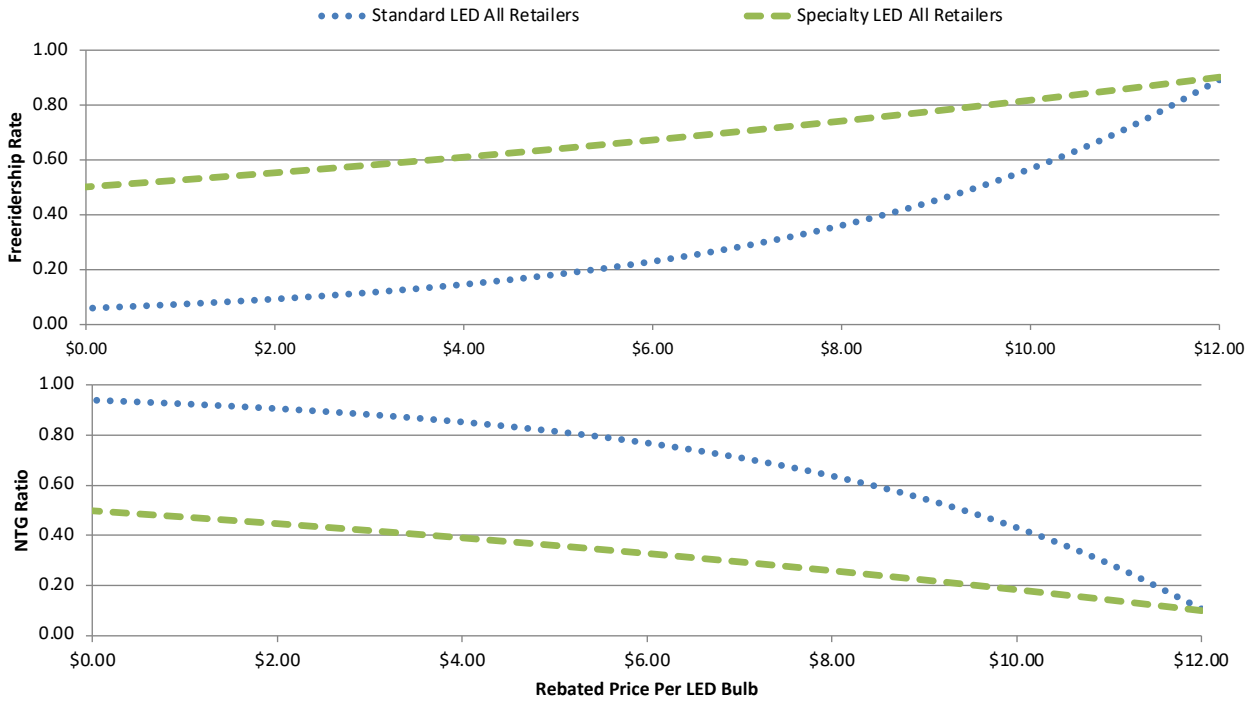
Table 20: Estimates of Price Elasticity of Demand and NTG Ratio

LED Bulb Type	Elasticity at Mean Rebated Price	NTG Ratio at Mean Rebated Price
Standard LED	-1.64	0.70
Specialty LED	-0.44	0.22
Program Overall (weighted by sales)	**-1.37**	**0.60**

Figure 15 shows how expected rates of free ridership and NTG ratios vary by rebated bulb price for standard and specialty bulbs.[11] As the rebated price of LEDs drops, the proportion of purchasers that free ride decreases and the NTG ratio increases. The trajectories differ for standard and specialty bulbs due to the substantially different price elasticity of demand for the two bulb types.

[11] Excludes bulbs distributed through giveaways because there is no price sensitivity to measure.

Figure 15: Estimated Free Ridership and NTG Ratio by LED Bulb Type and Retailer



It is important to note that the free ridership chart (upper panel of Figure 15) does not show the expected number of bulbs sold by rebated price, but rather the proportion of bulbs sold by rebated price that would have sold even without the rebate. As the rebated price decreases (moving from right to left along the horizontal axis), more and more consumers—who otherwise would not purchase LED bulbs—are motivated to purchase bulbs, resulting in a decreasing proportion of purchasers that are free riders.

The purpose of the rebates is to encourage those consumers who would not otherwise purchase an LED to make the purchase. However, since the rebate is available to all purchasers of the LED bulbs, even those who would have purchased the bulbs without the rebate still receive the rebate. The larger the rebate, the lower the cost to the consumer, and the greater the number of consumers who will purchase LED bulbs, leading to a lower rate of free ridership and a higher NTG ratio (lower panel of Figure 15).

Table 21 summarizes the final gross and net impacts for the Residential Lighting program using the NTG ratio derived from the PY2020 elasticity model. Using the overall NTG ratio of 0.6700, the PY2021 net realized impacts for the Residential Lighting program are 3,301,471 kWh and 557 kW. In PY2022, the NTG ratio will change from 0.6700 to 0.6000.

Table 21: Gross and Net Impact Summary

Residential Lighting Program	# of Bulbs	Expected Gross Savings	Engineering Adjustment Factor	Realized Gross Savings	NTG Ratio	Realized Net Savings
kWh Savings	153,508	4,927,568	1.0000	4,927,568	0.6700	3,301,471
kW Savings	153,508	831	1.0000	831	0.6700	557

5.3 Residential Lighting General Population Survey

As part of the PY2021 evaluation, the evaluation team fielded a general population survey to collect information on lightbulb purchases among New Mexico households. The survey was fielded online in January and February 2022, and we received 244 responses compared to our original goal of 200 completes. The survey data were used to assess the current residential lighting baseline assumptions. A summary of the lighting survey responses is provided below. Note that many customers refused to provide information on income, which limited our ability to break out the results by income level.

Figure 16 shows the home type for households responding to the survey; the vast majority of respondents are in single-family homes.

Figure 16: Home Types (n = 136)

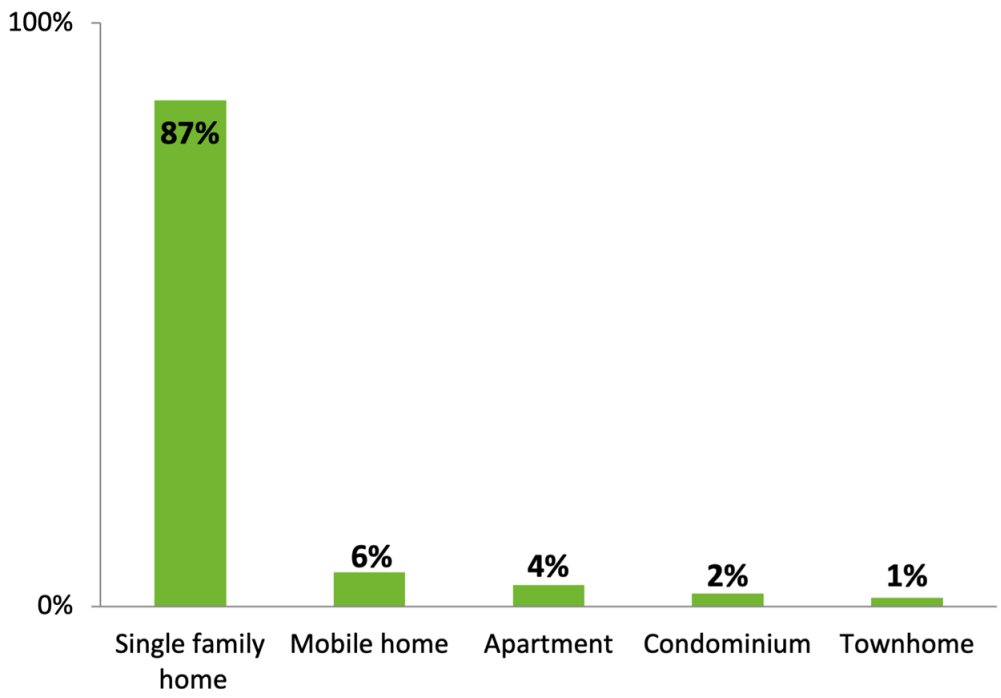


Figure 17 shows that, overall, almost three quarters (73%) of the sample are households with two or fewer people.

Figure 17: Household Size (n=85)

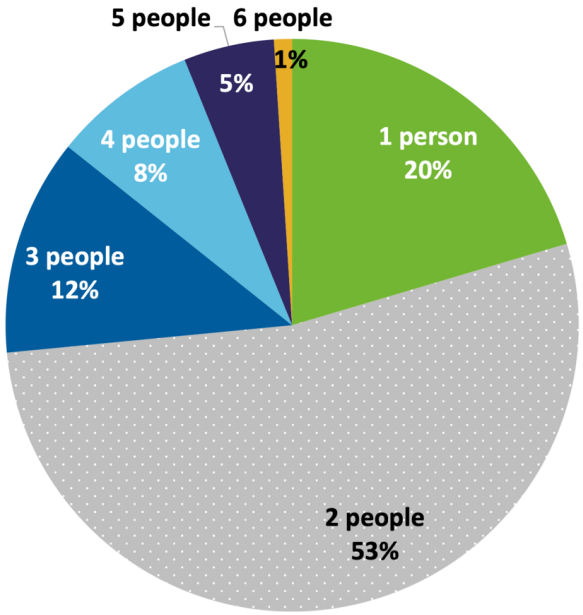


Figure 18 shows how household size varies by income level. Low-income households skew toward larger families, with fewer single-resident households (9%) and over 25 percent of low-income households with four or more people. Overall, low-income households had an average of 1.93 people, compared with 1.59 people for non-low-income households in the sample.

Figure 18: Household Size by Income

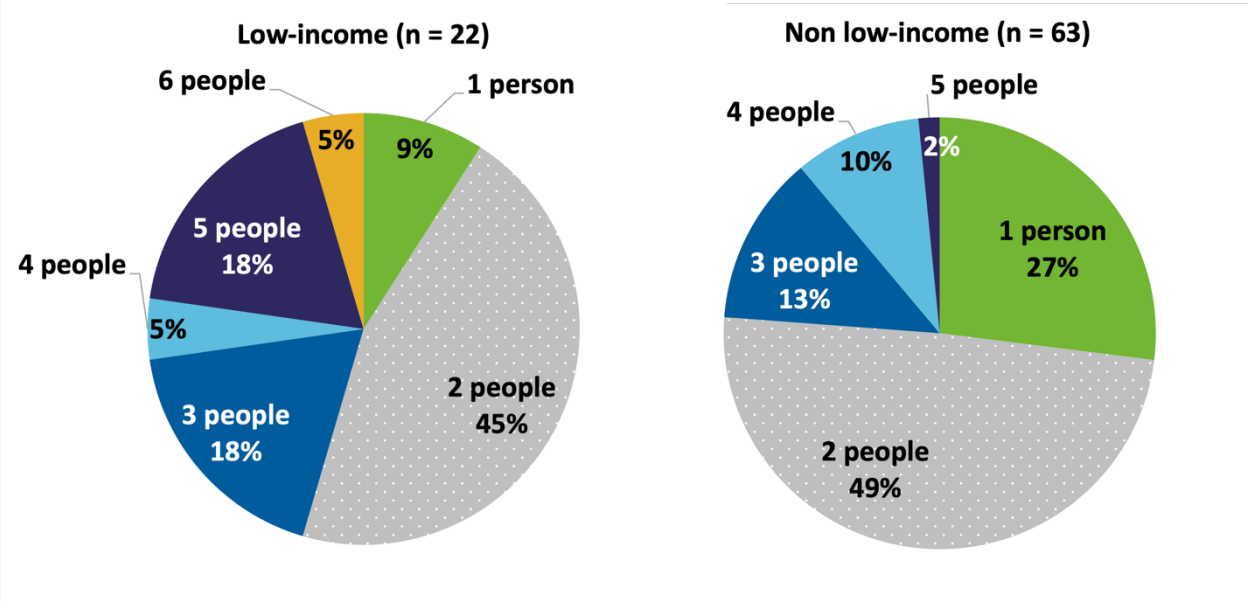


Figure 19 shows the number of low-income households in the sample. Note that less than half the respondents provided information about their income.

Figure 19: Income Breakdown in Survey Sample

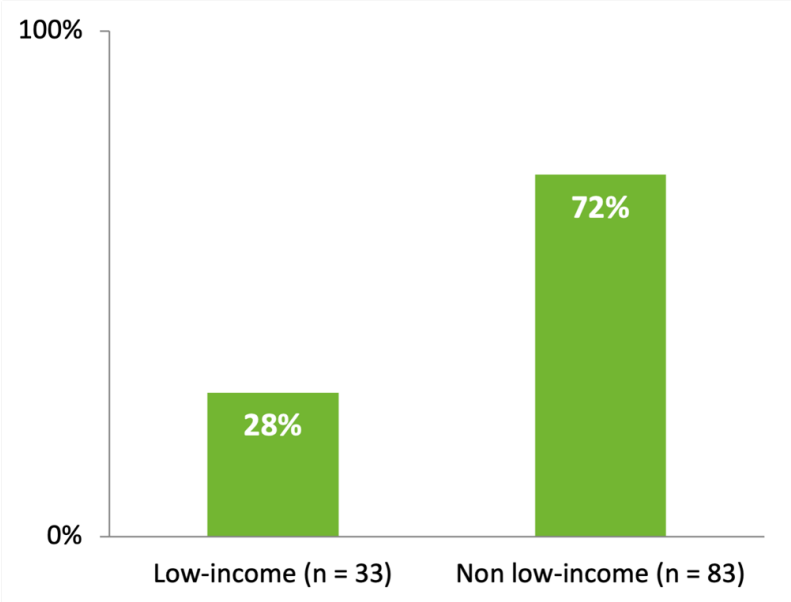


Figure 20 shows the types of lightbulbs purchased over the last year. The majority of the total bulbs purchased were LEDs (58%), and less than 10 percent of bulbs purchased were CFLs.

Figure 20: Bulbs Purchased by Bulb Type

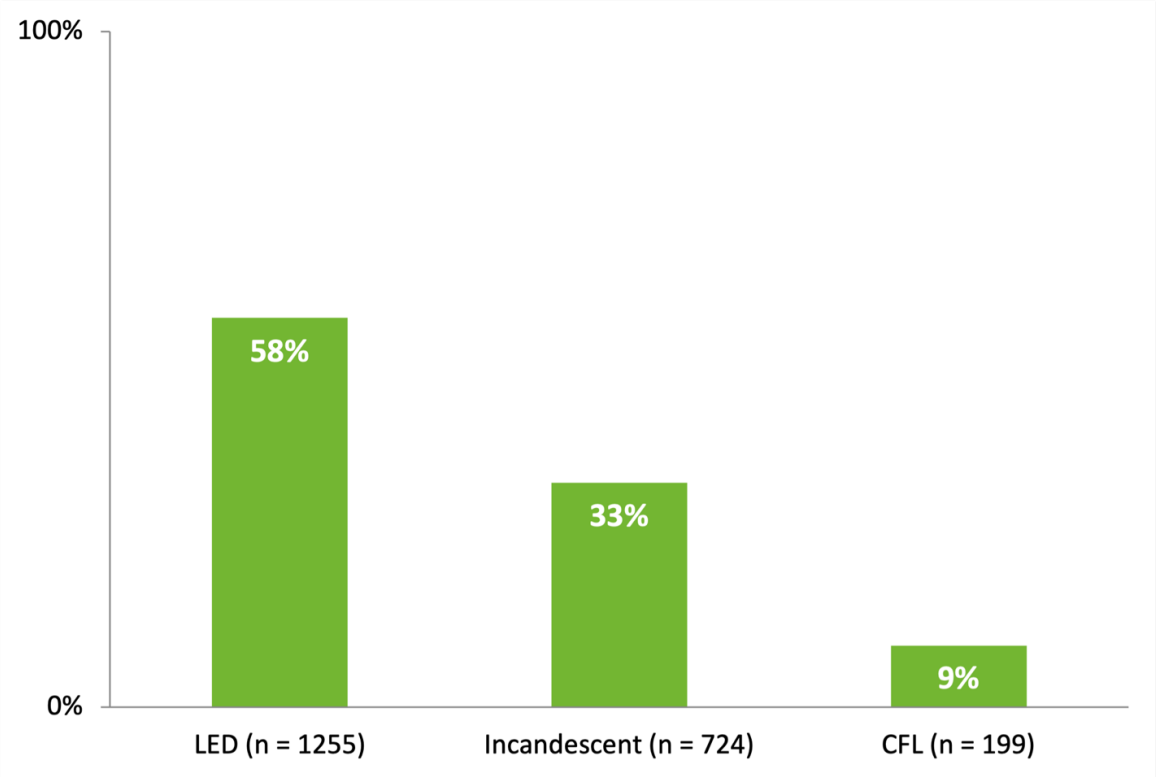
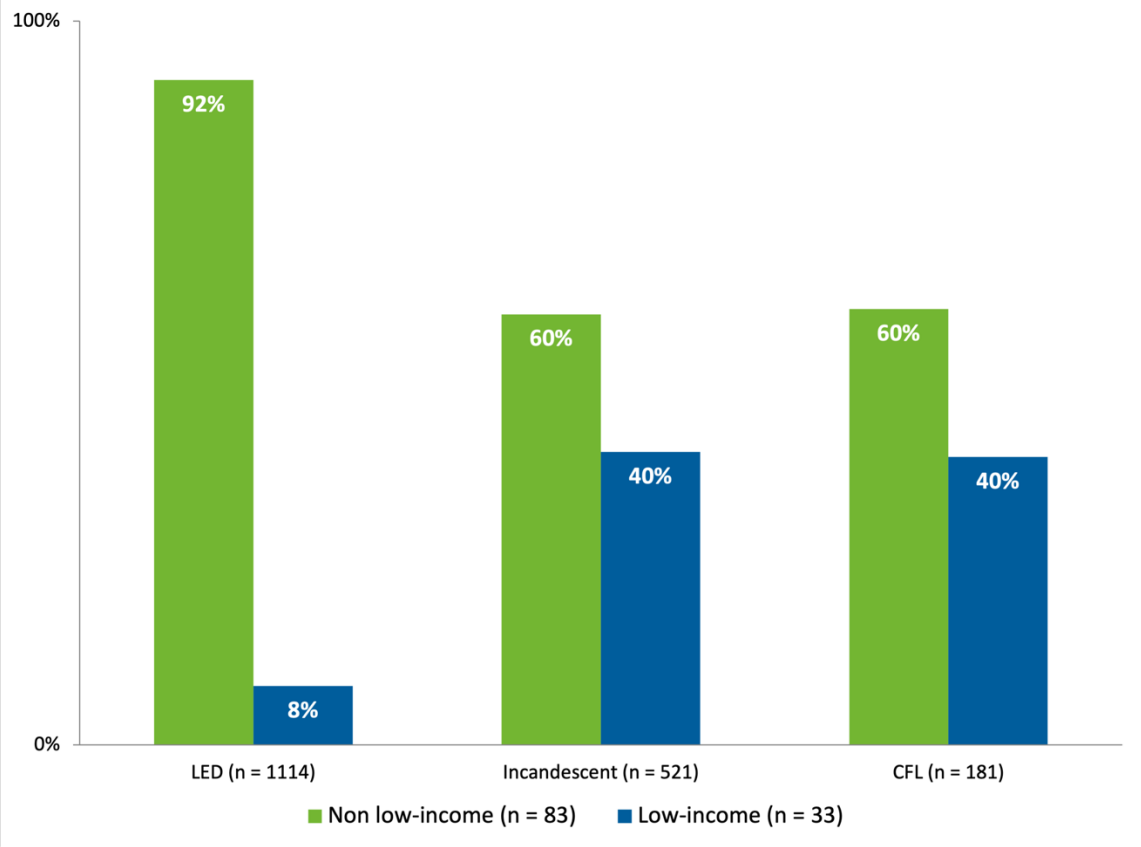


Figure 21 shows the share of each bulb type purchased by income level, for those respondents that provided income information. LEDs are mostly being purchased by non-low-income households, while low-income households are responsible for a greater share of incandescent and CFL purchases (40% for both bulb types).

Figure 21: Bulb Types Purchased by Income Level



We also looked at how many of the purchased bulbs were stored versus installed (Figure 22) and examined stored versus installed bulbs by income (Figure 23). Overall, across all bulb types and income levels, respondents were more likely to install the bulbs they purchased compared to storing them. Non-low-income households tended to store incandescent bulbs at a greater rate, while low-income households were more likely to store LEDs for future use compared to non-low-income households.

Figure 22: Number of Bulbs Installed vs. Stored by Bulb Type

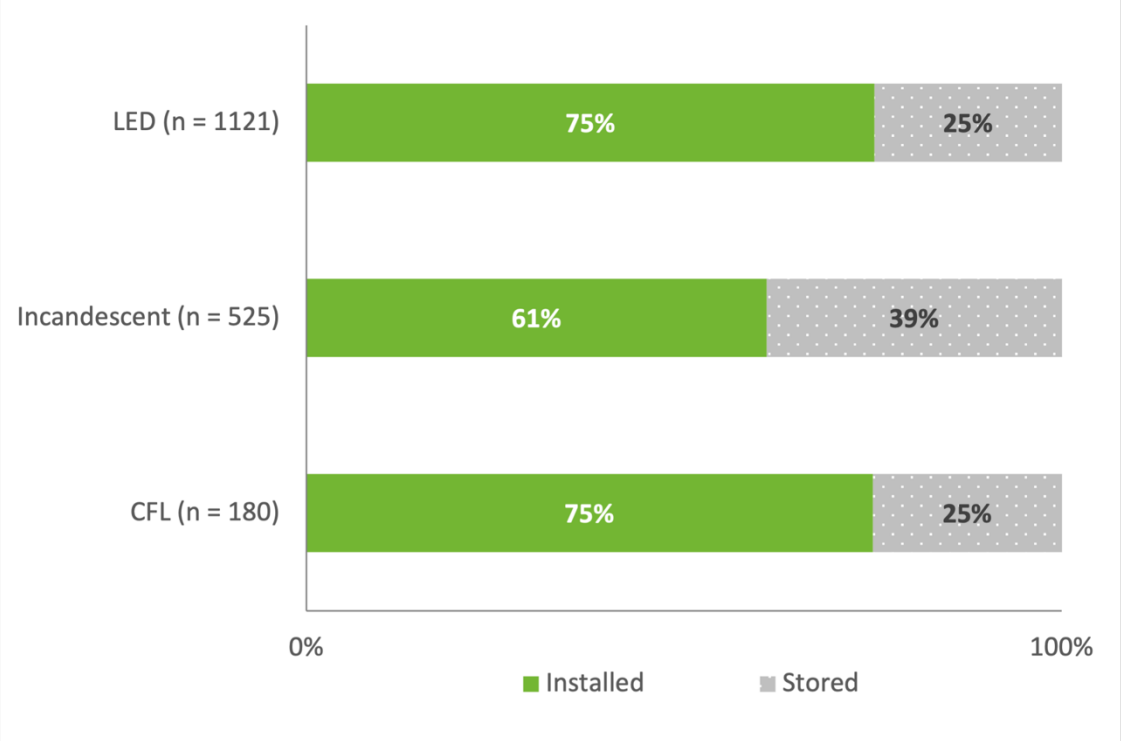
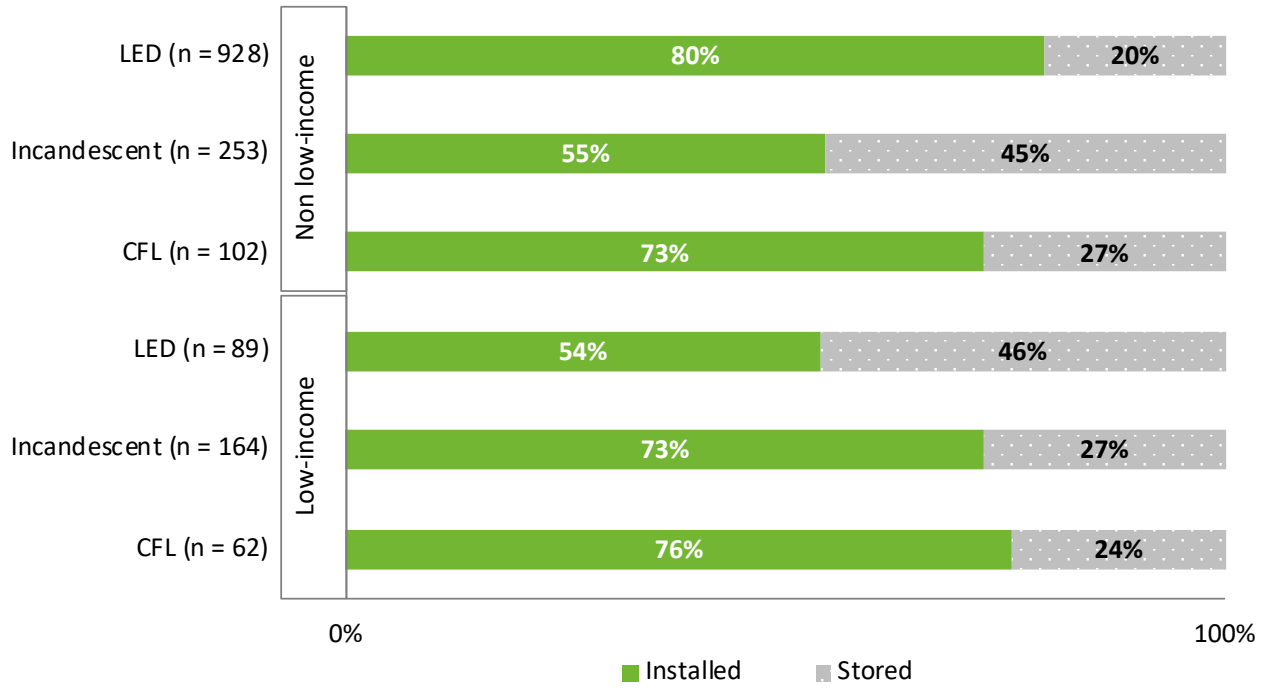


Figure 23: Number of Bulbs Installed vs. Stored by Bulb Type and Income



The following charts (Figure 24 through Figure 29) show where households typically purchased each bulb type, broken out by the full respondent population and income level. Note that with the small sample sizes for income, it is difficult to draw definite conclusions by income type. LEDs are generally purchased by all households at larger big box stores (Home Depot, Walmart, Costco, etc.). With incandescents, there is a greater incidence of purchases through online retailers, particularly with non-low-income households. Most CFLs are also purchased at larger big box stores. Although the sample sizes are small, these results do not support the theory that a significant number of CFLs and incandescents are purchased by low-income households at dollar stores or other similar outlets; most of these bulbs are being purchased at the large box stores, across all income types.

Figure 24: Purchases by Store Type: LEDs (# bulbs=148)

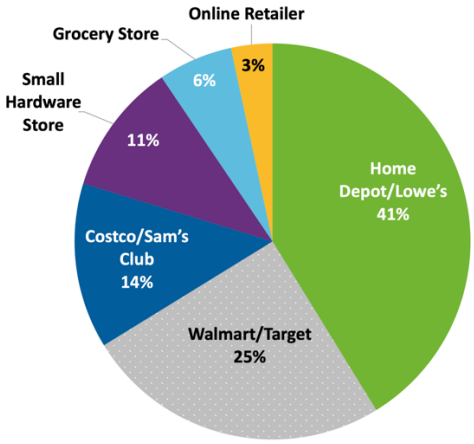


Figure 25: Purchases by Store Type: LEDs (# bulbs=108)

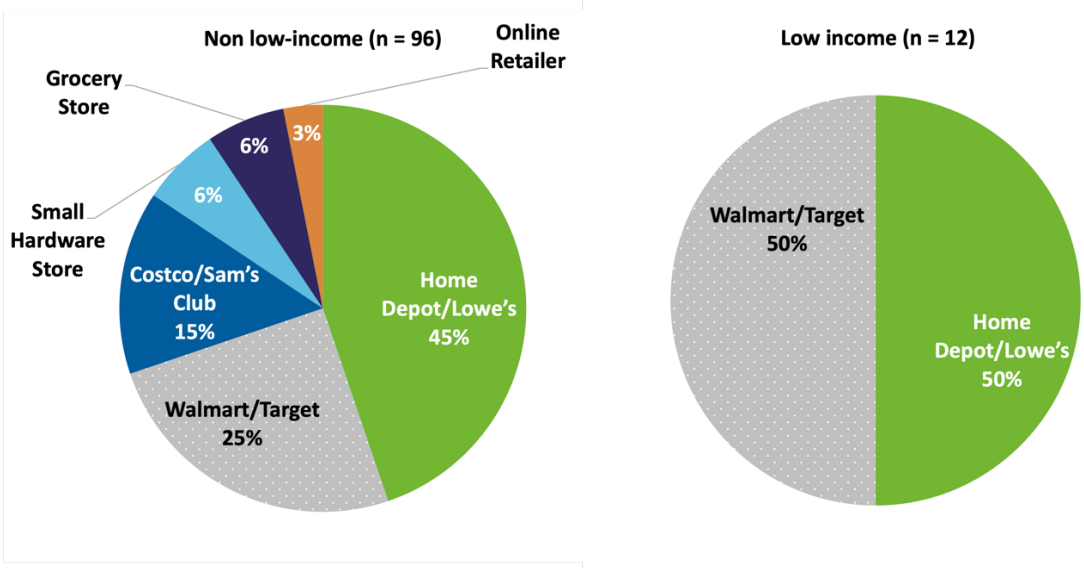


Figure 26: Purchases by Store Type: Incandescents (# bulbs=137)

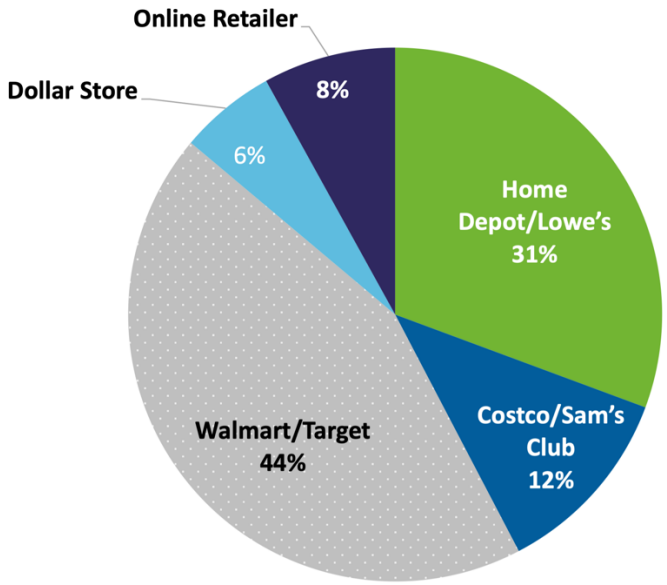


Figure 27: Purchases by Store Type and Income: Incandescents (# bulbs=92)

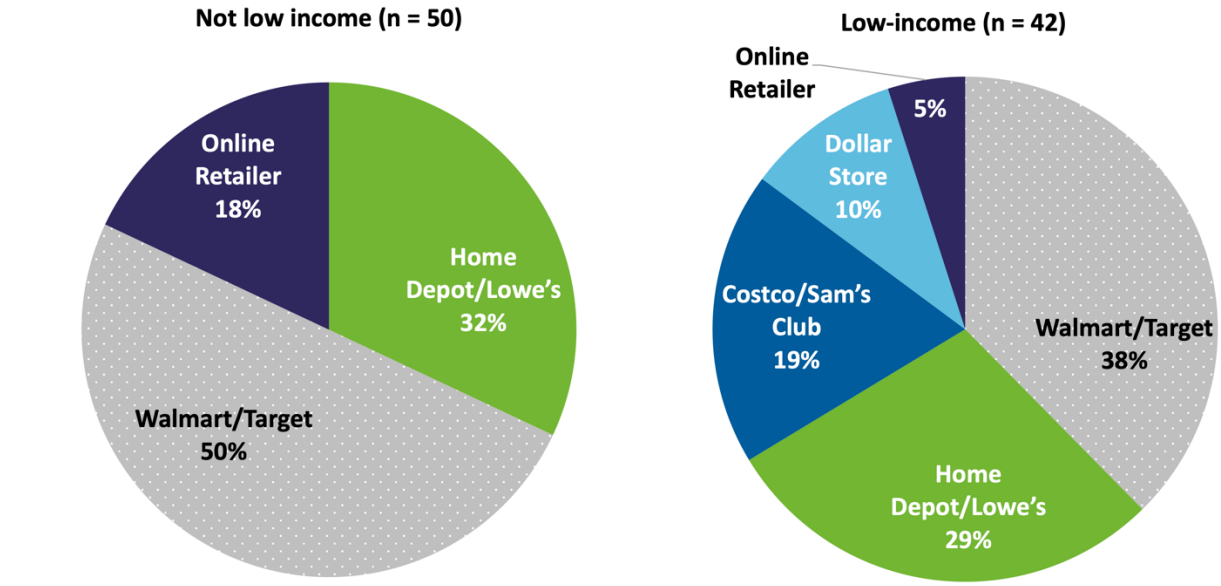


Figure 28: Purchases by Store Type: CFLs (# bulbs=36)

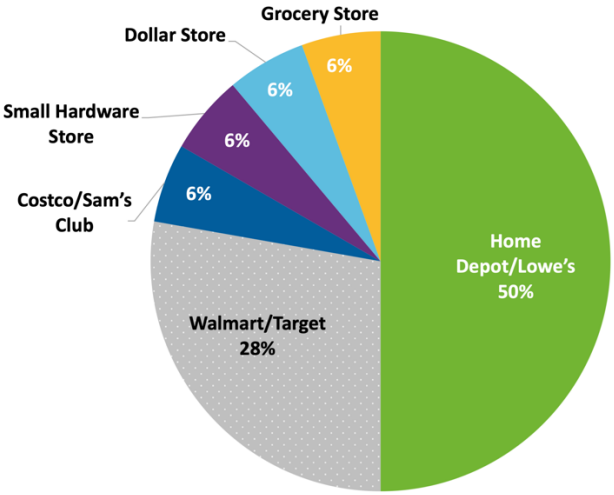
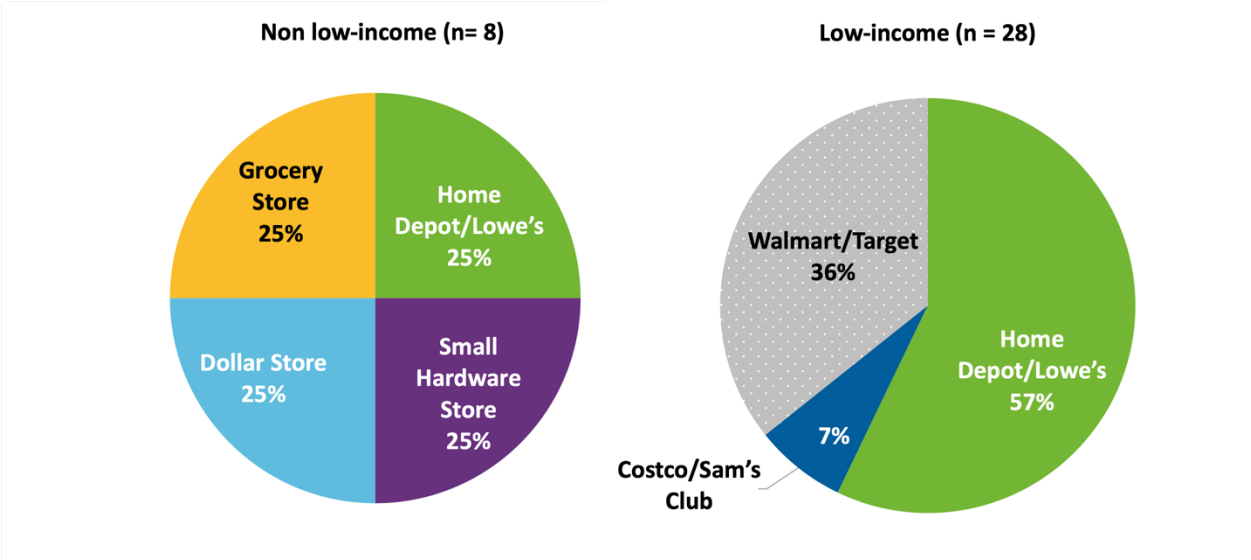
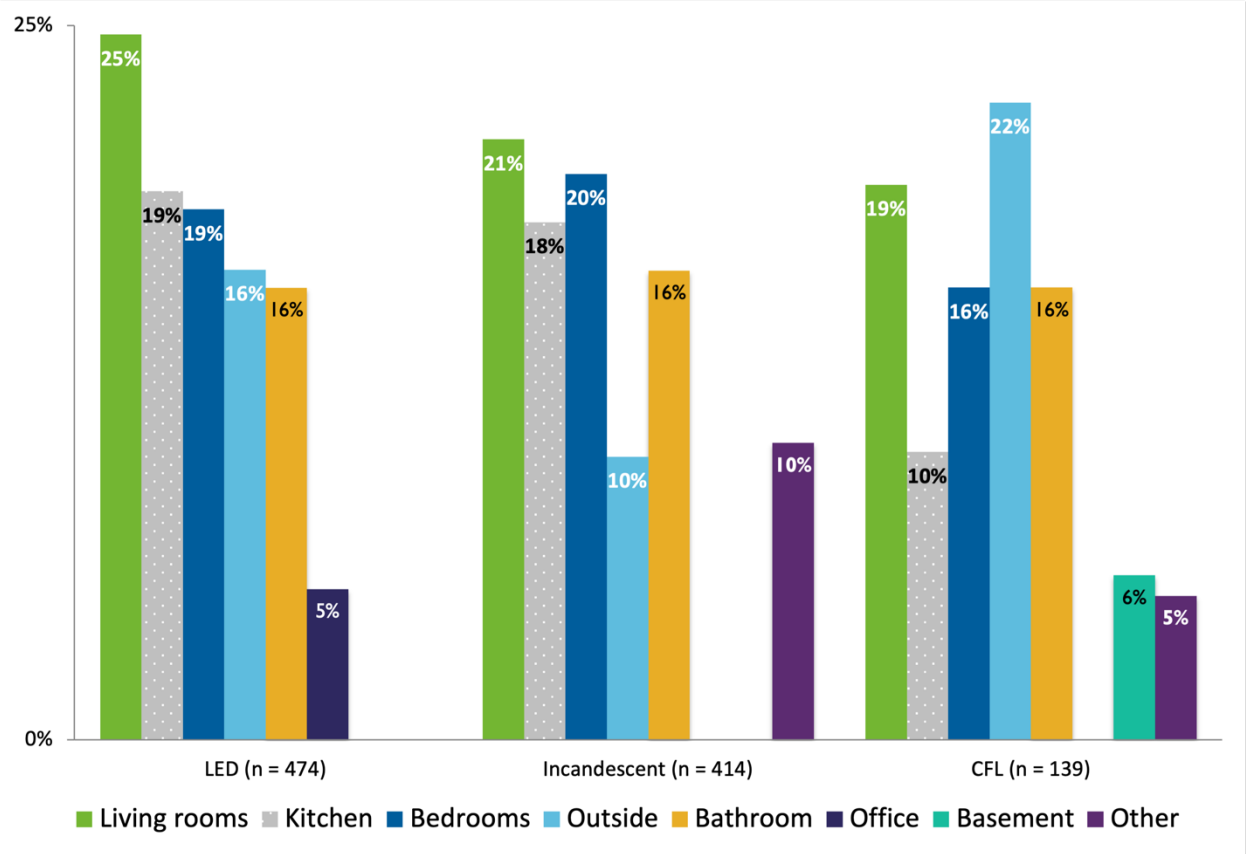


Figure 29: Purchases by Store Type and Income: CFLs (# bulbs=36)



Finally, Figure 30 shows the distribution of rooms where lightbulbs were installed. In general, the same four locations (living rooms, bedrooms, outside, bathrooms) comprise the majority of installations for each bulb type. CFLs tended to be installed more frequently outside and less frequently in the kitchen compared with both LEDs and incandescents.

Figure 30: Percent of Bulb Types Installed by Room



6 NM EnergySaver Program

The NM EnergySaver program provides weatherization and other efficiency improvements at no cost to low-income customers. Other measures provided include LEDs and water conservation measures for customers with electric water heaters. These are prescriptive measures, and as such, the focus of the evaluation for this program was a deemed savings review. The evaluation team reviewed per-unit savings values for measures installed through the program to determine the realized gross savings.

The evaluation of the NM EnergySaver program included both an impact evaluation and an interview with the contractor involved with the program.

6.1 NM EnergySaver Gross and Net Impacts

The impact evaluation consisted of a deemed savings review for the measures included in the NM EnergySaver program. In the deemed savings review, we attempted to confirm the source of savings cited by EPE and/or replicate the per-unit savings values if savings were based on an algorithm from the New Mexico TRM. All measures in the NM EnergySaver program use savings from the New Mexico TRM. For some deemed measures such as faucet aerators and low-flow showerheads, the evaluation team was able to confirm that the savings values in use by the program match the TRM. For other measures that are algorithm based, such as ceiling insulation, duct efficiency, and air infiltration reduction, the inputs used for savings calculations were not available in the tracking data file, but the evaluation team did review the source of savings and algorithms used. EPE does appear to be using the correct algorithms for these measures, and the savings were reasonable, so the evaluation team did not make adjustments to savings for these measures.

The NTG ratio for the NM EnergySaver program is stipulated at 1.0 because this program serves low-income customers, and as a result, the net realized savings are equal to the gross verified savings of 1,078,078 kWh and 590 kW (Table 22).

Table 22: NM EnergySaver Gross and Net Impact Summary

Easy Savings	Number of Projects	Expected Gross Savings	Engineering Adjustment Factor	Realized Gross Savings	NTG Ratio	Realized Net Savings
kWh Savings	1,177	1,078,078	1.0000	1,078,078	1.0000	1,078,078
kW Savings	1,177	590	1.0000	590	1.0000	590

6.2 NM EnergySaver Contractor Interview

As part of the PY2021 evaluation, the evaluation team conducted a telephone interview with the one contractor who participates in the NM EnergySaver program.

The interview focused on the following topics:

- Contractor background and program involvement;
- Role and influence of the EPE NM EnergySaver program; and
- Program satisfaction.

Due to there only being one contractor that is involved with the program and the depth of discussion, this section presents results in a qualitative fashion.

The evaluation team interviewed the contracting company's president, who has a wide range of knowledge and experience with the program process and components. The contractor has been involved with the program since it started in 2010, and projects through the program account for 99 percent of the firm's residential work.

The interviewed contractor was asked to quantify their level of satisfaction and their customers' satisfaction with the program overall using a 1 to 5-point scale, with 1 indicating very dissatisfied and 5 indicating very satisfied. The contractor rated both their satisfaction and their customers' satisfaction a 5 (very satisfied). We then asked whether or not they have received any feedback from their customers about their experiences with the program. The contractor explained that they receive many "heartwarming moments" with customers calling back to let them know how thankful they are for what the program has done for their home. This high level of satisfaction with the program has led to many customers referring friends and family, which is the most common way participants learn about the program. In addition to word-of-mouth, the program team has a table set up at El Paso Electric payment centers where customers can come pay their bills, and they discuss the program with those who are struggling to make full or on-time payments. The contractor went on to say that taking this more customer-facing approach has proved to be very successful in making customers aware of what offerings are available to them, and "from an outreach standpoint, I think EPE is a national leader on how these programs should be run."

Overall, the contractor and its customers are very satisfied with the program, and the program is doing an excellent job creating opportunities for energy efficient measures to be installed in low-income households.

7 Commercial Load Management Program

For the PY2021 Commercial Load Management program, the evaluation team was able to recreate most of Trane's calculations and affirms that their methodology was sound. Trane's gross reported savings are displayed in Table 23.

Table 23: Gross Reported Savings

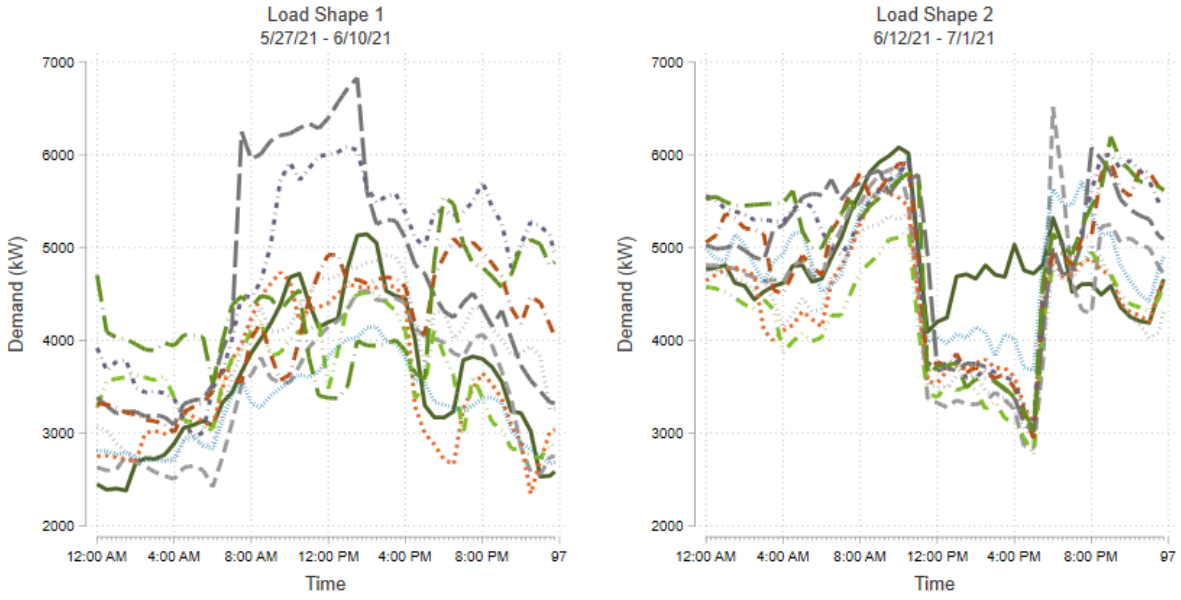
Event Day	Portfolio Committed Capacity (kW)	Portfolio Load Reduction (kW)	Reduction Relative to Committed Capacity (kW)	Actual Enabled Capacity Percentage
June 11, 2021	1,195	711	-484	59%
August 25, 2021	1,195	1,054	-141	88%
September 14, 2021	1,195	468	-727	39%
Average	**1,195**	**745**	**-451**	**62%**

We were able to replicate the Trane numbers exactly except for three schools on June 11, 2021. The difference in the reported delivered capacity and our estimated delivered capacity was 1.96 percent[12] on the June 11 event day across all seven sites (5.11% across the affected sites).

In our savings verification, we used the same "top 8-of-10" methodology as Trane in the independent evaluation. Our approach was identical to Trane's for six of the participating sites and was slightly adjusted for the remaining site on June 11. The site typically operates thermal storage for six hours in the afternoon, from 12:00 to 6:00 p.m., producing a load shape with a clear drop in demand between 12 p.m. and 1 p.m. This year, there were no non-holiday, non-event weekdays *before* the June 11 event with thermal storage load shapes. The days preceding the June 11 event were fundamentally different from the event day. To ensure that the baseline days represented the same conditions as the event, the 10 eligible weekdays *after* June 11 were used to populate the 10 days in the "top 8-of-10" calculations. The two distinct load profiles can be seen in Figure 31.

[12] The Evergreen team's replica calculation returned 725 kW compared to the 711 kW value reported by Trane.

Figure 31: New Mexico State University Load Shape Change



The gross verified savings estimates for demand savings by event and in total are summarized in Table 24. The portfolio delivered average reductions below the 1,195 kW of committed capacity in all three events, with the average portfolio load reduction being 793 kW, or 402 kW (34%) below the portfolio committed capacity. The adjustment to the methodology for the NMSU site on June 11 resulted in a 133 kW (18%) increase in portfolio load reduction on the event day and an overall 3 percent increase in actual enabled capacity.

Table 24: Gross Verified Savings

Date	Portfolio Committed Capacity (kW)	Portfolio Load Reduction (kW)	Reduction Relative to Committed Capacity (kW)	Actual Enabled Capacity Percentage
June 11, 2021	1,195	858	-337	72%
August 25, 2021	1,195	1,054	-141	88%
September 14, 2021	1,195	468	-727	39%
Average	**1,195**	**793**	**-402**	**66%**

Demand response events may also yield energy savings if the demand reductions during the event window are not offset by actions such as precooling or snapback, which shifts demand to intervals outside of the event window. The evaluation team's approach to estimating the net energy savings

on demand response event days is similar to the approach for estimating demand savings. Demand savings are estimated by calculating the difference between a site's actual load and its baseline load for the hours in the event window only. To calculate energy savings, the evaluation team measured the difference between a site's actual load and its baseline load for the daytime hours of event days from 8:00 a.m. to 8:00 p.m.[13] By looking at the hours outside the event window, we account for increases in energy consumption that may occur before or after the demand response event as a result of pre-cooling or other load-shifting activities.

Table 25 shows the portfolio net energy savings for each event and in total. Total energy savings across the three events was 10,075 kWh.

Table 25: Energy Savings by Event Day

Date	Energy Savings (kWh)
June 11, 2021	1,635
August 25, 2021	2,146
September 14, 2021	6,294
Total	**10,075**

[13] The cutoff hours of 8:00 a.m. and 8:00 p.m. were chosen based on a comparison of daily load shapes across different days and specifically the observation that load profiles tend to track each other closely until 8:00 a.m. and converge again after 8:00 p.m. We measure energy savings from 8:00 a.m. to 8:00 p.m. only because we would not expect the baseline and event day loads to differ outside of these time periods as a result of weather conditions or other factors.

8 Residential Load Management Program

For the Residential Load Management program, the impact analysis used a within-subjects regression analysis. For each event day and hour, the average hourly impact was estimated by subtracting the actual runtime from the baseline runtime estimate, where runtime is expressed as the number of minutes that the HVAC system is running that hour. The cooling runtime impacts (in minutes) are then converted to cooling load impacts (in kW), using the connected load assumptions in the New Mexico TRM.

Based on this approach, the gross verified impacts by event day are summarized in Table 26.

Table 26: Demand Impacts by Event Day

Date	Full Event Hours	Impact per Device (kW)	Total Impact (kW)
June 11, 2021	1	1.116	1,365
August 10, 2021	2	0.898	1,267
August 23, 2021	2	0.967	1,410
August 25, 2021	2	0.874	1,269
September 14, 2021	1	1.063	1,592
Event Average	**5 events**	**0.984**	**1,381**
Hourly Average	**8 hours**	**0.957**	**1,356**

The total impact column refers to the average estimated load reduction (in kW) delivered on each event day. This number is calculated by multiplying the impact per device and the total number of devices with telemetry data on each event day.

The final 2021 gross verified impacts in Table 27 were calculated by combining the average impact per device with the total number of customers that were enrolled in the program at the end of the summer demand response season (September 30, 2021). Table 27 shows the evaluation team's overall end-of-season capability.

Table 27: Gross Verified Program Impacts

Impact per Device (kW)	End of Season Enrollment	Estimated Program Load Reduction (kW)
0.957	1,455	1,392

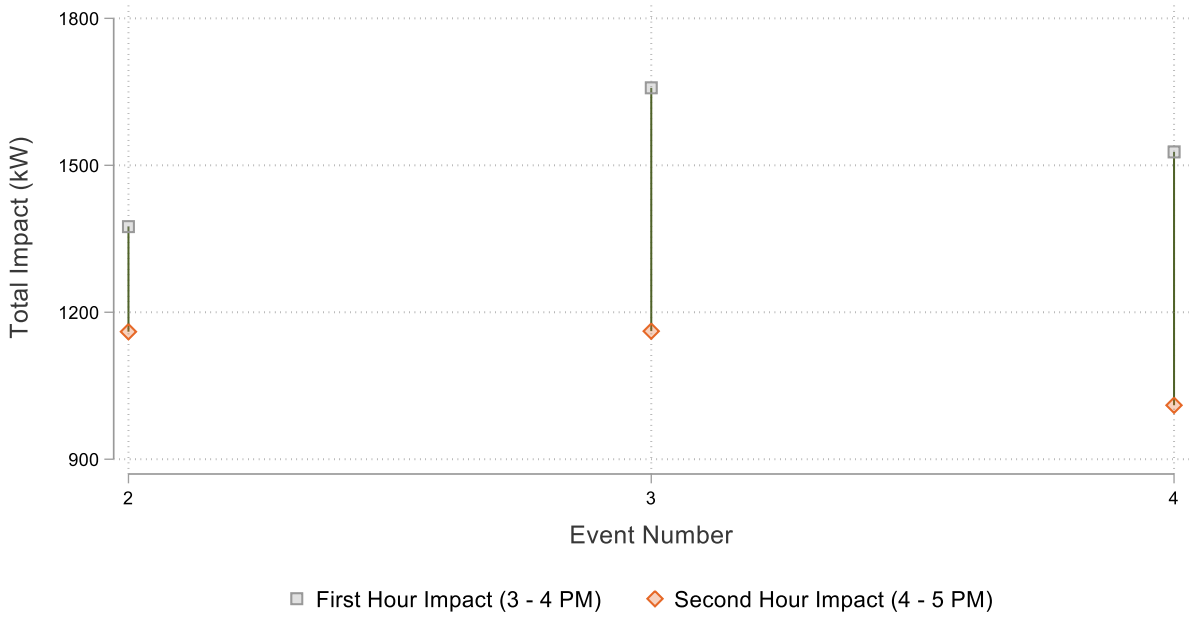
Table 28 shows the hourly demand impacts as well as a count of devices and temperature during each event.

Table 28: Hourly Demand Impacts

Date	Demand Response Devices	Total Devices	Hour Ending MDT	Humidity	Temp. (F)	Impact per Device (kW)	Total Impact (kW)
June 11, 2021	754	1,223	17	5%	101	1.116	1,364
August 10, 2021	1,077	1,411	16	34%	87	0.974	1,374
			17	30%	91	0.822	1,160
August 23, 2021	1,191	1,458	16	28%	92	1.137	1,658
			17	30%	91	0.797	1,162
August 25, 2021	1,165	1,452	16	22%	94	1.052	1,527
			17	21%	94	0.696	1,010
September 14, 2021	1,217	1,498	17	11%	96	1.063	1,592

During each two-hour event, load impacts were larger in the first hour than they were in the second hour. In calculating the event-level impacts, the evaluation team used the average of the two hourly impacts. Figure 32 shows a visual of the diminishing impacts for each of the three two-hour events lasting from 3:00 p.m. to 5:00 p.m.

Figure 32: Diminishing Hourly Impacts



EPE resource planners and system operators should be aware of this decay. Since the events last for at most two hours, it is impossible to predict if this decay would continue if the events were longer. However, if the impact on demand becomes negligible after the first few event hours, this could affect the value of the program as a demand resource.

The Residential Load Management program provides load reductions by reducing the amount of time a customer's HVAC system is running and cooling the home. If load reduction was the only program goal, Uplight would turn off the HVAC system entirely, rather than just manipulating temperature setpoints; however, customer comfort is also an important consideration. To help keep households cool throughout an event, Uplight pre-cools the home in the hours before the event by lowering the setpoint and then also allows the system to run more after the event to return the home to the customer's desired temperature. As a result, the demand response treatment increases runtime and energy usage in the hours before and after the event.

This can sometimes lead to an increase in overall energy usage, even if there are significant peak demand savings. Figure 33 shows the estimated hourly energy impacts for each event day to illustrate the increased energy usage before and after the event and the decreased usage during the event. Negative impacts represent an increase in hourly cooling energy consumption at the device level.

Figure 33: Hourly Energy Impact by Event Day

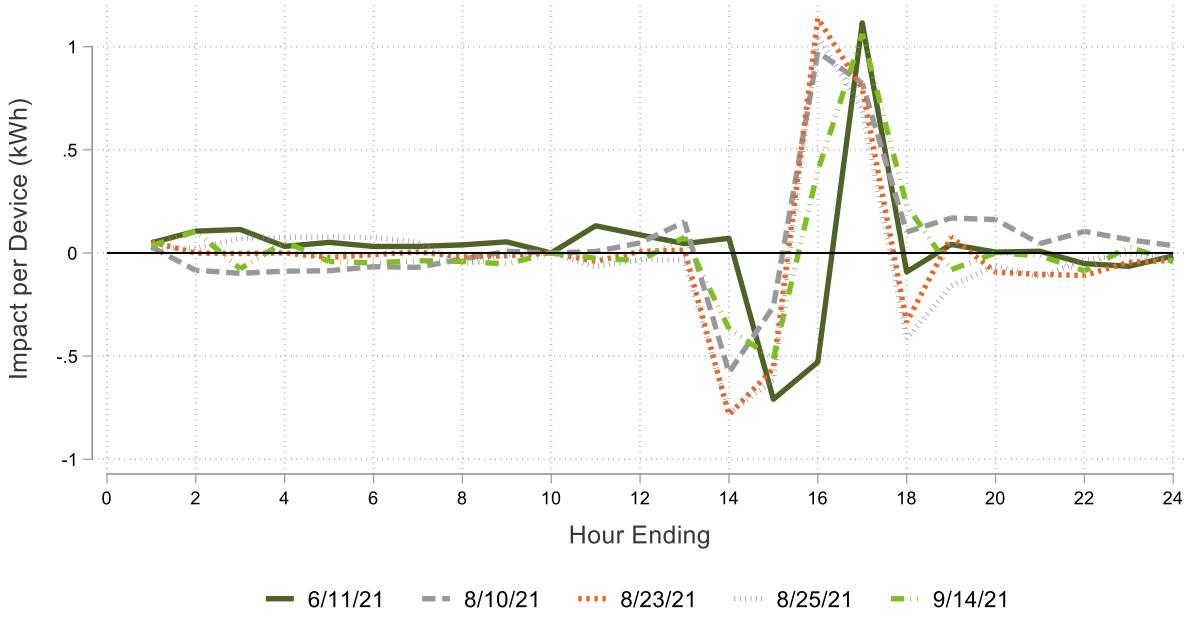


Table 29 shows the net energy impact of the demand response across each full event day. Energy impacts varied by event day, with a positive impact for five event days and a negative impact for three event days. The average impact across all five event days for the Residential Load Management program was close to zero and was not statistically significant. Our interpretation of these results is that the Residential Load Management events are energy neutral in terms of savings.

Table 29: Net Energy Impact by Event Day

Date	Overall Event Day Impact (kWh)
June 11, 2021	0.55
August 10, 2021	1.36
August 23, 2021	-0.08
August 25, 2021	-0.26
September 14, 2021	0.53
Average	**0.42**

9 Cost Effectiveness Results

The evaluation team calculated cost effectiveness using the Utility Cost Test (UCT) for each individual EPE energy efficiency program, as well as the cost effectiveness of the entire portfolio of programs.[14] The evaluation team conducted these tests in a manner consistent with the California Energy Efficiency Policy Manual.[15]

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 30.

Table 30: 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 EPE, the evaluation team calculated the ratio of benefits to costs for each of EPE's programs and for the portfolio overall. The results of the UCT are shown below in Table 31. The portfolio overall was found to have a UCT ratio of 1.40.

[14] The Utility Cost Test is sometimes referred to as the Program Administrator Cost Test, or PACT.
[15] California Public Utilities Commission. 2020. *California Energy Efficiency Policy Manual – Version 6*. https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf

Table 31: PY2021 Cost Effectiveness

Program	Utility Cost Test (UCT)
Small Business Comprehensive	1.48
SCORE Plus	1.04
Residential Lighting	3.84
Residential Comprehensive	1.65
ENERGY STAR New Homes	0.88
NM EnergySaver	1.74
LivingWise	0.79
Commercial Load Management	0.53
Residential Load Management	0.59
Overall Portfolio	**1.40**

10 Conclusions and Recommendations

The general evaluation conclusions are presented below, along with recommendations for program improvement where appropriate.

10.1 Small Business Comprehensive Program

Impact evaluation activities for the Small Business Comprehensive program included engineering desk reviews for a sample of projects. Based on these desk reviews, an engineering adjustment factor of 1.0001 was found for kWh savings, and 1.0003 was found for kW savings. The fact that engineering adjustments are close to 1.0 indicates that the evaluation was generally in agreement with the original *ex ante* savings values and few adjustments were needed. As discussed in the *Evaluation Methods* section, the PY2020 net-to-gross (NTG) ratio of 0.8211 was applied for PY2021. In PY2022, the NTG ratio will change from 0.8211 to 0.8919.

Recommendations for the Small Business Comprehensive program are based on areas where savings adjustments were made based on the project desk reviews:

- The evaluation team increased the kWh savings for one cooling project, which resulted in a 1.1347 realization rate for kWh savings and a 1.0000 realization rate for kW savings. For this project, the evaluation team accounted for both the cooling and heating savings for the installation of a heat pump, which is consistent with the methodology in the New Mexico TRM. The *ex ante* savings appear to only account for the cooling savings.
    - **Recommendation**: Ensure savings algorithms account for heating and cooling savings when stipulated by the New Mexico TRM.

10.2 SCORE Plus Program

Impact evaluation activities for the SCORE Plus program included engineering desk reviews for a sample of projects. Based on these desk reviews, an engineering adjustment factor of 0.9966 was found for kWh savings, and 0.9963 was found for kW savings. As discussed in the *Evaluation Methods* section, the PY2020 NTG ratio was applied for PY2021 based on the previous year's survey responses. An updated NTG ratio based on survey data from the PY2019-PY2021 evaluations resulted in an updated value of 0.6088, which will be used beginning in PY2022.

Conclusions and recommendations resulting from the evaluation include the following:

- The evaluation team updated the savings for one HVAC project. The *ex ante* calculations appear to use SEER instead of EER when calculating energy savings for split AC units with capacities between 5.4 tons and 20 tons. The New Mexico TRM stipulates that the energy savings should use the EER for units in that capacity range. This adjustment decreased

energy (kWh) and peak demand (kW) savings, resulting in realization rates of 0.3625 and 0.7862, respectively.

  - **Recommendation**: Ensure savings algorithm inputs are in alignment with the NM TRM for prescriptive HVAC projects.

- The evaluation team found one lighting project that did not include the correct post installation fixture quantities. The evaluator reviewed the supplied photos and found photographic evidence that four exterior lamp fixtures were installed. This adjustment decreased energy (kWh) and peak demand (kW) savings, resulting in realization rates of 0.9206 and 0.9916 respectively.
  - **Recommendation**: Ensure all installed fixtures are accounted for in the *ex ante* savings calculations.
- The evaluation team had low success in getting participants to participate in the end of year survey. Contacts were exhausted after three emails and two voicemails requesting an interview.
  - **Recommendation**: EPE to send an initial recruitment email to program participants prior to recruiting for the survey to help motivate participants to respond.

10.3 NM Energy Saver

The review for the deemed savings confirmed the original savings numbers. We have no recommendations for program changes at this time.

10.4 Residential Load Management

Based on our impact evaluation of the 2021 Residential Load Management Program, the evaluation team offers the following conclusions and recommendations:

- The transition to a full dispatch model in summer 2021 was successful. The Evergreen team was able to use non-event weekday runtime data to produce defensible estimates of kW impacts without an experimental design.
- The M&V Status designation of the devices becomes less important in a full dispatch model. We observed some amount of demand response amongst the devices not classified as having status of “Demand Response” and elected to simply model all program devices on event days against all program devices on non-event weekdays.
  - The M&V status field still provides useful contextual information about program performance. The share of program devices classified as “Inoperative” or “Ineligible” was much lower in 2021 than in 2020. This explains why average kW impacts were 14 percent higher (0.957 kW in 2021 versus 0.838 kW in 2020).
  - For the last four events of 2021, over 75 percent of enrolled devices got some amount of demand response. This is higher than in 2020, but Uplight and EPE should continue to work with the thermostat manufacturers to maximize the number of devices that are available for demand response.