PY2023 EVALUATION OF THE PUBLIC SERVICE COMPANY OF NEW MEXICO ENERGY EFFICIENCY AND LOAD MANAGEMENT PROGRAMS

FINAL REPORT

Date: April 9, 2024

Prepared for: The Public Service Company of New Mexico

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EXECUTIVE SUMMARY

This report presents the independent evaluation results for the Public Service Company of New Mexico (PNM) energy efficiency programs for program year 2023 (PY2023).

The PNM programs and evaluation requirements were first established in 2005 by the New Mexico legislature's pass age 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, PNM 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 EcoMetric evaluation team consisted of the following firms:

- EcoMetric was the prime contractor and managed all evaluation tasks and deliverables;
- EcoMetric provided engineering capabilities and led the review of PNM’s savings estimates;
- Evergreen Economics provided process evaluation capabilities;
- Demand Side Analytics conducted the impact evaluation of the Commercial and Residential Load Management programs; and
- Research & Polling fielded all the phone surveys.

For PY2023, the following PNM programs were evaluated:

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

- Commercial Comprehensive
- New Homes Construction
- Energy Smart (LI)
- Home Energy Reports (HER)
- Power Saver
- Peak Saver

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 Commercial Comprehensive, New Homes Construction, and Energy Smart programs. A summary of the analysis methods for each of the PY2023 programs that were evaluated is included below.

Commercial Comprehensive. The majority of projects in the Commercial Comprehensive program are prescriptive in nature, and as such the evaluation of this program centered on a deemed savings review, phone survey verification, and project desk reviews. Custom projects were evaluated by a desk review and participant phone survey. The deemed savings review for prescriptive measures focused on verifying that the appropriate savings values were applied based on the equipment installed and per the referenced source of savings, whether that is 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 gather information to calculate a free ridership rate, as described in more detail in the Net Impacts section below. Additionally, desk reviews conducted by engineers examined the savings assumptions and calculations specific to each project that is selected for review. Finally, on-site visits were conducted to verify measures in a sample of the larger projects.

New Homes Construction. This program was re-launched by PNM in 2017 after the Energy Star New Homes program was discontinued in 2014. There are two paths offered by the program: The Performance path, which encourages a whole home approach to efficiency, and the Prescriptive path, which provides incentives for individual equipment upgrades. The impact evaluation included desk reviews for Performance projects, and a deemed savings review for Prescriptive measures. The evaluation team also attempted to complete phone interviews with participating builders to estimate free ridership, described further under the net impact section of this report.

Energy Smart (Low Income). The Energy Smart program provides weatherization services and other efficiency upgrades to low-income households in PNM territory. Measures are prescriptive in nature and include insulation, duct sealing, water heater tank and pipe insulation, low-flow showerheads and aerators, and efficient lighting. A deemed savings review was conducted to complete the impact evaluation for this program.

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

Power Saver and Peak Saver. PNM had two demand response programs in PY2022. The Power Saver program focuses on single-family, multifamily, and small and medium commercial customers. For all Power Saver customers, the five-minute interval load data were analyzed during event periods and compared to load shapes from a control group. The Peak Saver program is for larger customers that typically have unique load shapes, which makes finding a matched control group difficult. For these customers, savings were estimated based on the differences in load shapes between event and non-event weekdays for the same customer.

Table 1 summarizes the PY2023 evaluation methods.

Table 1: Summary of PY2023 Evaluation Methods by Program

Sector	Program	Deemed Savings Review	Participant Survey / Interviews	Engineering Desk Reviews	Site Visits	Billing Regression
Residential	New Homes Construction		✓	✓		
	Energy Smart	✓				
	Home Energy Reports					✓
	Peak Saver					✓
	Power Saver					✓
Commercial	Commercial Comprehensive		✓	✓	✓	

The results of the PY2023 impact evaluation are shown in Table 2 (kWh) and Table 3 (kW), with the programs evaluated in 2023 bolded.

Table 2: PY2023 Savings Summary – kWh

Program	Sub-Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Commercial Comprehensive	**Retrofit Rebate**	**175**	**18,789,289**	**1.0699**	**20,102,009**	**0.626**	**12,583,858**
	New Construction	**72**	**12,296,992**	**0.9583**	**11,784,359**	**0.763**	**8,991,466**
	Quick Saver	**194**	**6,706,304**	**1.0554**	**7,077,955**	**1.000**	**7,077,955**
	Multifamily	**66**	**4,780,243**	**1.1022**	**5,268,852**	**0.763**	**4,020,134**
	Building Tune-Up	**9**	**1,063,059**	**1.0000**	**1,063,059**	**0.763**	**811,114**
	Midstream	**3**	**241,428**	**0.9280**	**224,045**	**0.763**	**170,947**
Residential Comprehensive	Home Energy Checkup - LI	7,649	2,562,808	1.0000	2,562,808	1.000	2,562,808
	Home Energy Checkup	25,113	8,441,582	1.0000	8,441,582	0.978	8,255,867
	Refrigerator Recycling	3,385	3,668,365	1.0000	3,668,365	0.630	2,311,070
	Cooling	887	1,014,623	1.0000	1,014,623	0.626	635,154
Residential Lighting		1,230,913	36,800,066	1.0000	36,800,066	0.510	18,768,034
Residential Products		117,752	11,942,265	1.0000	11,942,265	0.510	6,090,555
Home Works		13,273	3,589,117	1.0000	3,589,117	1.000	3,589,117
Energy Smart		**442**	**1,201,137**	**1.0000**	**1,197,483**	**1.000**	**1,197,483**
Easy Savings		4,444	2,787,904	1.0000	2,787,904	1.000	2,787,904
New Home Construction		1,205	1,537,110	1.0100	1,552,482	0.730	1,133,312
Residential Behavioral HER		**217,670**	**10,094,228**	**0.9133**	**9,219,000**	**1.000**	**9,219,000**
Commercial Behavioral SEM		31	1,337,981	1.0000	1,337,981	1.000	1,337,981
Peak Saver		**160**	**285,600**	**0.3904**	**111,500**	**1.000**	**111,500**
Power Saver		**64,253**	**546,000**	**0.6740**	**368,000**	**1.000**	**368,000**
Total		**1,687,696**	**129,686,102**	**1.0033**	**130,113,454**		**92,023,257**

Table 3: PY2023 Savings Summary – kW

Program	Sub-Program	# of Projects	Expected Gross kWSavings	Engineering Adjustment Factor	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Commercial Comprehensive	**Retrofit Rebate**	**175**	**4,869**	**1.1168**	**5,438**	**0.626**	**3,404**
	New Construction	**72**	**1,692**	**1.0976**	**1,857**	**0.763**	**1,417**
	Quick Saver	**194**	**1,061**	**0.9212**	**977**	**1.000**	**977**
	Multifamily	**66**	**568**	**1.4353**	**815**	**0.763**	**622**
	Building Tune-Up	**9**	**0**	**NA**	**88**	**0.763**	**68**
	Midstream	**3**	**21**	**4.4520**	**93**	**0.763**	**71**
Residential Comprehensive	Home Energy Checkup - LI	7,649	279	1.0000	279	1.000	279
	Home Energy Checkup	25,113	477	1.0000	477	0.978	467
	Refrigerator Recycling	3,385	854	1.0000	854	0.630	538
	Cooling	887	283	1.0000	283	0.626	177
Residential Lighting		1,230,913	7,090	1.0000	7,090	0.510	3,616
Residential Products		117,752	2,144	1.0000	2,144	0.510	1,094
Home Works		13,273	188	1.0000	188	1.000	188
Energy Smart		**442**	**382**	**1.0000**	**382**	**1.000**	**382**
Easy Savings		4,444	229	1.0000	229	1.000	229
New Home Construction		1,205	334	1.0000	334	0.730	244
Residential Behavioral HER		**217,670**	**0**	**NA**	**2,172**	**1.000**	**2,172**
Commercial Behavioral SEM		31	0	NA	0	1.000	0
Peak Saver		**160**	**35,700**	**0.4454**	**15,900**	**1.000**	**15,900**
Power Saver		**64,253**	**60,790**	**0.6322**	**38,430**	**1.000**	**38,430**
Total		**1,687,696**	**116,961**	**0.6486**	**78,031**		**70,274**

Beginning in 2021, the impact evaluation moved to applying new net-to-gross (NTG) ratios prospectively in future years, rather than retrospectively as had been done in prior years. The PY2023 NTG ratios are being applied to the PY2024 results. The NTG ratios calculated in PY2023 will then be applied to the PY2024 results.

Table 4 summarizes the updates to the NTG ratios for PY2024, with the updated values bolded.

Table 4: Net-to-Gross Ratio Updates for PY2024

Program	Sub-Program	PY2023 NTG Ratio	PY2024 NTG Ratio
Commercial Comprehensive	Retrofit Rebate	0.626	0.649
	New Construction	0.763	0.649
	Quick Saver	1.000	1.000
	Multifamily	0.763	0.649
	Building Tune-Up	0.763	0.649
	Midstream	0.763	0.649
Residential Comprehensive	Home Energy Checkup - LI	1.000	1.000
	Home Energy Checkup	0.978	0.978
	Refrigerator Recycling	0.630	0.630
	Cooling	0.626	0.626
Residential Lighting		0.510	0.510
Residential Products		0.510	0.510
Home Works		1.000	1.000
Energy Smart		1.000	1.000
Easy Savings		1.000	1.000
New Home Construction		0.730	0.713
Residential Behavioral HER		1.000	1.000
Commercial Behavioral SEM		1.000	1.000
Peak Saver		1.000	1.000
Power Saver		1.000	1.000

Using net realized savings from this evaluation and cost information provided by PNM, the evaluation team calculated the ratio of benefits to costs for each of PNM'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 1.30.

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

Table 5: PY2023 Cost Effectiveness

Program	Utility Cost Test (UCT)
Res Comp – Refrigerator Recycling	0.61
Res Comp – Home Energy Checkup	1.01
Res Comp – Home Energy Checkup LI	0.64
Res Comp – Residential Cooling	0.58
Residential Behavioral HER	0.71
Residential Lighting	1.86
Residential Products	2.40
Commercial Comprehensive	1.58
Commercial Comprehensive - Multifamily	1.09
Easy Savings	1.60
Energy Smart (MFA)	1.81
New Home Construction	0.95
PNM Home Works	1.85
Commercial Behavioral SEM	0.22
PNM Power Saver	0.98
PNM Peak Saver	0.90
Overall Portfolio	**1.30**

Table 6: PY2023 Savings Summary – Lifetime kWh

Program	Sub-Program	Expected Gross kWh Savings	Realized Gross kWh Savings	Realized Net kWh Savings
Commercial Comprehensive	Retrofit Rebate	199,166,467	213,081,298	133,388,893
Commercial Comprehensive	New Construction	130,348,118	124,914,206	95,309,539
Commercial Comprehensive	Quick Saver	71,086,821	75,026,324	75,026,324
Commercial Comprehensive	Multifamily	50,670,580	55,849,831	42,613,421
Commercial Comprehensive	Building Tune-Up	11,268,425	11,268,425	8,597,808
Commercial Comprehensive	Midstream	2,559,140	2,374,882	1,812,035
Residential Comprehensive	Home Energy Checkup - LI	22,937,133	22,937,133	22,937,133
Residential Comprehensive	Home Energy Checkup	75,552,158	75,552,158	73,890,011
Residential Comprehensive	Refrigerator Recycling	17,938,305	17,938,305	11,301,132
Residential Comprehensive	Cooling	15,655,015	15,655,015	9,800,040
Residential Lighting		347,392,620	347,392,620	177,170,236
Residential Products		158,316,978	158,316,978	80,741,659
Home Works		47,871,368	47,871,368	47,871,368

Energy Smart	17,578,957	17,525,478	17,525,478
Easy Savings	18,095,762	37,184,847	37,184,847
New Home Construction	24,740,241	24,987,644	18,240,980
Residential Behavioral HER	10,094,228	9,219,000	9,219,000
Commercial Behavioral SEM	4,013,943	4,013,943	4,013,943
Peak Saver	285,600	111,500	111,500
Power Saver	546,000	368,000	368,000
Total	**1,226,117,858**	**1,261,588,954**	**867,123,346**

The impact evaluation—which included engineering desk reviews for a sample of Commercial Comprehensive and New Homes Construction projects, site visits for a sample of Commercial Comprehensive projects, and a review of deemed savings values for Energy Smart —resulted in engineering adjustment factors that varied from 1.000 for realized gross savings. Adjustments to savings based on the Commercial Comprehensive, New Homes Construction, and Energy Smart desk reviews resulted in minor changes at the program or portfolio level.

The process evaluation activities included phone surveys with Commercial Comprehensive, New Home Construction, and Energy Smart participants and interviews with Commercial Comprehensive and New Home Construction participating contractors. Based on the data collection and analysis conducted for this evaluation, the evaluation team found that overall, PNM is operating programs that are resulting in energy and demand savings and satisfied participants.

1 INTRODUCTION

This report presents the independent evaluation results for the Public Service Company of New Mexico (PNM) energy efficiency programs for program year 2023 (PY2023).

The PNM 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).[4] 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, PNM 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 EcoMetric evaluation team consisted of the following firms:

- EcoMetric was the prime contractor and managed all evaluation tasks and deliverables;
- EcoMetric provided engineering capabilities and led the review of PNM's savings estimates;
- Evergreen Economics provided process evaluation capabilities;
- Demand Side Analytics conducted the impact evaluation of the Commercial and Residential Load Management programs; and

For PY2023, the following PNM programs were evaluated:

- Commercial Comprehensive

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- New Homes Construction
- Energy Smart (LI)
- Power Saver
- Peak Saver

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.

The subsequent sections of this report outline the overall evaluation methods, discuss program level results, and provide findings and recommendations for PNM to consider.

2 EVALUATION METHODS

This section describes the evaluation methods used to evaluate The Public Service Company of New Mexico (PNM) 2023 energy efficiency programs.

Table 7 below identifies the tasks EcoMetric plans to complete at the program level.

Table 7: PY2023 Program Evaluation Summary

Sector	Program	Deemed Savings Review	Participant Survey / Interviews	Engineering Desk Reviews	Site Visits	Billing Regression
Residential	New Homes Construction		✓	✓		
	Energy Smart	✓				
	Home Energy Reports					✓
	Peak Saver					✓
	Power Saver					✓
Commercial	Commercial Comprehensive		✓	✓	✓	

EcoMetric completed the cost-effectiveness analysis for each program in the portfolio. The portfolio evaluation included a combination of the following components listed below:

- Gross and net impacts for kWh and kW
- Process evaluation
- Cost-effectiveness analysis
- Assisting PNM as needed in providing real-time feedback on programs
- Coordinating with the New Mexico PRC on evaluation activities

The evaluation report still summarizes programs that were not evaluated in 2023. For any program that was not evaluated in 2023, EcoMetric applied an engineering adjustment factor of 100% for that program as well as a net-to-gross ratio that was specified in the 2022 evaluation report. These programs have the following elements compiled and reported for PY2023:

- Gross impacts (kWh, kW) using PNM's ex ante values for savings
- Net impacts calculated using the existing ex ante net-to-gross ratio
- Cost-effectiveness calculations using the ex ante net impact values

2.1 PROGRAM DESCRIPTIONS

Different programs require leveraging different techniques for program evaluation based on measure type and program delivery. This section describes the program offerings the team evaluated in PY2023. Table 8 below summarizes the types of energy savings methodologies used in each of the evaluated programs.

Table 8: Summary of Savings Methodologies by Program

Program	Prescriptive	Custom	Load Management
Commercial Comprehensive	✓	✓	
New Homes Construction	✓	✓	
Energy Smart	✓		
Home Energy Reports		✓	
Power Saver			✓
Peak Saver			✓

Commercial Comprehensive. The majority of projects in the Commercial Comprehensive program are prescriptive in nature, and as such the evaluation of this program will center on a deemed savings review, phone survey verification, and project desk reviews. Custom projects were evaluated by a desk review and participant phone survey. The deemed savings review for prescriptive measures focused on verifying that the appropriate savings values were applied based on the equipment installed and per the referenced source of savings, whether that is 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 gather information to calculate a free ridership rate, as described in more detail in the Net Impacts section below. Finally, desk reviews conducted by engineers will examine the savings assumptions and calculations specific to each project that is selected for review.

New Homes Construction. This program incentivizes homebuilders to construct homes that meet or exceed current Energy Star standards. The program offers two paths: the Products path, which provides incentives for a minimum of three individual equipment upgrades; and the Performance path, which provides tiered rebate levels for new homes that exceed the 2018 International Energy Conservation Code (IECC) by at least 10%. The impact evaluation will include desk reviews for Performance projects, a deemed savings review for Products projects, and builder interviews to estimate net impacts.

Energy Smart (LI). PNM's Energy Smart program provides weatherization services and other efficiency upgrades to low-income households in PNM territory. Measures are prescriptive in nature and include insulation, duct sealing, water heater tank and pipe insulation, low-flow showerheads and aerators, and efficient lighting. To evaluate the impacts of the Energy Smart program, the evaluation team conducted a deemed savings review of the energy saving measures provided by the program.

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

Power Saver and Peak Saver. These are demand response programs targeting different customer groups. The Power Saver program focuses on single family, multi-dwelling units (MDUs), and small and medium commercial customers. There are five separate Power Saver components. The Peak Saver program is for larger commercial customers that typically have unique load shapes. For Peak Saver and four of the five Power Saver components, savings will be estimated based on the difference in load shapes between event and recent non-event weekdays for the same customer. For the fifth Power Saver component (residential direct load control through AC switches), impacts will be estimated by comparing participants' load with load from a control group. All analyses use 5-minute interval load data and are consistent with what our team has done in prior evaluations of these programs.

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

2.2 PHONE SURVEYS

Phone surveys were fielded in January through March of 2024 for participants in the Commercial Comprehensive, New Homes Construction and Energy Smart programs. The phone surveys ranged from 15 to 20 minutes in length and covered the following topics:

- Verification of measures included in PNM'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.

The final survey instruments for the Commercial Comprehensive, New Home Construction, and Energy Smart are included in the Appendix A, B, C, and D.

2.3 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 Commercial Comprehensive and New Home Construction programs while the Energy Smart program received a deemed savings review. 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 PY2023, deemed savings reviews were completed for the Commercial Comprehensive and New Home Construction 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.

2.4 ONSITE INSPECTIONS

In support of the engineering desk reviews, the evaluation team completed onsite inspections for eight of the Commercial Comprehensive projects in the evaluation sample. The evaluation team contacted selected participants by phone and email to schedule the onsite inspections. The evaluation team visited sites to verify equipment installation and operational parameters.

2.5 LOAD MANAGEMENT IMPACT ESTIMATION

Load management programs and how they are evaluated depends specifically on how the program is designed and how customers are engaged in the program. The details regarding how PNM's load management programs were evaluated are presented in Section 6.

2.6 NET IMPACT ANALYSIS

The evaluation team estimated net impacts for some 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:

1. What were the circumstances under which the customer decided to implement the project (i.e., new construction, retrofit/early replacement, replace-on-burnout)?
2. To what extent did the program accelerate installation of high efficiency measures?
3. What were the primary influences on the customer's decision to purchase and install the high efficiency equipment?
4. How important was the program rebate on the decision to choose high efficiency equipment?
5. 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)?
6. Were there other program or utility interactions that affected the decision to choose high efficiency equipment (e.g., was there an energy audit done, has the customer participated before, is there an established relationship with a utility account representative, was the installation contractor trained by the program)?

The method used for estimating free ridership (and ultimately the net-to-gross [NTG] ratio) using the self-report approach is based on the 2017 Illinois Statewide Technical Reference Manual (TRM).[5] For the PNM programs, questions regarding free ridership were divided into several primary components:

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

- 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.

2.7 GROSS AND NET REALIZED SAVINGS CALCULATIONS

The final step in the impact evaluation process was calculating the realized gross and net savings based on the program-level analysis described above. EcoMetric used the appropriate impact analysis methods described above and calculated gross realized savings by taking the original ex ante savings values from the participant tracking databases and adjusting them using an Installation Adjustment factor (based on the count of installed measures verified through the phone surveys or on-sites) and an Engineering Adjustment factor (based on the engineering analysis, desk reviews, etc.):

Gross Realized Savings = (Engineering Adjustment) *(Installation Adjustment) *(Ex Ante Savings)

Net realized savings are then determined by multiplying the Gross Realized Savings by a free ridership adjustment factor:

Net Realized Savings = (1-Free Ridership) *(Gross Realized Savings)

2.8 COST EFFECTIVENESS

The New Mexico Efficient Use of Energy Act (EUEA) requires that utilities include in their publicly available annual reports "the most recent measurement and verification report of the independent program evaluator, which includes documentation, at both the portfolio and individual program levels of expenditures, savings, and cost-effectiveness of all energy efficiency measures and programs and load management measures and programs, expenditures, savings, and cost-effectiveness of all self-direct programs, and all assumptions used by the evaluator."[6] The Utility Cost Test (UCT) is the method used for cost-effectiveness testing.

In preparation for the cost-effectiveness analysis, EcoMetric requested key assumptions and inputs from PNM, including:

- **Avoided cost of energy** – time differentiated production 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. Used to monetize peak demand impacts.
- **Discount rate** – used to calculate the net present value of future savings.
- **Administrative costs** – all non-incentive expenditures associated with program delivery.

The verified savings values will be gathered as part of the primary impact evaluation analysis effort and used to calculate benefits for each program. We will compile incentive payments from program tracking data for use in calculating UCT costs.

6 https://www.srca.nm.gov/parts/title17/17.007.0002.html, Section 17.7.2.14 - D1

3 COMMERCIAL COMPREHENSIVE PROGRAM

3.1 COMMERCIAL COMPREHENSIVE GROSS IMPACTS

The ex ante PY2023 impacts for the Commercial Comprehensive program are summarized in Table 9. In total, the Commercial Comprehensive program accounted for 34 percent of the ex ante energy impacts in PNM's overall portfolio.

Table 9: PY2023 Commercial Comprehensive Savings Summary

Program	# of Projects	Expected Gross kWh Savings	Expected Gross kW Savings
Retrofit Rebate	175	18,789,289	4,869
New Construction	72	12,296,992	1,692
Quick Saver	194	6,706,304	1,061
Multifamily	66	4,780,243	568
Building Tune-Up	9	1,063,059	0
Midstream	3	241,428	21
Total	**519**	**43,877,316**	**8,210**

The majority of the gross impact evaluation activities were devoted to engineering desk reviews of sample 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 90/1.4 overall.

Table 10: Commercial Comprehensive Desk Review Sample

Sub-Program	Measure Group	Stratum	Count	Average kWh	Total kWh savings	% of savings	Current Sample
Retrofit Rebate	Custom	Certainty	1	2,500,626	2,500,626	6%	1
		Large	3	325,416	976,249	2%	1
		Medium-Small	8	54,231	433,851	< 1%	5
	HVAC	Large	1	229,375	229,375	< 1%	1
		Medium-Small	6	20,866	125,195	< 1%	3
	Lighting	Large	37	263,154	9,736,694	22%	6
		Medium-Small	72	33,811	2,434,405	6%	2
	Other	Large	3	625,933	1,877,800	4%	3
		Medium-Small	7	67,871	475,095	1%	2
New Construction		Certainty	1	905,143	905,143	2%	1
		All	58	196,411	11,391,849	26%	11
Quick Saver		Large	53	81,173	4,302,147	10%	6
		Medium	54	28,330	1,529,841	3%	5
		Small	92	9,503	874,316	2%	5
Building Tune-Up		Certainty	9	118,118	1,063,059	2%	3
Midstream		Certainty	3	80,476	241,428	< 1%	3
Multifamily		Certainty	4	328,021	1,312,084	3%	4
		Large	18	80,389	1,447,008	3%	3
		Medium	3	61,146	183,439	< 1%	0
		Small	41	44,822	1,837,713	4%	5
Total			**474**	**6,054,817**	**43,877,316**	**100%**	**70**

As discussed in the Evaluation Methods section, the evaluation team determined gross realized impacts for the Commercial Comprehensive program by performing engineering desk reviews on the sample of projects. PNM 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 PNM 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 updates to four projects which impact the engineering adjustment factor.

In the evaluation of prescriptive projects, the team encountered various measures present in both the New Mexico TRM and the PNM Workpapers. However, the team observed some inconsistencies in the savings calculation methodologies between these sources. In such cases, the team conducted a review of both sources for consistency and applicability, but relied on the methodology and algorithm inputs specified in the NM TRM and ASHRAE 90.1-2018 when values differed. Some of the other incentivized measures in older projects existed only in the latest PNM Workpapers, and in these cases, the algorithms were reviewed for accuracy and adjusted as necessary to calculate realized energy and demand savings based on project specific information. When feasible, the evaluation team relied on non-prescriptive values, as described in the project files. To ensure the validity of these values, EcoMetric cross-referenced documented input parameters with sources like the TRM or posted business hours, to assess their reasonableness.

For the midstream program, the evaluation team updated the verified savings for sampled projects to be consistent with TRM values for operating hours and coincidence factors. The midstream ex ante savings leveraged the same default assumptions for some measure inputs. The evaluation team reviewed all custom projects carefully, leveraging the ex ante calculation tools and methods whenever possible. For more complex analyses (Option C), the evaluation team reviewed the calculation methods used to ensure they were consistent with engineering fundamentals, properly accounted for the baseline condition, and considered all available data.

Table 11 and Table 12 show the results of the desk reviews and how the resulting engineering adjustments were used to calculate realized savings. For the Commercial Comprehensive program overall, these adjustments resulted in average engineering adjustment factors of 1.0374 for kWh and 1.1288 for kW.

Table 11: PY2023 Commercial Comprehensive Gross Impact Summary - kWh

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Retrofit Rebate	175	18,789,289	1.0699	20,102,009
New Construction	72	12,296,992	0.9583	11,784,359
Quick Saver	194	6,706,304	1.0554	7,077,955
Multifamily	66	4,780,243	1.1022	5,268,852
Building Tune-Up	9	1,063,059	1.0000	1,063,059
Midstream	3	241,428	0.9280	224,045
Total	**519**	**43,877,316**	**1.0374**	**45,520,280**

Table 12: PY2023 Commercial Comprehensive Gross Impact Summary - kW

Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings
Retrofit Rebate	175	4,869	1.1168	5,438
New Construction	72	1,692	1.0976	1,857
Quick Saver	194	1,061	0.9212	977
Multifamily	66	568	1.4353	815
Building Tune-Up	9	0	NA	88
Midstream	3	21	4.4520	93
Total	**519**	**8,210**	**1.1288**	**9,268**

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

3.2 COMMERCIAL COMPREHENSIVE REALIZED GROSS AND NET IMPACTS

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

$$Gross\ Realized\ Savings = (Ex\ Ante\ Savings) * (Installation\ Adjustment) * (Engineering\ Adjustment\ Factor)$$

Net Realized Savings are then determined by multiplying the Gross Realized Savings by the NTG ratio:

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

Net impacts for the Commercial Comprehensive program were calculated using NTG ratios from the participant phone survey or ex ante values, depending on the sub-program. For the Retrofit Rebate sub-program, the NTG ratio was developed using the self-report method and participant phone survey data from the PY2022 evaluation.

Table 13 and Table 14 summarize the PY2023 net impacts for the Commercial Comprehensive program using the prospective NTG ratios calculated by the evaluation team during the PY2022 evaluation. Net realized savings for the program overall are 33,655,474 kWh, and net realized demand savings are 6,558 kW.

Table 13: PY2023 Commercial Comprehensive Net kWh Impact Summary

Program	# of Projects	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Retrofit Rebate	175	20,102,009	0.626	12,583,858
New Construction	72	11,784,359	0.763	8,991,466
Quick Saver	194	7,077,955	1.000	7,077,955
Multifamily	66	5,268,852	0.763	4,020,134
Building Tune-Up	9	1,063,059	0.763	811,114
Midstream	3	224,045	0.763	170,947
Total	**519**	**45,520,280**		**33,655,474**

Table 14: PY2023 Commercial Comprehensive Net kW Impact Summary

Program	# of Projects	Realized Gross kW Savings	NTG Ratio	Realized Net kWh Savings
Retrofit Rebate	175	5,438	0.626	3,404
New Construction	72	1,857	0.763	1,417
Quick Saver	194	977	1.000	977
Multifamily	66	815	0.763	622
Building Tune-Up	9	88	0.763	68
Midstream	3	93	0.763	71
Total	**519**	**9,268**		**6,558**

COMMERCIAL COMPREHENSIVE NET-TO-GROSS RATIO UPDATE FOR PY2024

For the net impact self-report analysis, the evaluation team completed 63 interviews out of the 165 customers who had valid contact information and participated in the PY2023 Commercial Comprehensive Program. Of the 63 participants interviewed, 36 participated in the Quick Saver sub-program and 27 participated in the Retrofit Rebate sub-program.

The net-to-gross ratio for the Quick Saver sub-program is 1.000 since it is a direct install program. For the non-direct install sub-programs, we used the self-report approach described earlier to calculate a free ridership rate of 0.351 that resulted in an overall net-to-gross ratio of 0.649. The overall average net-to-gross ratio for our sample is 0.705.

Table 15 shows how the Commercial Comprehensive NTG ratios will be updated for PY2024 based on the PY2023 evaluation results.

Table 15: NTG Ratio Update for PY2024

Program	PY2023 NTG Ratio	PY2024 NTG Ratio
Retrofit Rebate	0.626	0.649
New Construction	0.763	0.649
Quick Saver	1.000	1.000
Multifamily	0.763	0.649
Building Tune-Up	0.763	0.649
Midstream	0.763	0.649

3.3 QUICK SAVER AND RETROFIT REBATE PARTICIPANT SURVEYS

A phone survey was fielded in early 2024 for participants in the Retrofit Rebate and Quick Saver sub-programs of the Commercial Comprehensive program.

Table 16 shows the distribution of completed surveys for the two sub-programs.

Table 16: Commercial Comprehensive Phone Survey Sample

Sub-Program	Count of Customers with Valid Contact Information	Target Number of Completes	Number of Completed Surveys
Quick Saver	77	20	36
Retrofit Rebate	88	20	27
Total	**165**	**40**	**63**

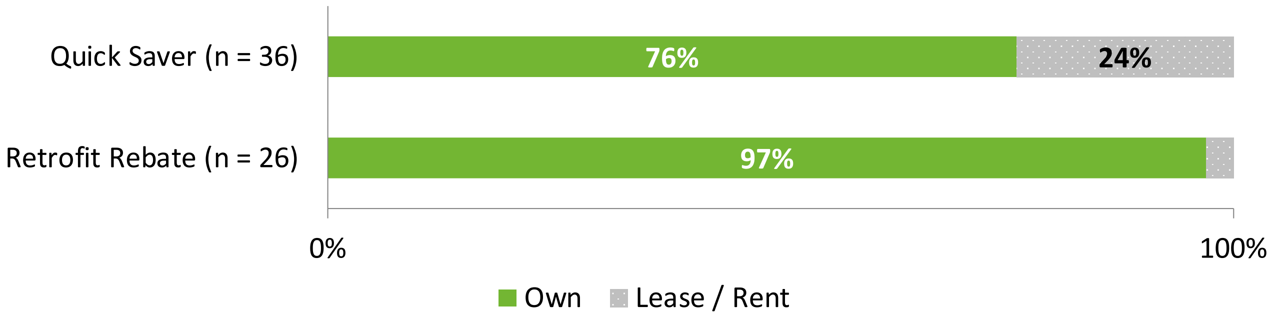
The following sections report results on company demographics, sources of program awareness, motivations for participation, and program satisfaction.

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

COMPANY DEMOGRAPHICS

We asked survey respondents whether their company owns or leases the building where the project was completed. Seventy-six percent of Quick Saver sub-program respondents and 97 percent of Retrofit Rebate sub-program respondents owned their building (Figure 1).

Figure 1: Building Ownership Type, by Quick Saver vs Retrofit Rebate Respondents



Businesses participating in the Quick Saver sub-program reported smaller building sizes (Figure 2) and fewer employees (Figure 3) than participants in the Retrofit Rebate sub-program. Most respondents (93%) in the Quick Saver sub-program had buildings that were smaller than 50,000 square feet, while all Quick Saver participants reported having fewer than 100 full-time employees. Contractors participating in the Retrofit Rebate sub-program reported similarly sized buildings, with over half of the firms (69%) occupying buildings smaller than 50,000 square feet. The majority (80%) of Retrofit Rebate respondents also reported having fewer than 100 full-time employees.

Figure 2: Building Size, Quick Saver vs Retrofit Rebate Respondents

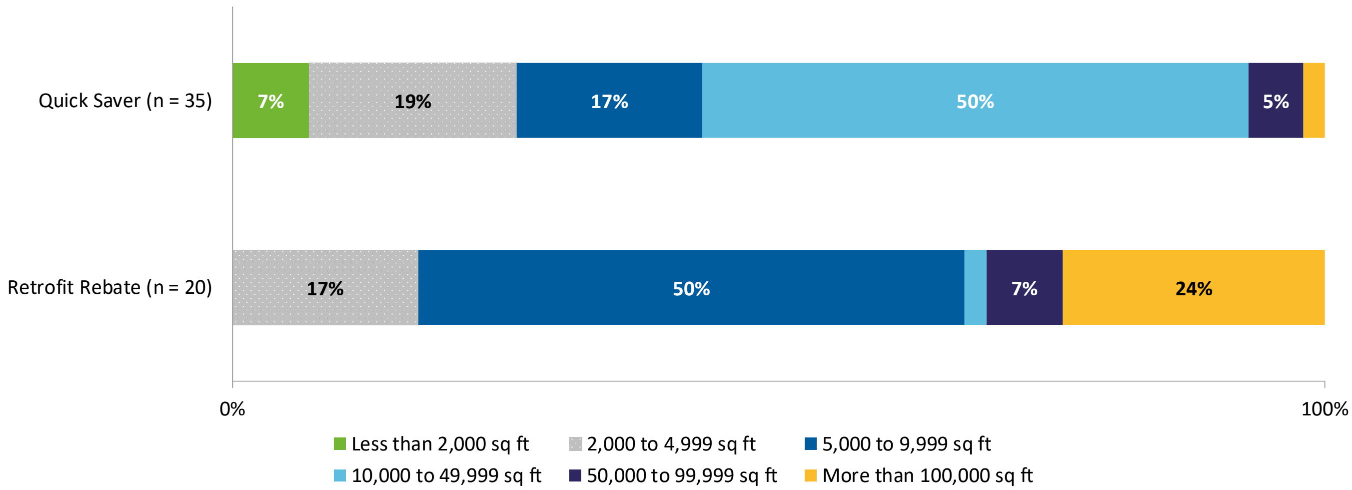


Figure 3: Number of Employees, by Quick Saver vs Retrofit Rebate Respondents

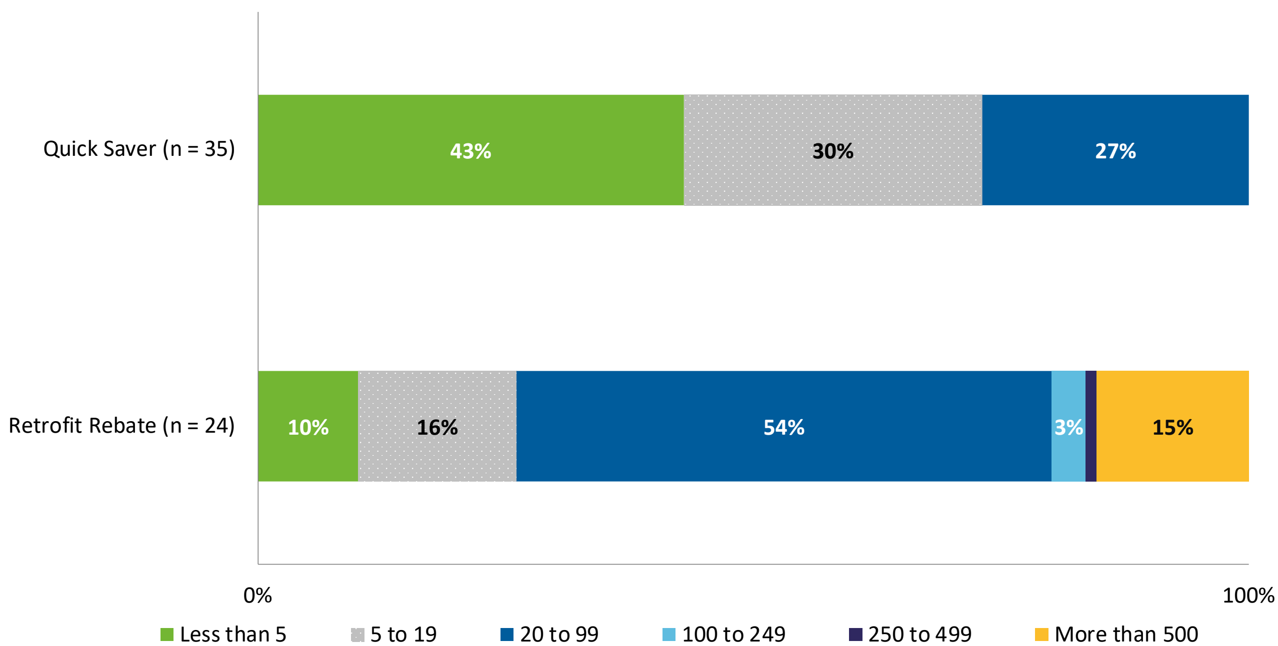
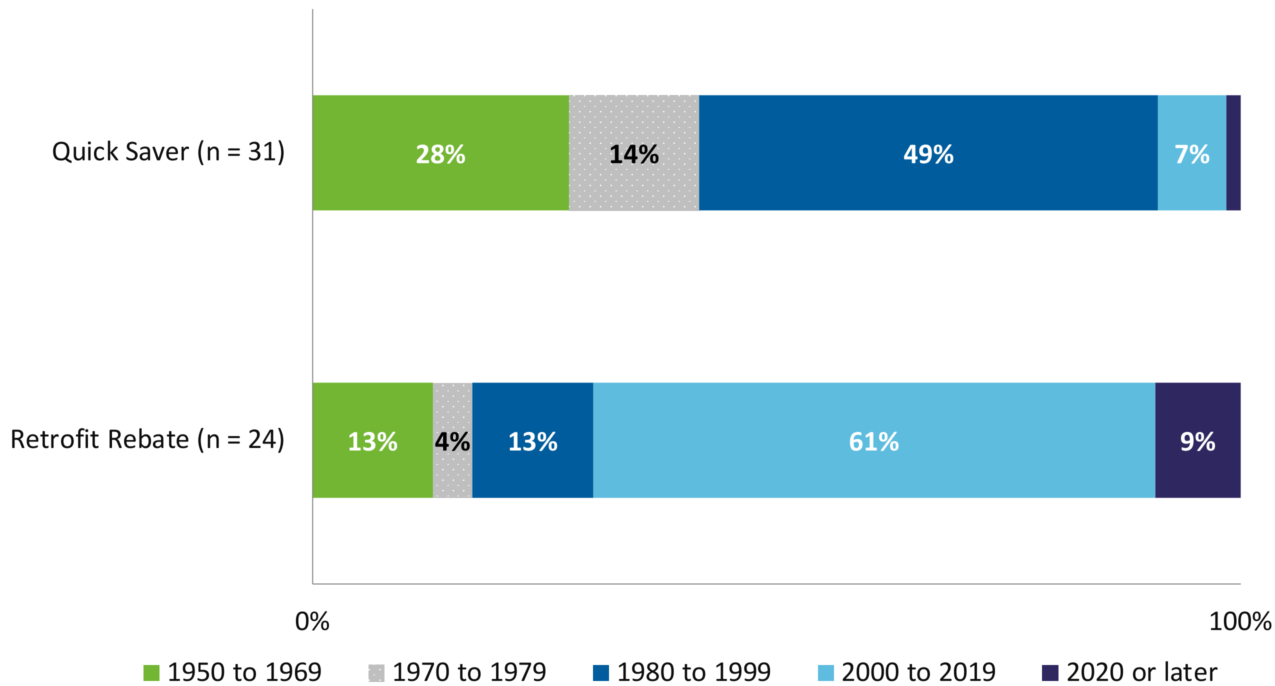


Figure 4 shows that the buildings of respondents in the Quick Saver sub-program tend to be older than those in the Retrofit Rebate sub-program. The majority of Quick Saver respondents (91%)

reported that their buildings were constructed in 1999 or earlier, while only approximately 30 percent of the Retrofit Rebate respondents indicated the same.

Figure 4: Building Age, Quick Saver vs Retrofit Rebate Respondents

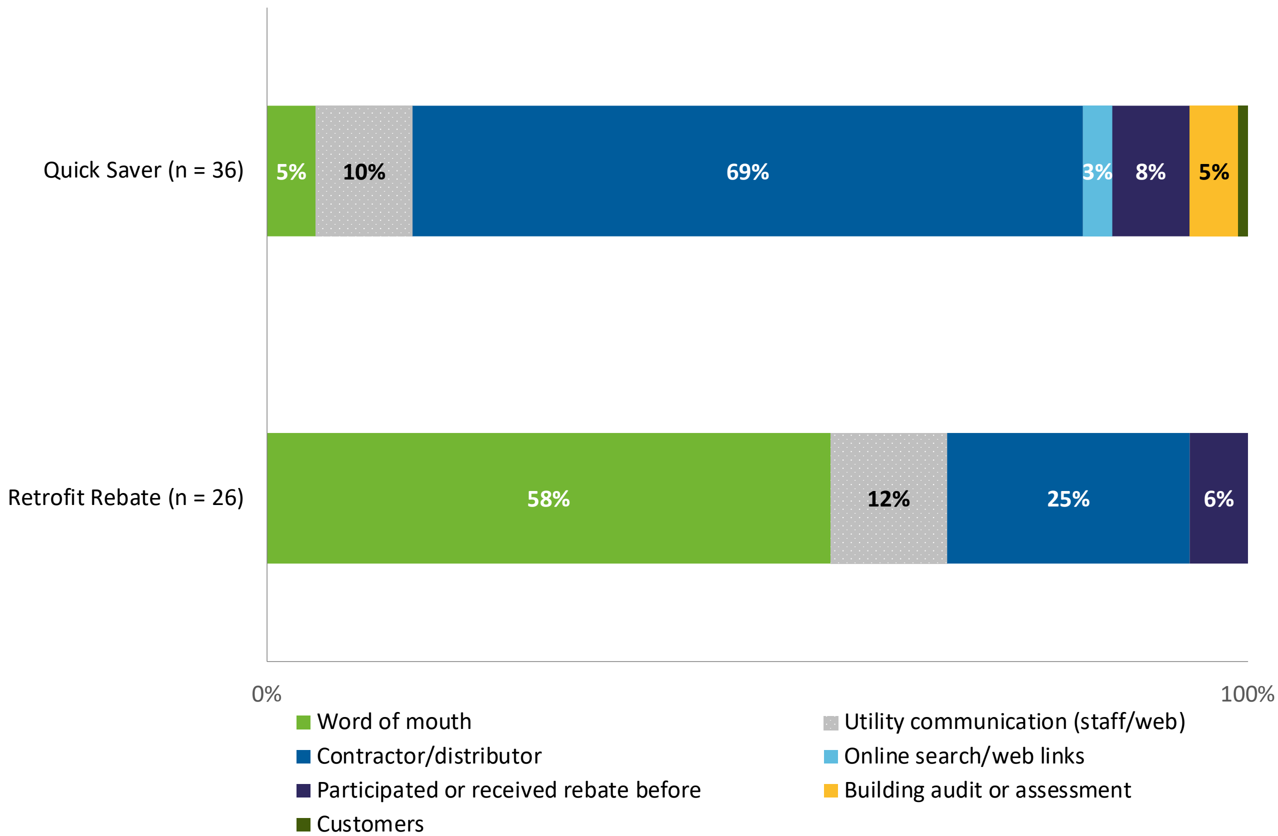


SOURCES OF AWARENESS

Both Quick Saver and Retrofit Rebate sub-program respondents became aware of the program rebates/assistance through a variety of ways, such as from contractors/distributors, online web searches, and previous participation in a PNM rebate program.

The majority of Quick Saver sub-program respondents initially learned of the program through contractors or distributors (69%), while a small majority of Retrofit Rebate participants reported learning about the program through word of mouth (53%) (Figure 5). No program participants reporting learning about the program from conferences, seminars, or workshops.

Figure 5: Initial Source of Awareness



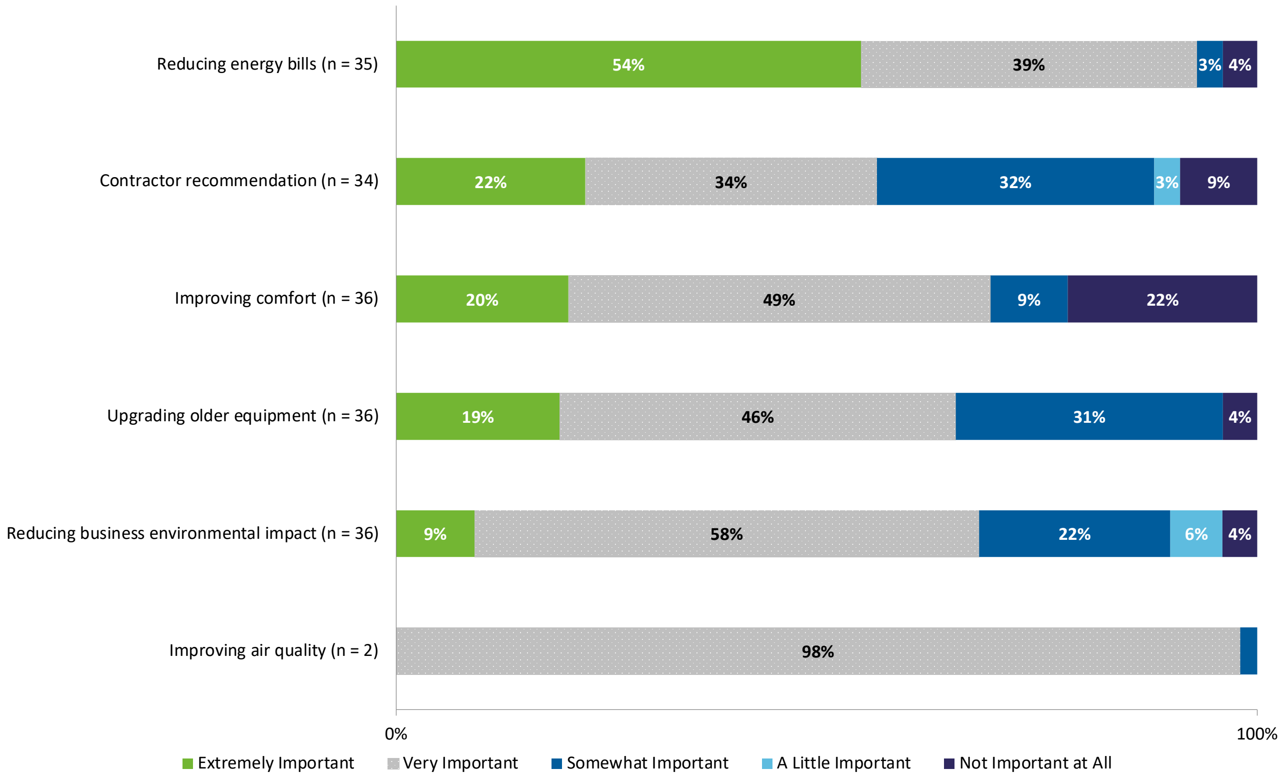
Quick Saver respondents were then asked to identify the most influential source in making their decision to participate in the program. Half of the participants reported being unsure of the most influential individual source. Of those who did recall, two stated that their contractor's recommendation was crucial to their decision, one cited communication with PNM, and one said past participation in the program were the most influential sources.

Three Retrofit Rebate sub-program respondents found the website to be the most helpful source, and two attributed their decision to participate to past participation. The recommendation of the contractor and interaction with PNM each influenced one respondent.

MOTIVATIONS FOR PARTICIPATION

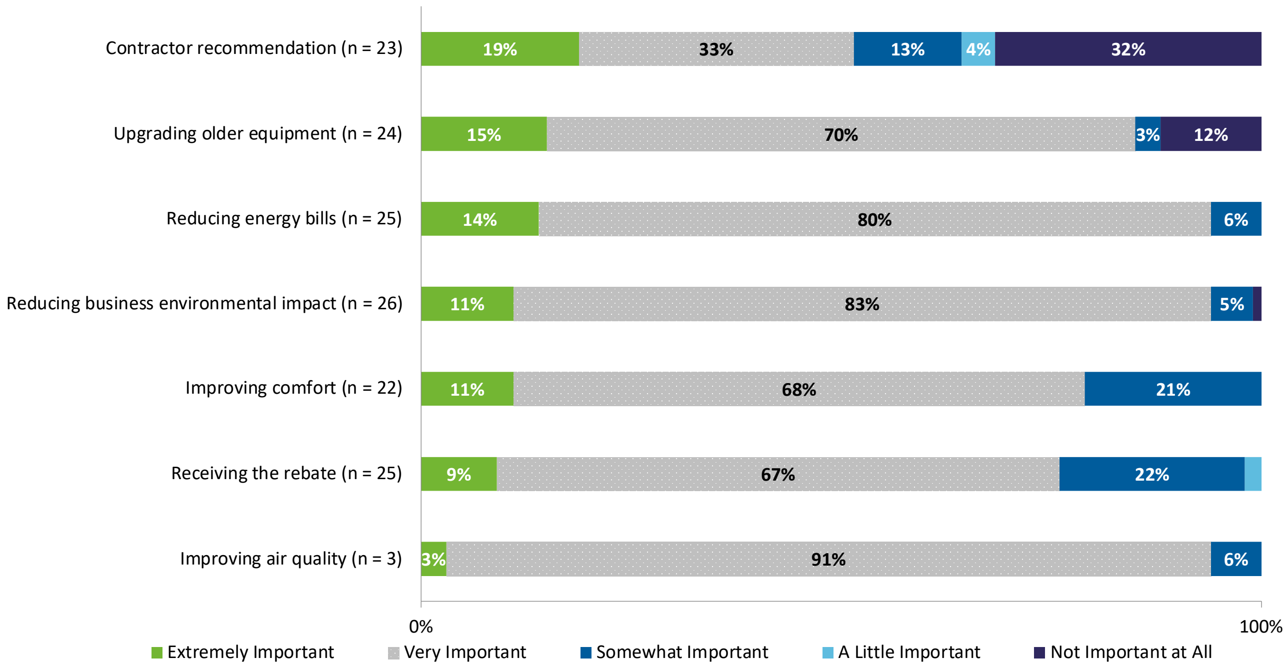
Figure 6 and Figure 7 show the level of importance placed on a variety of factors that might have influenced respondents' participation. For Quick Saver respondents, reducing energy bills was the most influential factor, with the majority (93%) of individuals considering it to be either very important or extremely important (Figure 6). Upgrading older equipment and improving the comfort of their business were also significant factors, with 65 percent and 69 percent of respondents, respectively, indicating that these factors were very or extremely important.

Figure 6: Quick Saver Motivations for Participation



Retrofit Rebate sub-program respondents reported that reducing energy bills (94%), reducing the environmental impact of their business (94%), and upgrading older equipment (85%) were "very" or "extremely" important determinants of their participation in the program (Figure 7).

Figure 7: Retrofit Rebate Motivations for Participation



Retrofit Rebate sub-program respondents were given a list of potential program and non-program factors that may have influenced their decision to purchase the energy efficient equipment. They were then asked to rate each factor's importance on a 1 to 10-point scale.7 Previous participation in a PNM program and technical assistance from PNM staff were rated as the most influential, with 95 percent and 83 percent of respondents, respectively, rating them as extremely important (Figure 8).

Figure 8: Retrofit Rebate Importance of Program Factors

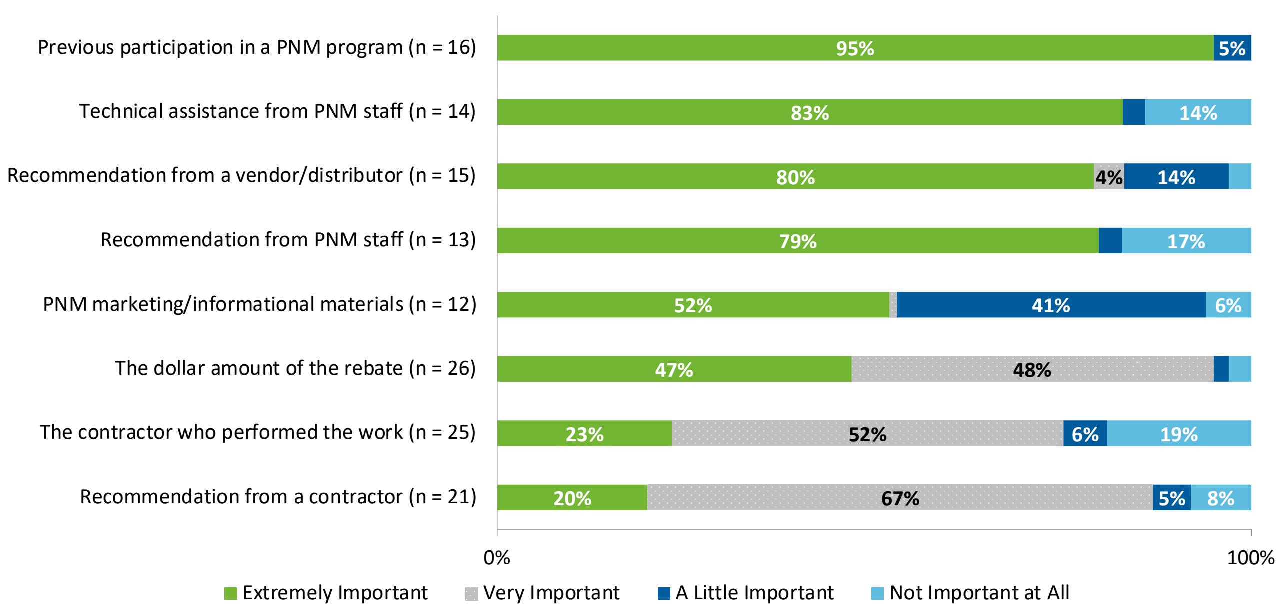
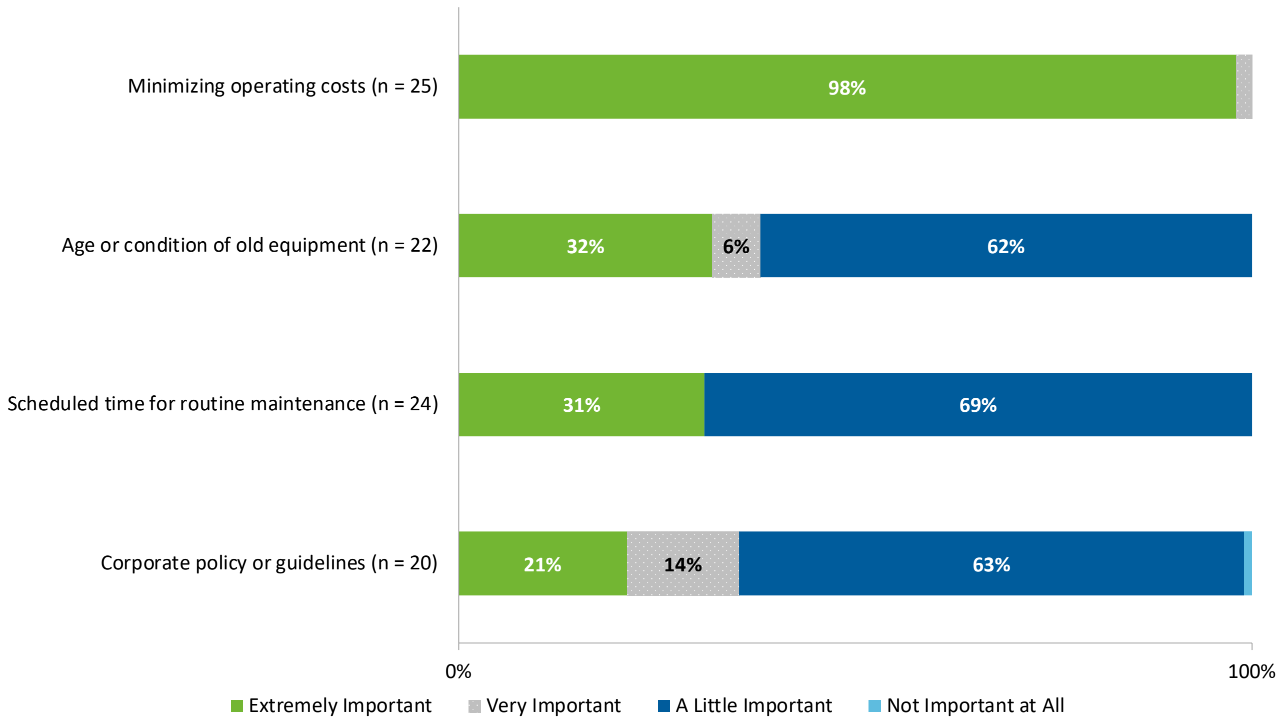


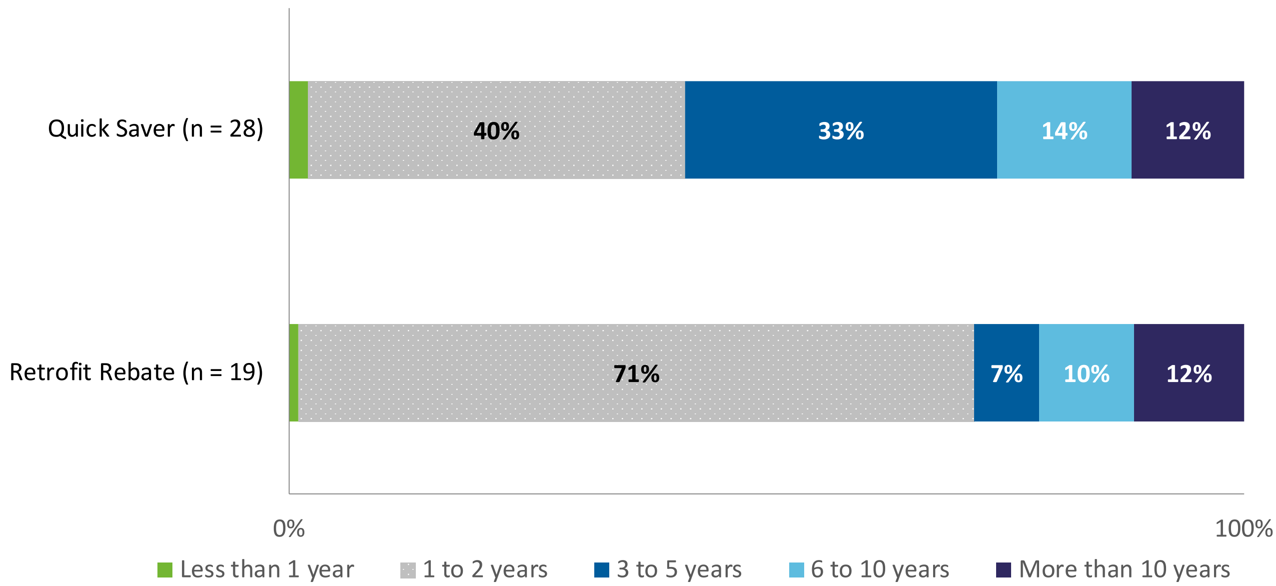
Figure 9 shows that most Retrofit Rebate sub-program respondents rated minimizing operating costs as the most influential non-program factor when considering the efficiency level of the equipment, with 98 percent reporting it as extremely important. In contrast, the other factors such as the age or condition of the old equipment (32% said extremely important), routine maintenance scheduling (31% said extremely important), and corporate policy or guidelines (21% said extremely important) were much less influential.

Figure 9: Retrofit Rebate Importance of Non-Program Factors



Respondents from both sub-programs were asked to estimate how much longer their equipment would have lasted if it had not been replaced. Most Quick Saver sub-program respondents reported that their equipment would have lasted at least three years without needing replacement (59%) (Figure 10). This suggests that the sub-program target customers with functioning equipment, rather than those whose equipment is not working, potentially reducing free-ridership. In contrast, most Retrofit Rebate sub-program respondents reported that their equipment would last two years or less without needing replacement (72%). This suggests that the program may be targeting customers who may be planning to replace their equipment soon, indicating that they maybe free-riders.

Figure 10: Remaining Life of Equipment



RESPONDENT SATISFACTION

Respondents were asked to rank their satisfaction with a variety of program elements including:[8]

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

8 Program participants were asked 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.

- Interactions with PNM
- The overall value of the equipment for the price they paid
- The time and effort required to participate
- The project application process

Respondents from both the Quick Saver sub-program and Retrofit Rebate sub-program generally expressed high levels of satisfaction, with well over two-thirds of respondents in both groups reporting that they were very satisfied with most factors (Figure 11 and Figure 12).

Quick Saver respondents reported being most satisfied with the equipment installed through the program and the contractor who installed the equipment (83% and 82% reported being very satisfied, respectively; Figure 11). Retrofit Rebate respondents were most satisfied with the contractor who installed the equipment and the rebate program overall (95% and 94% reported being very satisfied, respectively; Figure 12).

Figure 11: Quick Saver Sub-Program Satisfaction

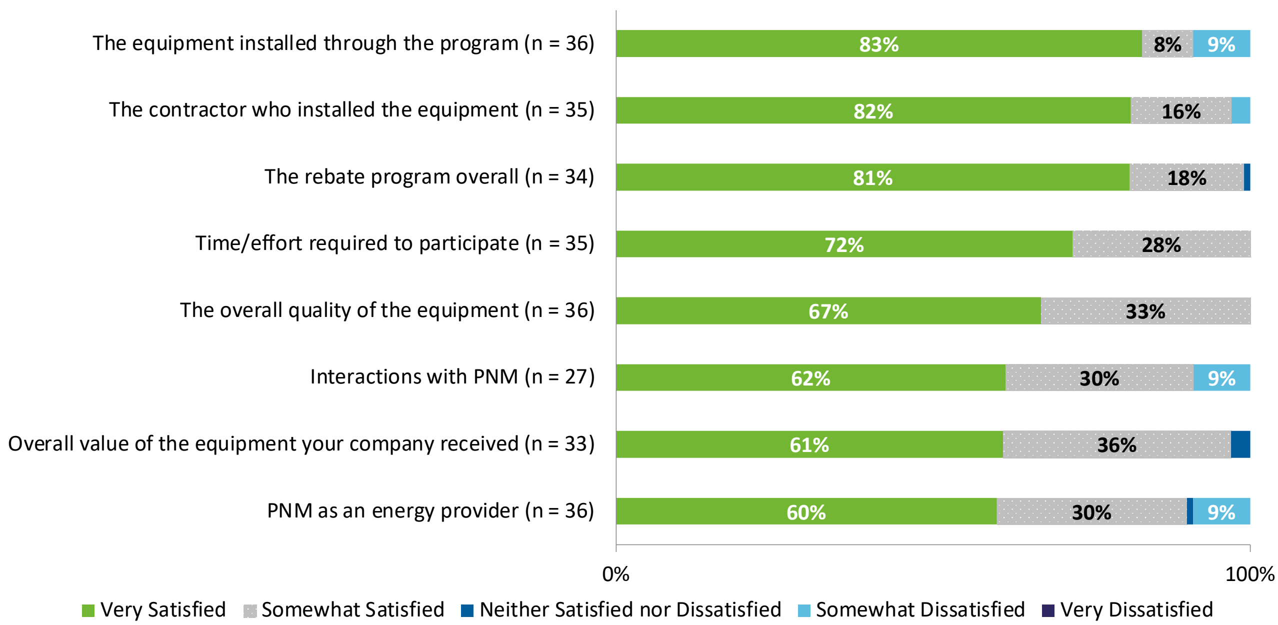
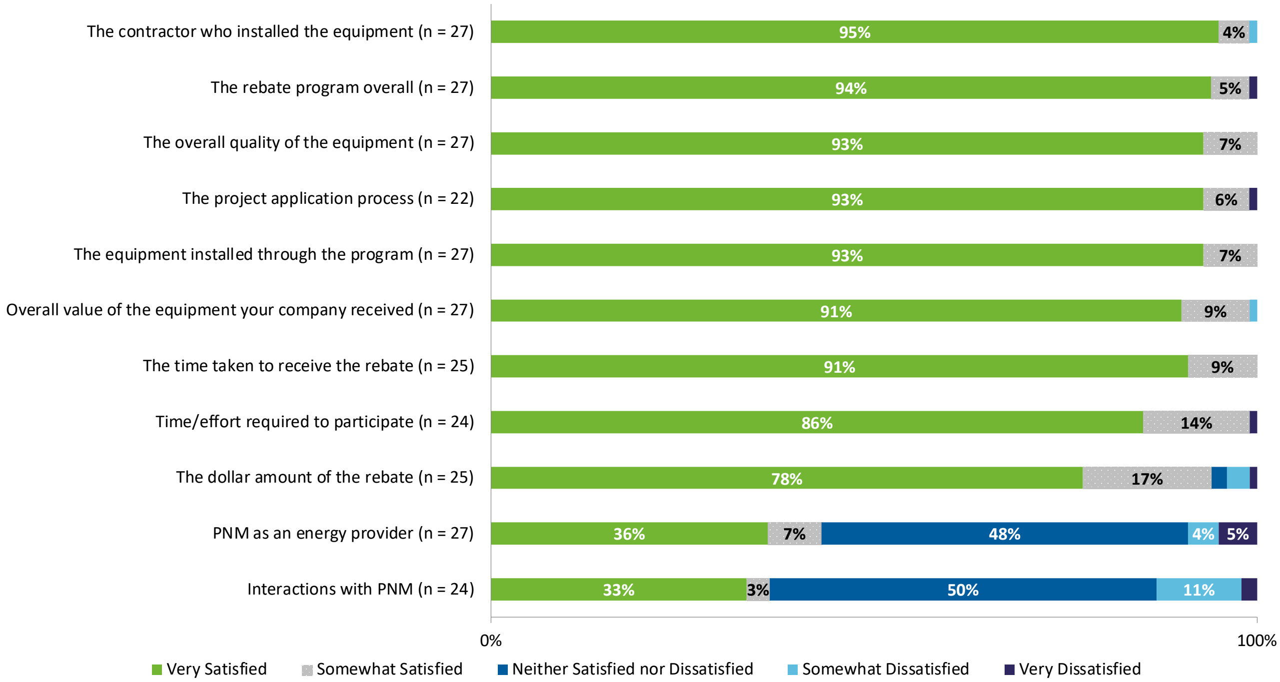


Figure 12: Retrofit Rebate Sub-Program Satisfaction



Overall respondent satisfaction for the Quick Saver sub-program is lower in program year 2023 (PY2023) than it was in program year 2022 (PY2022). While 81 percent of Quick Saver sub-program respondents reported being very satisfied in PY2022 across all factors, in PY2023 the average percentage of those who reported being very satisfied across all factors was 71 percent. Notably, in PY2022, 94 percent of Quick Saver sub-program respondents reported that they were very satisfied with the overall value of the equipment (the most highly rated factor), while in PY2023 only 61 percent reported being very satisfied with this factor.

This pattern of decreased satisfaction is seen, albeit to a lesser extent, among the Retrofit Rebate sub-program respondents as well. While 85 percent of Retrofit Rebate sub-program respondents reported being very satisfied in PY2022 across all factors, in PY2023 the average percentage of those who reported being very satisfied across all factors was 80 percent. In PY2022, 97 percent of Retrofit Rebate respondents reported that they were very satisfied with the rebate program overall (the most highly rated factor), while in PY2023, 94 percent reported being very satisfied with this factor.

3.4 COMMERCIAL COMPREHENSIVE CONTRACTOR INTERVIEWS

The evaluation team conducted 11 interviews with contractors who participated in the Commercial Comprehensive program in PY2023. The interviews lasted on average 20 minutes and covered the following topics:

- Contractor background and program involvement;

- The role and influence of the PNM program on the market; and
- Program satisfaction.

This section presents results qualitatively to show the range of perceptions and responses.

CONTRACTOR BACKGROUND AND PROGRAM INVOLVEMENT

The interviewed participants varied regarding the scope of their work and the geographic reach of their businesses. All 11 respondents reported serving commercial customers, with seven of them reporting that they also served residential customers. Most of the interviewees (8 of 11) serve customers across all of New Mexico, while three respondents reported only serving certain parts of the state.

Interviewees learned about the rebate program from a variety of sources. For three of the participants, word-of-mouth played a crucial role as they learned about the program from employees, family members, or friends. In contrast, two of the interviewees were introduced to the program through PNM marketing or direct interaction with PNM representatives. Some of the participants learned about the program through less common avenues, such as hearing about the program from a customer, having past familiarity with other rebate programs and finding the PNM program themselves, and being recommended by a different utility when expanding service to New Mexico. Additionally, three contractors did not remember where they first heard about the program, in part because they had been longtime participants.

The contractors' overall knowledge of the rebate process and the variety of sources that led them to the program suggest that PNM has been successful at making rebate information readily available to contractors.

PNM PROGRAM REACH

The interviewed contractors reported varying rates of customer qualification for rebates within PNM territory. Six of the 11 respondents reported that at least half of the customers who apply within PNM territory ultimately end up qualifying for the rebate. Of the contractors who reported lower qualification rates, the main reason provided was that the PNM program is not yet central to their operations; the rebate program and applicable projects make up a smaller portion of their work, or they are relatively new to the program and do not have much experience promoting the rebates.

Several contractors reported that PNM is doing a good job reaching intended audiences (4 of 11). A suggestion that two interviewees had for expanding the reach of the program is to generally increase outreach since they feel that many eligible people do not know about the opportunity.

PNM PROGRAM INFLUENCE

To better understand the program influence on the market, the evaluation team explored how and when contractors communicate with customers about the PNM rebates and what role they play in the contractors' and customers' decision making.

The interviews suggest that contractors are proactive with their promotion of the program – four of the 11 contractors bring up incentives from the start, and three bring them up once they learn more about the customer and think that they will be eligible for the program. Six of the contractors also reported that the rebates influence the type of equipment they suggest to customers.

Nine out of the 11 contractors shared that they perceived the overall market demand for energy efficiency equipment increasing because of this program. When asked about customers within and outside of PNM territory, four contractors observed that customers outside of PNM territory are less willing to install efficiency measures as customers within PNM territory. Additionally, four contractors reported that customers within and outside of PNM territory are equally likely to install energy efficiency measures. This implies that while the PNM program aligns with market demand for energy upgrades and may provide a helpful incentive to some customers, the program may not be essential for promoting the adoption of energy-efficient equipment.

PNM PROGRAM SATISFACTION

Contractors tended to rate the Commercial Comprehensive program highly. Ten out of the 11 contractors reported that they were somewhat or very satisfied with the program[9]. One contractor reported being somewhat dissatisfied with the program because they felt they did not receive enough information on how to offer the best rebates.

9 The evaluation team asked contractors to rate the Commercial Comprehensive program overall on a 5-point scale that ranged from 1 ('very dissatisfied') to 5 ('very satisfied'). A 3 was defined as 'neither satisfied nor dissatisfied', while a 2 indicated the contractor was 'somewhat dissatisfied' and a 4 indicated the contractor was 'somewhat satisfied'.

Contractors identified areas of potential improvement or ideas that they hoped PNM would consider. These included:

- ***Simplifying the required paperwork*** – Two contractors highlighted the challenging nature of the paperwork and application process, suggesting that it can act as a barrier to participation in the program and may affect their future participation.
- ***Expanding rebate offerings*** – Two contractors expressed that both expanding the types of rebates offered and increasing the rebate amounts could help increase participation.
- ***Providing more communication about rebates –*** Two contractors reported that increased communication about the program would be useful and help them make better referrals.

Contractors were also asked to give their impression of customer satisfaction with the program. Similar to how they themselves rated the program, ten out of the 11 contractors reported that customers were somewhat satisfied or very satisfied with the program, citing that customers generally are very appreciative of the rebates.

3.5 FINDINGS AND RECOMMENDATIONS

Impact evaluation activities for the Commercial Comprehensive program included engineering desk reviews for sample of the Retrofit Rebate, Multifamily, New Construction, Direct Install (Quick Saver), Building Tune-Up, Midstream, and AC Tune-Up sub-programs. Based on these desk reviews, the evaluation found an engineering adjustment factor of 1.0374 for kWh savings, and 1.1288 for kW savings. As a results of the reviews, the evaluation team developed several findings and recommendations. Overall, the engineering adjustment factor was near 1.00, indicating that as a whole the evaluation team found savings which were in line with the ex ante savings.

Finding 1: Project-specific ex ante calculation steps for prescriptive projects and custom Multifamily projects were not always documented in the files available for the evaluation team's review. EcoMetric used inputs from the provided project documents and algorithms from the 2023 PNM Workpapers and the New Mexico TRM which resulted in difference in savings (both higher and lower) than those reported by PNM for multiple projects. Without additional documentation of the project-specific calculations performed by PNM, the reasons for differences between ex ante and ex post savings were not always clear to the evaluation team.

> **Recommendation 1:** Provide documentation of calculation steps made for each project, ensuring that submitted project documentation can be followed to reproduce the reported savings estimates.

Finding 2: The supplied information for the Midstream sub-program did not include ex ante savings calculations. The summary table shows only values (no formulas) for a limited number of parameters related to the facility location, installed equipment, and energy savings. The evaluation team noted that the ex-ante calculations occasionally utilized deemed savings for measure configurations which were different than what was actually incented. For example, the program data included savings values for glass door refrigerators, whereas project documentation indicated the customer purchased solid door refrigerators. Furthermore, the *Commercial, General Building* facility type was used in most cases for calculating savings, instead of using specific building types. Information about Customer address, City or Zip was also unavailable for location-based savings calculations.

> **Recommendation 2**: Provide copies of savings calculations, or an explanation of how the savings values in the Excel summary table are generated each year. This should be accompanied by comprehensive documentation specifying the correct equipment types and savings values utilized for the actual equipment installed. Furthermore, the use of specific building types rather than a generic "Commercial, General" classification should be implemented to ensure accuracy. Additionally, providing customer address information is essential for location-based savings calculations.

Finding 3: The evaluation team was not able to replicate the *ex-ante* HVAC savings for several projects throughout the evaluated sub-programs using the supplied project documentation and PNM workpapers. The evaluation team used algorithm, assumptions and baseline value provided in ASHRAE 90.1 2016, NM TRM and AHRI certificate for installed HVAC unit. Using this approach, the team observed difference (both higher and lower) in savings than reported savings, though the exact reason for discrepancy in a few projects could not be identified.

> **Recommendation 3:** Provide algorithm inputs that were used to calculate the *ex-ante* savings for the HVAC projects throughout the sub-programs.

Finding 4: The ex ante calculation did not consider interactive factor and coincidence factor (CF) for interior lighting fixture (i.e., they used energy factor, demand factor and CF values of 1.0 instead of factors according to building type from workpaper).

> **Recommendation 4:** Utilize the appropriate building type (when it is available) from the New Mexico TRM or PNM workpapers to select interactive factors and CF.

Finding 5: The evaluation team could not identify baseline fixture wattages for the sampled Direct Install (Quick Saver) projects. The team back-calculated the baseline wattage when a fixture description or other supporting documentation was not available.

Recommendation 5: If possible, utilize the baseline fixture nomenclature per the PNM Workpaper Fixture List and if custom baseline wattage is used, please provide the documentation or calculation.

Finding 6: The evaluation team modified savings for several projects in the evaluation sample for the New Construction sub-program. Several fixtures were either:

(1) not DLC or Energy Star Certified and/or

(2) "not approved" in project submittals.

These fixtures were removed from the analysis, which decreased the total proposed watts. It was assumed that the square footage illuminated by these ineligible fixtures was proportional to the percentage of total fixtures they represented. This square footage was removed from the total floor area represented by the project. The removal of ineligible and/or unapproved fixtures coupled with the reduction in square footage decreased savings. The NM TRM allows for fixtures not listed on a qualified products list (QPL) to receive approval if results of independent lab testing show the projects comply with the requirements in the most current version of the DLC Technical Requirements.

Recommendation 6: In addition to Interior/Exterior Lighting COMcheck Certificates for all New Construction lighting projects, provide DLC or Energy Star certificates for each fixture. Ensure the DLC or Energy Star reported wattages are used for proposed LPD calculations. Additionally, ensure fixtures that are "not approved" in project submittals are updated accordingly when calculating proposed LPD. Also, for fixtures that are not listed on a QPL but generate savings in projects completed through program, the implementation team should provide independent lab testing results to show that the fixtures comply with the requirements in the most current version of the DLC Technical Requirements.

Finding 7 For New construction project PNM-23-05073 ex-ante calculation used demand factor as 1 and did not consider factor according to building type. For ex-post calculation WHF_d was selected as 1.247 reflecting the TRM value for Commercial, general. This led to an increase in ex-post savings. Also, the evaluator observed savings calculation for exit- sign fixture which is not considered in space lighting. Hence, ex-post saving exit sign fixture was not included which led to a decrease in savings slightly. The evaluator also observed discrepancy in installed fixture quantity among different documents. The evaluator did not adjust the fixture quantity since there was no base to do so.

Recommendation 7: We would suggest providing documents with the latest installed quantity and using interactive factors according to NM TRM or PNM workpaper. Also, ensure not to include the fixtures in savings which do not qualify for the program rebate.

Finding 8: For Midstream project PM-23-06127 evaluator team observed usage of commercial general as building type for calculation of energy savings and peak demand savings. Ex-post calculation used parameter according to building type specified in the midstream excel sheet. Using the appropriate building type resulted in an increase of kWh and kW savings. Also, the team observed the unavailability of customer address which is required to verify the weather zone.

Recommendation 8: We would recommend usage of building type according to workpaper or NM TRM instead of using general building type where building type is known and listed in workpaper or TRM. Additionally, we would suggest providing either installation pin code or installation address so that evaluation team could use exact weather zone instead of assuming.

Finding 9: For multifamily project PNM-23-05023 evaluator noticed usage of average deemed value from the workpaper for showerhead and low faucet instead of value according to project location. The team updated the savings value from customer application for Santa Fe weather zone.

Recommendation 9: We would suggest usage of weather zone according to project application for more accurate savings calculation.

Finding 10: For all Quick saver project evaluator team used efficient wattage according to fixture description as project documentation did not mention exact model number or spec sheet for efficient fixture.

Recommendation 10: The evaluation team recommends providing spec sheet and DLC certificate for efficient fixture for more accurate calculation.

Finding 11: For quick saver project 20509 project used lighting algorithm for case lighting measure. For ex-post analysis evaluator used case lighting measure resulting in RR variation.

Recommendation 11: The evaluation team recommends using algorithm from NM TRM or workpaper according to measure.

4 NEW HOMES CONSTRUCTION PROGRAM

4.1 NEW HOMES CONSTRUCTION GROSS IMPACTS

The ex ante PY2023 impacts for the New Homes Construction program are summarized in Table 17. In total, the New Homes Construction program accounted for one percent of the ex ante energy impacts in PNM's overall portfolio.

Table 17: PY2023 New Homes Construction Savings Summary

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Prescriptive	100	66,169	1.0100	66,831
Performance	1,105	1,470,941	1.0100	1,485,650
Total	**1,205**	**1,537,110**	**1.0100**	**1,552,482**

The majority of the gross impact evaluation activities were devoted to engineering desk reviews of sampled projects. There are two paths offered by the program: The Performance path, which encourages a whole home approach to efficiency, and the Prescriptive path, which provides incentives for individual equipment upgrades. The impact evaluation included desk reviews for Performance projects, and a deemed savings review for Prescriptive measures. The final sample design is shown in Table 18. The resulting sample achieved a relative precision of 90/3.7 overall.

Table 18: PY2023 New Homes Construction Desk Review Sample

Project Type	Count	Average kWh	Total kWh Savings	% of Savings	Final Sample
Performance	100	662	66,169	4%	10
Prescriptive	1,105	1,331	1,470,941	96%	10
Total	**1,205**	**1,276**	**1,537,110**		**20**

As discussed in the Evaluation Methods section, gross realized impacts for the New Home Construction program were determined by performing engineering desk reviews on the sample of performance and prescriptive projects and a deemed savings review for prescriptive projects.

The factors and assumptions used in these calculators were reviewed by the evaluation team and compared to the New Mexico TRM. The PNM calculation files are in alignment with the New Mexico TRM. For the prescriptive projects that received engineering desk reviews, the evaluation team adjusted all projects that impacted energy savings.

For prescriptive projects, the evaluation team found the measures associated with the equipment that existed in both the New Mexico TRM and the PNM Workpapers. For the Lighting and Radiant barriers, the deemed values were used to calculate the realized energy and demand savings. We deferred to prescriptive values assumed in the project files for Smart thermostats, checking the values for reasonableness by corroborating with sources such as the TRM and provided AHRI certificates.

For performance projects, the evaluation team did the impact evaluation review of the HERS certificate and found high levels of satisfaction. In some cases, we examined both prescriptive and performance sources in these sub programs.

Table 19 and Table 20 show the results of the desk reviews and how the resulting engineering adjustments were used to calculate realized savings. For the New Homes Construction program overall, these adjustments resulted in average engineering adjustment factors of 1.0100 for kWh and 1.0000 for kW.

Table 19: PY2023 New Homes Construction Gross kWh Impact Summary

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Prescriptive	100	66,169	1.0100	66,831
Performance	1,105	1,470,941	1.0100	1,485,650
Total	**1,205**	**1,537,110**	**1.0100**	**1,552,482**

Table 20: PY2023 New Homes Construction Gross kW Impact Summary

Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Prescriptive	100	26	1.0000	26
Performance	1,105	308	1.0000	308
Total	**1,205**	**334**	**1.0000**	**334**

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

4.2 NEW HOMES CONSTRUCTION NET IMPACTS

Net impacts for the New Homes Construction program were developed using the self-report method described in the Evaluation Methods chapter and based on participant phone survey data from the PY2023 evaluation. The evaluation team applied an NTG value of 0.73, which was measured during the PY2020 evaluation, to calculate the New Homes Construction program net impact results. The NTG ratio calculated using the PY2023 survey results will be applied to the PY2024 impacts. Table 21 and Table 22 summarize the PY2023 net impact calculations for the New Homes Construction program using the NTG ratio described above. Net realized savings for the program overall are 1,133,312 kWh, and net realized demand savings are 244 kW.

Table 21: PY2023 New Homes Construction Net kWh Impact Summary

Program	# of Projects	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Prescriptive	100	66,831	0.730	48,787
Performance	1,105	1,485,650	0.730	1,084,525
Total	**1,205**	**1,552,482**		**1,133,312**

Table 22: PY2023 New Homes Construction Net kW Impact Summary

Program	# of Projects	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Prescriptive	100	26	0.730	19
Performance	1,105	308	0.730	225
Total	**1,205**	**334**		**244**

NEW HOMES CONSTRUCTION NET-TO-GROSS RATIO UPDATE FOR PY2024

For the net impact self-report analysis, we were able to complete interviews with three of the 25 customers that had valid contact data. At the completion of these interviews, only one respondent provided the complete responses necessary to calculate the free-ridership rate. Based on the self-approach method described earlier, we calculated a free-ridership rate of 0.275 that resulted in an overall net-to-gross ratio of 0.725.

The current net-to-gross ratio, used in PY2023, is 0.730 for this program, which was calculated by the evaluation team in PY2020. The net-to-gross ratio for a similar New Home Construction program with contractor interviews by EPE is 0.683 for PY2024. Given that the new value of 0.725 is based on one response, we have averaged the three values to get a final net-to-gross ratio of 0.713 for this program. This new value will be applied to the program beginning in PY2024.

4.3 BUILDER INTERVIEWS

The evaluation team conducted interviews with three new home construction builder contacts. These contacts were from a pool of 25 potential builders for whom valid contact data were available and all of whom had participated in the PY2023 New Home Construction program. For this evaluation round, the interviews covered the following topics:

- Builder background;
- Program awareness and engagement;

- Program process and market response; and
- Program satisfaction

This section primarily presents results qualitatively to show the range of perceptions and responses, but some numbers are featured to provide further context on the frequency of types of responses.

BUILDER BACKGROUND

All three builders confirmed their participation in the New Home Construction program and had completed a variety of new construction projects. These projects included the installation of equipment eligible for rebates through the New Home Construction program. Three interviews were conducted with new home builders who played a significant role in their organization's participation in the program, all of whom specialize in residential home construction.

PROGRAM AWARENESS AND ENGAGEMENT

The evaluation team asked the builders to describe how they first learned about the New Home Construction program, as well as to elaborate on their experience with the program process. One of the builders mentioned always having known about the program and was not sure when it started. One other builder heard of the program through the local builders association.

Two of the builders felt that there have been no barriers to participating in the program, while one stated that they would no longer participate in it due to recent program changes. This builder stated that the new changes required meeting ENERGY STAR guidelines, and their challenge was specifically around vapor barriers and other additional requirements that they believed were not needed for the environment in which they build homes. All three builders expressed that the program has been easy to work with, and their representatives have been helpful. All three builders also mentioned that the program requirements were communicated very clearly and that there was helpful support when needed for clarification.

Two of the builders highlighted the value of the rebates, noting that these incentives enabled them to construct more energy-efficient homes while also delivering great value to homeowners. They emphasized the significance of affordability, with the incentive playing a crucial role in their ability to market competitively priced homes that offer substantial value.

One builder specifically appreciated the role of the third-party management firm, which added significant value beyond the financial incentives of the program. The builder valued the management firm's involvement in providing verification of the energy efficiency improvements via Home Energy Rating System (HERS) assessments. This process gives builders confidence in the work performed, enabling them to hold sub-contractors accountable for achieving the required certification and performance levels.

The builders were divided on how the program influenced their equipment selection decisions. Two felt that the incentives directly influenced their choice of equipment. One builder specifically gave an example of switching to all electric heat pump water heaters due to the influence of the program. Another builder felt that they set up their equipment to meet a wide range of energy codes and efficiency standards. This builder mentioned that they exceed current energy efficiency standards and codes and are pushing the envelope as far as energy efficiency. Although this builder believed their high standards for energy efficiency surpassed the direct influence of the program on equipment choices, they recognized the program's value in providing training, technical assistance, and resources. This program support has complemented their commitment to building energy-efficient homes, thereby enhancing their capability to achieve and exceed their energy efficiency goals.

PROGRAM PROCESS AND MARKET RESPONSE

The evaluation team asked the builders a series of questions about various factors related to their participation in the New Home Construction program. All three builders mentioned the simplicity of participating in the program and having an easy time with the administrative paperwork required, mainly because they all use a third-party rater service that helps with the paperwork.

All the builders stated that they do not bring up the rebates in their discussions with customers. Instead, they focus on highlighting and discussing the energy efficiency upgrades made to the homes as part of the program. They also expressed to the evaluation team the value that these energy efficiency improvements add to their sales and marketing strategies when communicating with customers. One builder particularly appreciated being able to inform customers that a third party audits the home and assigns a performance HERS rating.

When the evaluation team asked the builders for their views on the program's impact on the market demand for energy efficient equipment, their views were mixed. One builder mentioned the recent energy code changes and how they felt those were driven by the consumer. This builder interpreted the extensive public commentary on these changes as a sign of increased demand for energy efficiency. Another builder felt that the program itself has an impact on what equipment is used, hence the example of the switch to electric heat pump water heaters earlier. The builder also stated that many consumers will still want the more affordable option, so they were not sure if the program would have an effect on the market demand for energy efficient equipment. One other builder named the new code changes requiring them to achieve ENERGY STAR guidelines as his biggest roadblock. He predicted that , many of his HVAC contractors would not participate in program related trainings because of his nonparticipation. This in turn may have an impact on what energy equipment is installed in the future.

PROGRAM SATISFACTION

The evaluation team asked the builders to quantify their level of satisfaction with the program. Builders were asked to rate their satisfaction on a scale of 1 to 5, with 1 being “not at all satisfied” and 5 being “very satisfied.” Builders could also indicate if they were particularly satisfied or dissatisfied with anything specific. They could also indicate if their customers were satisfied.

Overall, the builders expressed a high level of satisfaction with the program. Two of the builders rated the program a 5 (“very satisfied”). However, one builder's opinion varied significantly over time; they rated their satisfaction as 5 (“very satisfied”) in the previous year but dropped to a 1 ("not at all satisfied") this year, primarily due to dissatisfaction with recent code changes. Despite this, the builder had previously expressed high satisfaction, citing benefits such as strong support, valuable educational resources, and attractive rebates. When it came to their customers' perspectives, two of the builders rated the program a 5 (“very satisfied”), and one did not provide a customer rating.

Given the relatively high level of satisfaction, the builders did not share any direct suggestions for improving the program. One builder said that the program ultimately lowers the cost of the home for their customers. Another builder mentioned that there were times when they received a rebate when it was not even expected, so they were very happy. The last builder had been very satisfied with the program, except for the recent code changes.

4.4 FINDINGS AND RECOMMENDATIONS

Finding 1: For prescriptive programs, the evaluation team was not able to replicate the ex-ante savings for all projects using the supplied project documentation and the PNM TRM. Using assumptions, algorithms and baseline values provided in the NM TRM and AHRI documentation on installed HVAC units controlled by smart thermostats, the evaluation team calculated the ex-post savings, which were different (both higher and lower) than those reported by PNM. Also, the evaluation team was not able to identify the discrepancy in the ex-ante and ex-post savings without additional documentation of the project-specific calculations performed by PNM.

> **Recommendation 1:** Compile the algorithm inputs used to calculate the ex-ante savings for the smart thermostats throughout the prescriptive sub- program so the evaluation can identify reasons for project specific realization rate drivers in future evaluations.

Finding 2: For prescriptive programs, the evaluation team assumed that the smart thermostats exclusively control the air conditioning units in new homes, unless the AHRI certificates were provided for the heating equipment. Heating savings were taken into account only when AHRI certificates for either heat pump, electric, or gas furnace heating equipment were available in the project files.

> **Recommendation 2:** We would recommend, to provide equipment details or AHRI certificate numbers on the 'HERS Rater Product Installation Verification' form for the heating and the cooling equipment controlled by the smart thermostats in the new homes, to ensure accurate ex-ante savings replication. This would help the evaluation team to use the appropriate deemed savings values from the NM TRM.

5 ENERGY SMART (LI) PROGRAM

PNM's Energy Smart program provides weatherization services and other efficiency upgrades to low-income households in PNM territory. Measures are prescriptive in nature and include insulation, duct sealing, water heater tank and pipe insulation, low-flow showerheads and aerators, and efficient lighting. To evaluate the impacts of the Energy Smart program, the evaluation team conducted a deemed savings review of the energy saving measures provided by the program.

5.1 ENERGY SMART (LI) GROSS IMPACTS

The ex ante 2023 impacts are summarized in Table 23. In total, the Energy Smart program accounted for one percent of energy impacts in PNM's overall portfolio.

Table 23: PY2023 Energy Smart (LI) Savings Summary

Sub-Program	# of Projects	Expected Gross kWh Savings	Expected Gross kW Savings
Energy Smart (Low Income)	224	1,201,137	382

In the deemed savings review, we attempted to confirm the source of savings cited by PNM and/or replicate the per-unit savings values if savings were based on an algorithm from the New Mexico TRM. The evaluation team reviewed only those measures, whose NEAT audit reports were generated. The inputs in these reports were reviewed by the evaluation team and compared to the New Mexico TRM. The evaluation team also reviewed the Program Data to look for any irregularities or abnormalities in the reported data.

The evaluation team found the measures associated with the equipment that existed in the New Mexico TRM, except for Residential Refrigerator replacement. For Refrigerator replacement measure, savings were calculated as the difference between the baseline refrigerator and the efficient refrigerator annual kWh consumptions. The savings were calculated only for the projects whose NEAT reports were generated. The evaluation team couldn't verify the kW savings for these projects because of lack of data available. Table 24 and Table 25 show the results of the deemed savings reviews. For the Energy Smart (LI) program overall, small adjustments were made because of the refrigerator replacement measure, resulting in an engineering adjustment factor of 0.997 for kWh.

Table 24: PY2023 Energy Smart (LI) Gross kWh Impact Summary

Sub-Program	# of Projects	Expected Gross kWh Savings	Engineering Adjustment Factor	Realized Gross kWh Savings
Energy Smart (Low Income)	224	1,201,137	0.9970	1,197,483

Table 25: PY2023 Energy Smart (LI) Gross kW Impact Summary

Sub-Program	# of Projects	Expected Gross kW Savings	Engineering Adjustment Factor	Realized Gross kW Savings
Energy Smart (Low Income)	224	382	1.000	382

5.2 ENERGY SMART (LI) NET IMPACTS

The NTG ratio for the Energy Smart program is stipulated at 1.00, and as a result the net realized savings are equal to the gross verified savings of 1,197,483. Table 26 and Table 27 summarizes the net verified savings for the program.

Table 26: PY2023 Energy Smart (LI) Net kWh Impact Summary

Sub-Program	# of Projects	Realized Gross kWh Savings	NTG Ratio	Realized Net kWh Savings
Energy Smart (Low Income)	224	1,197,483	1.00	1,197,483

Table 27: PY2023 Energy Smart (LI) Net kW Impact Summary

Sub-Program	# of Projects	Realized Gross kW Savings	NTG Ratio	Realized Net kW Savings
Energy Smart (Low Income)	224	382	1.00	382

5.3 TRADE ALLY INTERVIEWS

To evaluate the impacts of the Energy Smart program, the evaluation team conducted an interview with one trade ally from a pool of three potential trade allies for whom valid contact data were available; all three had interacted with the PY2023 Energy Smart program. The interview covered the following topics:

- Trade ally background;
- Program awareness and engagement;
- Program process and market response; and
- Program satisfaction.

TRADE ALLY BACKGROUND

The trade ally who completed an interview confirmed participation in the Energy Smart program and had completed a variety of new construction projects to install equipment that received rebates from the Energy Smart program. As a trade ally in the Energy Smart program, this firm helps weatherize low-income houses for families across northern New Mexico. For all new projects, the trade ally completes an initial energy audit to understand what equipment they can fix or replace. The trade ally is the one responsible for completing the paperwork to submit for the rebate. The rebates go to the trade ally, which allows them to provide the work and the equipment at no cost to their customers.

PROGRAM AWARENESS AND ENGAGEMENT

The evaluation team asked the trade ally to describe how they first learned about the Energy Smart program, as well as to elaborate on their experience with the program process. The trade ally was unsure of when they first started participating in the program, as their firm had been participating in the program before the individual had started working there.

The trade ally felt that there have been no barriers to participating in the program and expressed that it is nice to have the extra support from the program. The trade ally felt that PNM was very clear on which equipment or services are eligible for rebates and was aware that there are only certain measures they can charge to PNM.

The trade ally was asked to evaluate if the program is helpful to their business. The trade ally viewed participation in the program as very helpful to them, allowing them to provide energy efficient equipment at no cost to their customers. The trade ally mentioned that they and their customers are extremely grateful for the program and are happy to have it.

The evaluation team asked the trade ally about the influence of the Energy Smart program on their choices of equipment. The trade ally indicated it was the primary driver in choosing equipment for customers in PNMs territory.

PROGRAM PROCESS AND MARKET RESPONSE

The evaluation team asked the trade ally a series of questions about various factors related to their participation in the Energy Smart program.

When asked about paperwork involved for processing rebates, they said that the paperwork is not a significant burden and does not take a lot of time for them to complete compared to other funding sources.

The trade ally was asked about their discussion of the rebate with customers. The trade ally does not mention the rebate to the customers. Instead, they discuss the energy efficiency upgrades made to their customers' houses as part of the program and communicate the value that these energy efficiency improvements bring to their customers.

The evaluation team inquired about the program's impact on demand for energy-efficient equipment among customers. The trade ally noted a generally positive effect, although provide feedback on other factors which limit program participation. They said the primary barrier to participation is the income threshold, which they felt was below the income level of many of their low-income customers. Additionally, the trade ally highlighted several other challenges these customers face which deter participation such as housing and energy security. This insight suggests that while the program successfully generates interest among qualifying customers, there exists a contingent of interested but currently unserved customers due to conditions unrelated to income.

PROGRAM SATISFACTION

The evaluation team asked the trade ally to quantify their level of satisfaction with the program. The trade ally was asked to rate their satisfaction on a scale of 1 to 5, with 1 being "not at all satisfied" and 5 being "very satisfied."

The trade ally expressed a high level of satisfaction with the program, rating the program a 5 ("very satisfied"). When, they believed, their customers would also rate the program a 5 ("very satisfied").

Given the relatively high level of satisfaction, the trade ally did not share any direct suggestions for improving the Energy Smart program. The trade ally said that they were very satisfied and grateful for the program. They believe that the program is doing an excellent job creating opportunities for energy efficient measures to be installed in low-income households.

5.4 FINDINGS AND RECOMMENDATIONS

Finding 1: For Energy Smart (LI) programs, the evaluation team was not able to replicate the ex-ante savings for all projects using the supplied project documentation (NEAT reports) and the assumptions, algorithms and baseline values provided in the New Mexico TRM. Also, the evaluation team was not able to identify the discrepancy in the ex-ante and ex-post savings without additional documentation of the project-specific calculations performed by PNM. However, the evaluation team was able to replicate the savings for only the LED 9 W measure using assumptions in the New Mexico TRM.

> **Recommendation 1:** If possible, provide algorithms and inputs used to calculate the ex-ante savings for all the measures throughout the program so the evaluation can identify reasons for project specific realization rate drivers in future evaluations.

Finding 2. For a few measures, ex ante reported zero peak kW savings. For these measures, a positive peak kW savings must be calculated consistent with the New Mexico TRM. The list of measures is given below.

- Air Sealing
- Floor Insulation
- Infiltration
- Pipe Wrap (per linear feet)
- Window Replacement

> **Recommendation 2.** Calculate and report peak kW savings for the above mentioned measures consistent with the New Mexico TRM.

Finding 3. The per-unit kWh and kW savings were reported the same for all the Refrigerator replacement projects. The evaluation team observed that for all projects, the replaced Refrigerator had varying volume capacities and annual kWh consumption. However, the Program Data reported the same per-unit kWh and kW savings for all the projects. The evaluation team believes that ex ante used a prescriptive method to calculate savings, which the evaluation team was not able to replicate.

For nine projects whose NEAT reports were provided, the replaced Refrigerator model in the Program Data did not match with the model in the project documentation (NEAT audit reports).

> **Recommendation 3.** Consider using the refrigerator inputs to calculate savings using actual specifications of the replaced Refrigerator model, ensuring that the replaced Refrigerator model in the Program Data matches with the model in the NEAT audit reports.

Finding 4. For Pipe Wrap (per linear feet) of DHW Pipe Insulation measure, the project documentation (NEAT report) does not report Pre and Post R values, and Linear feet of the pipe.

> **Recommendation 4.** Report Pre and Post R values, and Linear feet of the pipe in the project documentation (NEAT report) and use the same information in calculating savings.

Finding 5. For Faucet Aerator – Chrome Kitchen measure, the project documentation (NEAT report) reported kWh savings as 1.0 MMBTU converted to kWh by multiplying with 293. The project documentation (NEAT report) does not have any section which collects detailed information related to the Faucet Aerator measure.

> **Recommendation 5.** Collect actual measure data and inputs and calculate savings consistent with the New Mexico TRM.

6 LOAD MANAGEMENT PROGRAMS

6.1 POWER SAVER

INTRODUCTION

Power Saver is a direct load control program offered to residential, small commercial (< 50 kW), and medium commercial (50 kW – 150 kW) Public Service New Mexico (PNM) customers. There are six program components:

- Residential Digital Control Unit (DCU)
- Small Commercial DCU
- Medium Commercial DCU
- Residential Two-Way Smart Thermostat
- Residential Bring Your Own Thermostat (BYOT) – Honeywell
- Residential BYOT – Nest

To facilitate load control in the DCU program components, participants must have a device attached to the exterior of their air conditioning unit. This device can receive a radio signal that turns off the unit's compressor for an interval of time. For the smart thermostat components, load curtailment is achieved via communication with the WiFi-enabled thermostat. Residential and small commercial participants receive an annual $25 incentive for their participation. Medium commercial participants receive an annual incentive of $9 per ton of refrigerated air conditioning.

There were four Power Saver events during the summer 2023 demand response (DR) season, which began May 15th and ended September 30th. Table 28 provides some information on the 2023 events. During the first and the last events, all five program components were dispatched. For the middle two events, only the Residential DCU and Small Commercial DCU components were dispatched. For all segments other than Residential BYOT, each event used an adaptive 50% cycling strategy where curtailment is based on the runtime in the previous hour. For the BYOT Honeywell group, devices are curtailed using a 50% cycling strategy performed by the vendor. For the BYOT Nest group, thermostat setpoints are increased by three degrees.

Table 28: 2023 Power Saver Event Summary

Date	Day of Week	Start Time (MDT)	End Time (MDT)	Daily High at KABQ (F)
7/11/2023	Tuesday	4:00 PM	8:00 PM	100
7/17/2023	Monday	2:00 PM	6:00 PM	102
7/18/2023	Tuesday	2:00 PM	6:00 PM	102
7/26/2023	Wednesday	4:00 PM	8:00 PM	101

The average load reduction delivered by the Power Saver program during summer 2023 event hours was 38.4 MW. Under planning conditions, we estimate the load reduction capability of the Power Saver program to be 39.1 MW. The realized gross energy savings for summer 2023 was 367.9 MWh. The energy savings estimate for the program accounts for the load shed during the event and the post-event snapback and is a function of the number of events called.

After the conclusion of the summer 2023 season, Itron provided the EcoMetric team with a series of datasets for the evaluation. These files included:

- For a sample of about 250 Residential DCU and about 40 Small Commercial sites, 5-minute load data from 6/1/2023 to 9/30/2023
- For a sample of about 50 Medium Commercial DCU sites, 5-minute load data from 6/1/2023 to 9/30/2023
- For Residential DCU and Small Commercial sites, an M&V list that provided the location type (residential or commercial), the group (control or curtailment), and/or the dates each load control device was active
- For Medium Commercial sites, an M&V list that provided the dates each load control device was active
- For the Two-Way Smart Thermostat and BYOT Honeywell populations, 5-minute runtime data from 6/1/2023 to 9/30/2023
- For the BYOT Nest population, 15-min runtime data for July 2023

The EcoMetric team also received Itron's Power Saver impact evaluation report, which detailed the methods Itron employed in calculating customer baselines (CBLs) for the five different DR program components. A CBL is an estimate of what participant loads would have been absent the DR event dispatch. For each DR program component, the report also showed the load impact, which is the difference between the CBL and the metered load, for each 5-minute interval of each curtailment day. The key steps in the EcoMetric verified savings analysis were:

1) For each DR program component, reproduce the performance estimates calculated by Itron using the contractually agreed upon CBL method.
2) Modify the CBL methodology and produce ex post estimates of what the per-device impact was during the 2023 DR season.
3) Where possible, leverage additional historical data from 2015 through 2023 to produce ex ante estimates of what the per-device impact at peaking conditions (5-6 PM at 100°F) will be in future summers.
4) Scale the per-device estimates by the number of active program devices to calculate the aggregate load reduction capability (MW) of the Power Saver program.

By segment, Table 29 summarizes our findings for the 2023 summer.[10] The main driver in the difference between reported and evaluated load reduction estimates is that Itron commonly summarized impacts with the maximum (e.g., the largest 5-minute impact in a one-hour interval is the impact for that hour), whereas the EcoMetric team summarized impacts with an average. Multiplying our per-device reduction estimates by the number of devices in each class leads to a 2023 average total estimated load reduction of approximately 28.48 MW, 0.96 MW, 0.27 MW, 2.38 MW, 3.92, and 2.43 MW for the Residential DCU, Two-Way Smart Thermostat, BYOT Honeywell, BYOT Nest, Small Commercial, and Medium Commercial segments respectively. In aggregate, the average 2023 performance is 38.43 MW. This is approximately 63% of Itron's estimate for the 2023 season (60.79 MW).

Table 29: Power Saver Evaluation Results

Segment	Devices	Metric	Reported[1]	Evaluated	RR
Residential DCU	**51,598**	kW / device	0.86	0.55	64.2%
		Total MW	44.37	28.48	64.2%
		Total MWh	458	272	59.5%
	760	kW / device	1.47	1.26	85.2%
		Total MW	1.12	0.96	85.2%

10 The numbers in this table reflect operability and online adjustments. For the DCU components, there is an 86% adjustment factor to account for devices that weren't operable. For the thermostat components, there are online adjustment factors (78% for Two-Way, 74% for BYOT Honeywell, and 93% for BYOT Nest).

Segment	Devices	Metric	Reported[1]	Evaluated	RR
Two-Way Smart Thermostats		Total MWh	8	7	88.0%
BYOT Honeywell	**434**	kW / device	1.38	0.63	45.4%
		Total MW	0.60	0.27	45.4%
		Total MWh	3	2	71.6%
BYOT Nest	**2,172**	kW / device	1.66	1.09	65.7%
		Total MW	3.62	2.38	65.7%
		Total MWh	16	15	90.6%
Small Commercial DCU	**6,042**	kW / device	1.11	0.65	58.5%
		Total MW	6.70	3.92	58.5%
		Total MWh	56	43	76.5%
Medium Commercial DCU	**3,247**	kW / device	1.37	0.75	54.8%
		Total MW	4.38	2.43	55.4%
		Total MWh	20	30	151.9%
Portfolio		**Total MW**	**60.79**	**38.43**	**63.2%**
		Total MWh	**546**	**368**	**65.7%**

[1] Note Itron does not report energy savings. The reported MWh values represent the sum of hourly impacts multiplied by device counts.

The EcoMetric team used Power Saver results from 2015 to 2023 to estimate the load relief capability under extreme conditions. Table 30 shows the results (and reflects operability/online adjustments). We estimate the program can deliver 39.13 MW of meter-level load reduction under planning conditions of 100°F between 5:00 PM and 6:00 PM MDT. Of the estimated 39.13 MW of load reduction capability, 31.60 MW comes from the Residential DCU segment, 3.31 MW comes from the Residential Thermostat segments, 2.86 MW comes from the Small Commercial DCU segment, and 1.36 MW comes from the Medium Commercial DCU segment. At 100% operability, the portfolio total would be 45.49 MW.

Table 30: Power Saver Load Relief Capability under Peaking Conditions

Segment	kW/Device	Total MW
Residential DCU	0.61	31.60
Residential Two-Way Thermostat	1.35	1.03
Residential BYOT Honeywell	0.61	0.26
Residential BYOT Nest	0.93	2.02
Small Commercial DCU	0.47	2.86
Medium Commercial DCU	0.42	1.36
Total	**---**	**39.13**

METHODOLOGY

This section discusses the methods used to validate Itron's impact estimates and those used by the EcoMetric team to produce verified ex post and ex ante impact estimates.

6.1.1.1 Residential DCU Impact Validation

The impact evaluation for the Residential DCU class relies on an alternating treatment design. Under this approach, load in the group that was not dispatched serves as a proxy for what curtailment group load would have been if the DR event had not been initiated. Both groups contained approximately 130 devices.

Impact estimates were derived using 5-minute interval kW data collected by DENT Elite Pro SP Portable Power Data Loggers and PowerCAMP and IntelliMEASURE M&V equipment. Steps taken are as follows:

1. For both the control and curtailment groups, calculate the average demand (kW) for each 5-minute interval.
2. For both the control and curtailment groups, calculate a fifteen-minute rolling average demand. Suppose the average demand for the control group is 3 kW during interval t, 4 kW during interval $t+1$, and 5 kW during interval $t+2$. The fifteen-minute rolling average demand for interval t would then be 4 kW.
3. For each interval, find the difference between the rolling averages for the control and curtailment groups (where difference = control – curtailment).

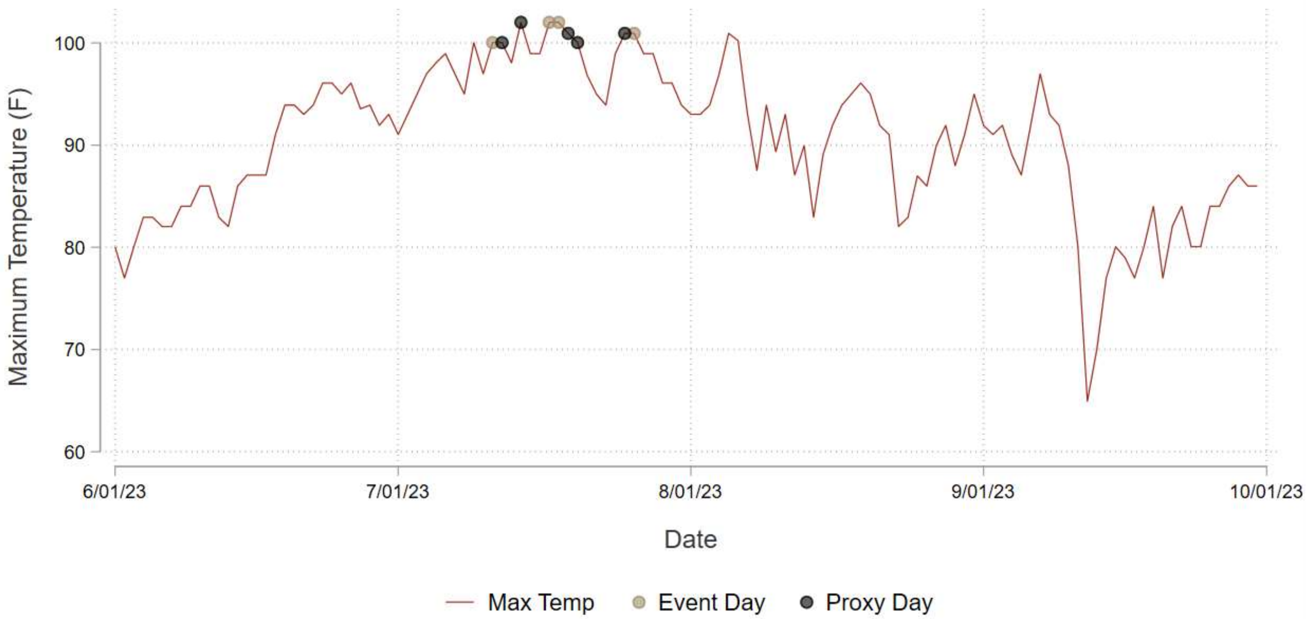
4. The impact for any given event hour is the maximum difference across the 12 intervals in the hour, as calculated in step 3.
5. The maximum difference across all qualified event hours[11] is the kW per device impact estimate for the 2023 DR season.
6. Adjust the residential impacts for an operability factor of 86%. The determination of the operability percentage is detailed in detail in Section 6.1.1.6.

6.1.1.2 Verified Residential DCU Impacts

In 2018, the Residential DCU segment of Power Saver switched to alternating dispatch between M&V groups to determine which devices were called to reduce load on event days. In theory, this means that any difference in the behavior of the two groups is removed when we look at events across the whole summer. Because dispatch alternates between the two groups, any bias in impacts should be minimal, on average. Nevertheless, to assess the differences between the groups, the EcoMetric team compared the load profiles of the two groups on proxy days. Proxy days are non-event days that were chosen from non-holiday weekdays where the maximum temperature was at least as hot as the event days. There were five proxy days used to develop this comparison. Figure 13 shows the maximum temperature and distribution of proxy days throughout the summer, compared to the event days and non-event days.

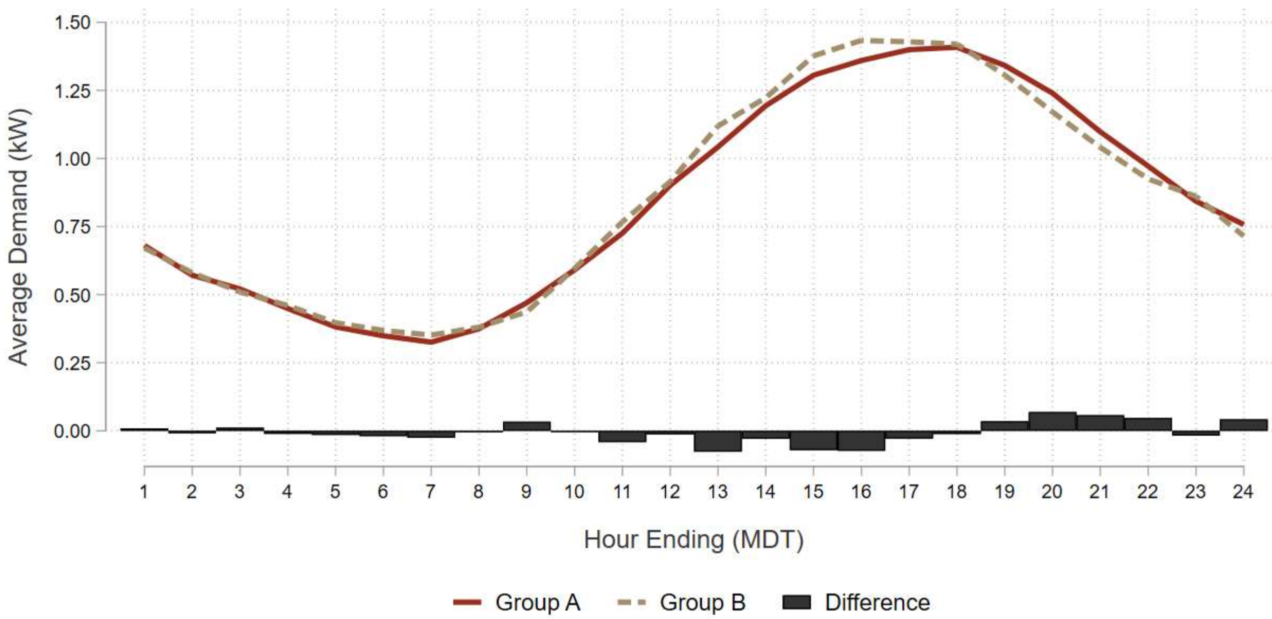
11 ‘Qualified’ hours were defined as hours where the outdoor temperature is at least 97 degrees (F).

Figure 13: Albuquerque Weather on Event and Proxy Days



The average hourly load profiles for the two residential M&V groups, averaged across all proxy days, are shown in Figure 14. The average difference between the two groups is 0.01 kW, with a maximum difference of 0.07 kW. The average difference during typical event hours is 0.02 kW and the maximum is 0.04 kW. Group B tends to have slightly higher average cooling load than Group A. This means when Group B is curtailed, impact estimates that rely on a simple difference will be understated. When Group A is curtailed and Group B acts as the control group, a simple difference in average group loads will overstate the load reduction.

Figure 14: Residential DCU Load Shapes on Event-Like Days



The EcoMetric team felt that taking the simple difference between the two groups would not be sufficient to calculate an unbiased ex post event impact. Instead, we used a difference-in-differences approach. Table 31 provides an illustration. In this illustration, Group B is the curtailment group. The difference-in-difference calculation nets out the proxy day difference from the event day difference.

Table 31: Difference-in-Difference Illustration

Hour Ending (MDT)	Proxy Day Difference (kW)	Event Day Difference (kW)	Difference-in-Difference (kW)
5:00 PM	-0.03	0.62	0.65
6:00 PM	-0.01	0.67	0.68
7:00 PM	0.04	0.55	0.52
8:00 PM	0.07	0.46	0.39

As described further in Section 0, the EcoMetric team also believes that the Itron method for calculating the impacts for the Residential DCU segment overstates the actual program performance because the impact for each hour is defined as the *maximum* difference out of the twelve 5-minute intervals within the hour (see step 4 of Section 6.1.1.1). We believe that using the maximum difference of all intervals within each hour, as opposed to the average difference, overstates the amount of load shed produced by a typical DR event because it counts favorable noise. In Section 0, we develop an alternative DR impact methodology that relies on the average impact rather than the maximum, and we use this methodology to produce ex ante estimates for future program planning.

6.1.1.3 Two-Way Smart Thermostat, BYOT, Small Commercial, and Medium Impact Validation

The impact evaluation for the Small Commercial, Medium Commercial, Two-Way Smart Thermostat, and BYOT components relies on a "high X of Y" customer baseline (CBL) approach with a multiplicative day-of adjustment. Under this approach, the average load for three of the previous five eligible[12] days is used as a proxy for what load would have been if the DR event had not been called. In selecting which three days to use, the criterion is greatest maximum load between 1:00 PM and 8:00 PM. For a hypothetical event that lasts from 4:00 PM until 8:00 PM, the steps to calculating the impact estimate are as follows:

1. Calculate the unadjusted baseline.
    - For each of the five eligible days prior to the event day, calculate the average demand between 1:00 PM and 8:00 PM across the entire M&V population. Select the three days with the greatest average demand (i.e., "high 3 of 5").
    - Across the three baseline days, calculate the average demand across the entire M&V population for each 5-minute interval. This essentially collapses the three baseline days into one baseline day.
    - For each 5-minute interval, calculate a 15-minute rolling average kW load. As an example, suppose the average 5-minute interval load is 10 kW at time t, 12 kW at time $t + 1$, and 14 kW at time $t + 2$. The 15-minute rolling average kW load at time t would be (10 + 12 + 14)/3 = 12 kW. This value (12 kW) would be the unadjusted CBL at time t. Note rolling averages were not calculated for the BYOT Nest component because the interval data was 15-minute rather than 5-minute.
2. Calculate 15-minute rolling average demand (kW) for the entire M&V population.
    - Across the entire M&V population, calculate average demand for each 5-minute interval.
    - For each 5-minute interval, calculate a 15-minute rolling average as described above.

12 Eligible days are weekdays that are neither holidays or DR event days.

3. Calculate the multiplicative adjustment factor.
    - For the twelve 5-minute intervals preceding the event, sum up the 15-minute rolling average demand for the unadjusted baseline.
    - For the twelve 5-minute intervals preceding the event, sum up the 15-minute rolling average demand for the M&V population.
    - Divide the second sum by the first sum. This quotient is the adjustment factor.
4. Calculate the impact.
    - Multiply the unadjusted baseline by the adjustment factor. This yields the adjusted CBL.
    - For each 5-minute interval, subtract the 15-minute rolling average demand for the entire M&V population (as calculated in Step 2) from the adjusted baseline. Note that this yields 12 impacts in every hour.
    - For Two-Way and BYOT add 0.1 kW to impacts to account for the thermostats curtailing the air handler fan in addition to the AC compressor.
    - For each event hour, take the maximum 5-minute impact. This value serves as the impact estimate for the event hour.
    - The maximum 5-minute impact across all qualified event hours (when temperature exceeds 97°F) is the 2023 Power Saver impact estimate.

6.1.1.3.1 BYOT Connected Load Assumption

BYOT Smart Thermostats are not installed by Itron field technicians. As a result, A/C tonnage and amperage information is missing for all participants who have enrolled in the BYOT program component. In the absence of A/C unit nameplate information, a default value is used as the connected load estimate. This default connected load value is estimated from the 2020 Two-Way Smart Thermostat residential population. This value is then used to convert A/C runtime to power draw (kW) for each 5-minute interval.

Itron uses a connected load of 4.19 kW. EcoMetric used a connected load of 3.22 kW to calculate BYOT 5-minute kW interval data based on the formulas and assumptions below drawn from the Smart Thermostat and High Efficiency Air Conditioner measures in the New Mexico 2021 Technical Reference Manual.

$$Connected\ Load = \frac{Capacity_{cool}}{1000\frac{W}{kW}} \times \frac{1}{EER} = 3.22\ kW$$

Where:

- $Capacity_{cool}$ = 36,000 BTU/hour (2021 TRM Section 4.20.3)

EER = -0.02 * $SEER^2$ + 1.12 * SEER (2021 TRM Section 4.6.4)

  - Assuming SEER = 13 (2021 TRM Section 4.20.3)

6.1.1.4 Verified Two-Way Smart Thermostat, BYOT, Small Commercial, and Medium Commercial Impacts

Reported impacts for the Two-Way Smart Thermostat, BYOT, Small Commercial, and Medium Commercial offerings rely on a CBL method where the key step involves taking the maximum 5-minute rolling average difference within each hour. The maximum difference for the hour is the reported impact. The EcoMetric team feels that using the maximum difference, rather than the average difference, overstates the capability of the program by including favorable noise into the impact calculation. Therefore, the EcoMetric impact estimates for these program offerings use the same general baseline method as summarized in Section 6.1.1.3 except that the rolling 5-minute impacts are summarized by the mean rather than the maximum by hour.

Figure 15 illustrates why using the maximum 5-minute impact within each hour overstates the true DR program impact, using the BYOT Honeywell program as an example. The figure shows the baseline (brown) and average participant load (red) for each 5-minute interval on 7/11/2023. Within a given event hour, the average participant load ranges from as low as 0.51 kW to as high as 1.70 kW. The average participant load across the event period was 1.11 kW. Therefore, taking the maximum of the 5-minute impacts within a given hour will yield an inflated impact value compared to taking the average 5-minute impact.

Figure 15: BYOT Honeywell Baseline and Actual Load for July 11, 2023

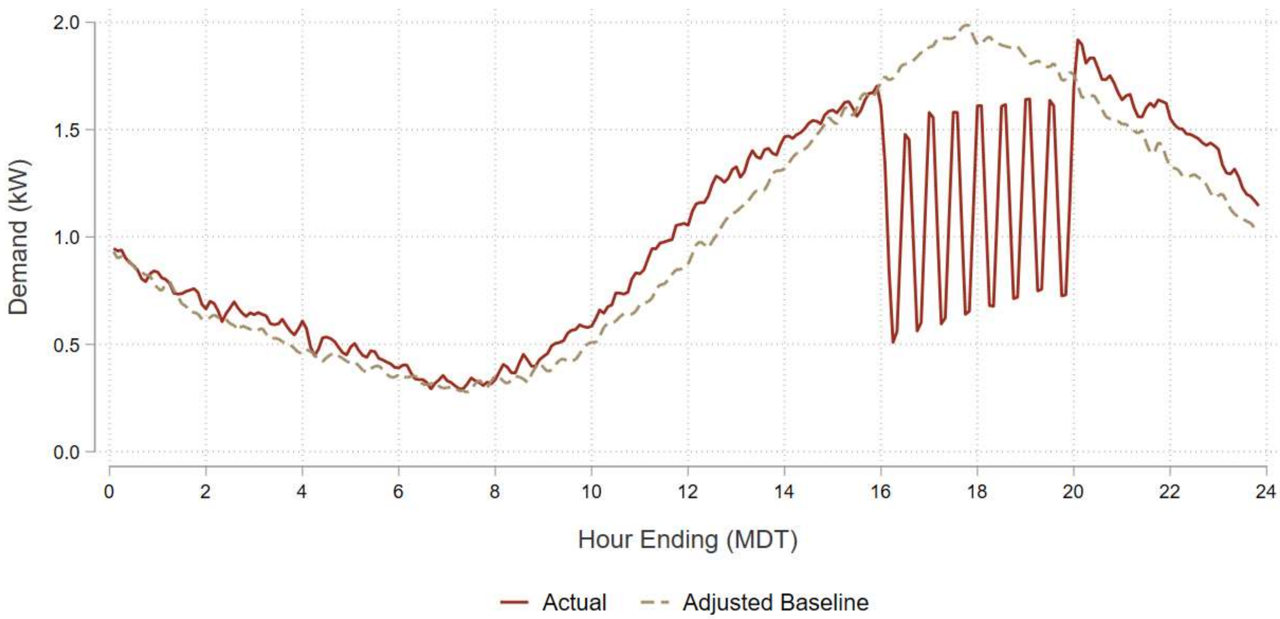
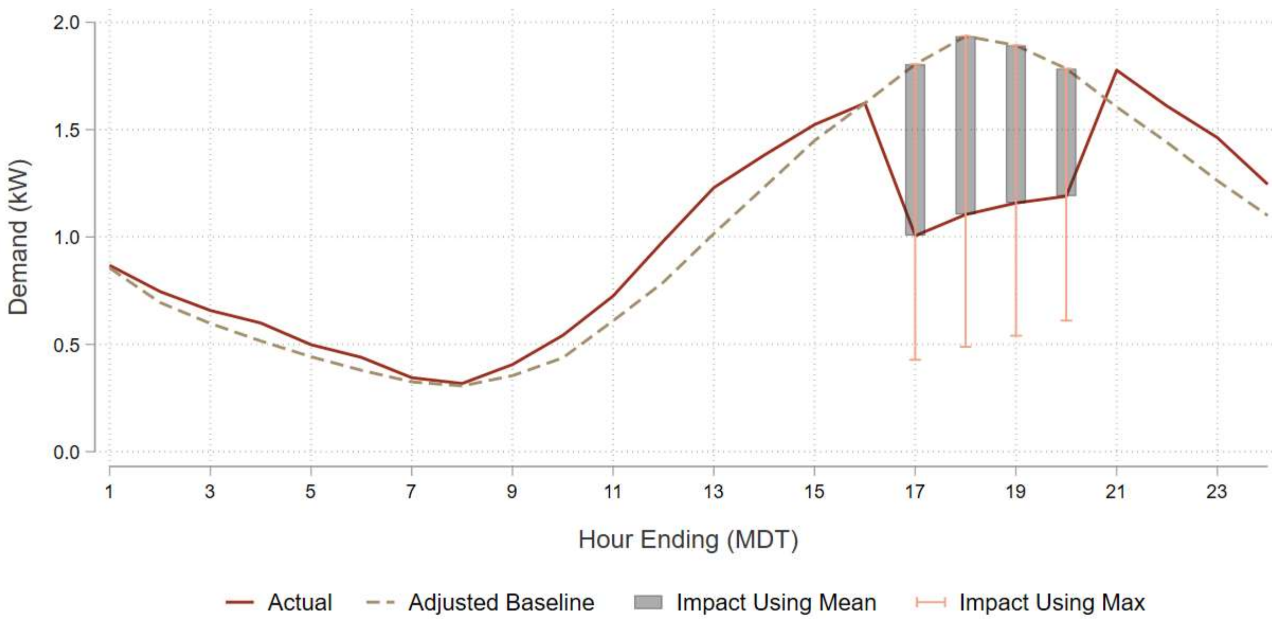


Figure 16 compares the impacts using the two different methods. As in Figure 15, the brown and red lines represent the customer baseline and participant load on 7/11/2023; the key difference is that Figure 16 shows average hourly values whereas Figure 15 used the more granular 5-minute interval data. The grey bars represent the DR impacts using the average 5-minute impact within each hour, while the orange capped lines represent the DR impacts using the Itron maximum methodology. Note that the average impacts (grey) are equal to the difference between the baseline and the average participants' loads, while the Itron impacts (orange) far overstate actual DR program performance. Again, this is an artifact of using the highest 5-minute impact within each hour. The degree to which impacts are overstated using the Itron method depends on how much loads vary within each hour.

Figure 16: BYOT Honeywell Baseline and Actual Load for July 11, 2023 with Impacts Calculated Using Mean and Max Methodologies



6.1.1.5 Ex Ante Impacts

Of particular interest for ex ante load considerations is how sensitive the program performance is to temperature and time of day. When multiple years of data are included in such an analysis, a wider range of program conditions can be investigated which leads to a more robust understanding of the capability of the program. Details regarding how we produced ex ante estimates for each Power Saver component are provided below.

Residential DCU. We leveraged 2015-2023 verified load reduction estimates. In 2015, 2016, 2017, and 2019, only one of the Residential DCU M&V groups was consistently curtailed while the other group acted as a control. In 2018, 2020, 2021, 2022 and 2023, the curtailment groups switched between event days. Because some differences exist between the two groups in terms of load profile on event-like days, the EcoMetric team used a difference-in-differences impact estimation method, which was described in Section 6.1.1.2, to estimate the impacts for these earlier summers.[13] Ex post impacts in 2018 were not calculated via difference-in-differences, as statistically significant differences between the groups were not found.

Residential Thermostats. For the Two-Way Smart Thermostat segment, we leveraged 2019-2023 verified load reduction estimates. The 2019 approach relied on control groups. Since then, the approach has relied on the X-of-Y baseline method described above. For the BYOT Honeywell segment, we leveraged 2020-2023 verified load reduction estimates. The same approach for estimating ex post results was used in each year. For the BYOT Nest segment, we did not have sufficient data to build an ex ante model. Instead, we took an average of the hourly impacts from 2023.

Small Commercial DCU. We leveraged 2015-2023 verified load reduction estimates. Prior to 2019, impacts for the Small Commercial segment were calculated in a manner similar to the Residential DCU segment – an M&V group was split into curtailment and control groups. The control group was used as a baseline for the curtailment group. Since 2019, the full M&V group was curtailed for all events, and the program implementer relied on an X-of-Y baseline method to estimate impacts (same method as the one used for the Large Commercial segment). Therefore, the ex ante estimate is a function of historical ex post estimates that were developed using slightly different methods over the years.

Medium Commercial DCU. We leveraged 2017-2023 verified load reduction estimates. The same approach for estimating ex post results for the Medium Commercial segment was used in each year.

Once data had been compiled for each customer segment, regression modeling was used to estimate the effect temperature and time of day have on demand reductions. The resulting regression model was used to predict impacts for a range of planning scenarios. The regression equation specified was:

$$\Delta kW_h = \alpha + \beta * T_t + \sum_{h=15}^{h=20} \gamma_h * I_h + \sum_{h=15}^{h=20} \delta_h * I_h * T_h + \varepsilon_h$$

13 There were not many non-event weekdays during the summer of 2015 where the maximum outdoor temperature exceeded 94 degrees (F), so a threshold of 91 degrees (F) was used for the 2015 data instead. The temperature threshold for the summer of 2016 was 94 degrees (F), just like the threshold for the summer of 2017. In 2018, the groups were similar in terms of non-event day usage, so the difference-in-differences method was not necessary.

Where the variables have the following interpretations:

Table 32: Ex Ante Regression Terms

Variable	Interpretation
α	Constant term
β	The incremental kW usage associated with a warming of 1 degree Fahrenheit
T_t	Outdoor air temperature in hour h
γ_h	Incremental kW usage associated with each hour
I_h	Indicator variable equal to 1 if the hour is 14, 15, 16, etc., and 0 if not
δ_h	Incremental kW usage associated with a 1-degree increase in outdoor temperature in hour h
ε_h	The error term

6.1.1.6 Operability Adjustments

To reach a true estimate of program capability, ex post and ex ante impacts in this analysis need to be adjusted for operability. In a previous evaluation, the EcoMetric team recommended adjusting residential impacts by 8% based on operability inspections that occurred during Summer 2018. Our 2018 Evaluation Report covered the inspection process and key findings in detail. Itron's 2018 report adopted this recommendation. In 2023, the adjustment factor was 86% for the Residential DCU, Small Commercial, and Medium Commercial programs. The 86% operability adjustment value represents a weighted average of 85% and 95% where the two values correspond to sites that have not been visited in the past two years and sites that have been visited in the past two years, respectively. Separately, Itron's report notes that a 78% online factor (not operability factor) is applied to the Two-Way Smart Thermostat group, a 74% online factor is applied to the BYOT Honeywell group, and a 93% online factor is applied to the BYOT Nest group. We have adopted these adjustments as well. Unless otherwise noted, results in this analysis are reported without the operability adjustment applied.

RESIDENTIAL DCU RESULTS

This section reviews the Residential DCU impacts calculated by Itron and validated by the EcoMetric team. Additionally, the team provides feedback on the evaluation approach used by Itron and provides an alternative impact analysis for summer 2023 events. Finally, multiple years of event history are combined to develop ex ante impacts for various temperature scenarios.

6.1.1.7 Validation of Reported Ex Post Impacts

After receiving the participant load data from Itron, the EcoMetric team attempted to reproduce the impacts in Itron's Power Saver impact evaluation report. Figure 17 compares the impacts as calculated by Itron and by EcoMetric at the 5-minute level for each event day. There is strong but imperfect alignment. The average difference between Itron's impacts and EcoMetric's validated impacts is 0.005 kW (with EcoMetric's validated impacts being slightly larger, on average). For reference, Itron's Residential DCU impact estimates are shown in Table 33. Note that an asterisk (*) denotes a qualifying event hour. The maximum impact during qualifying event hours was 1.00 kW per device for the Residential DCU class without any adjustment for operability.

Figure 17: Residential DCU Impact Verification

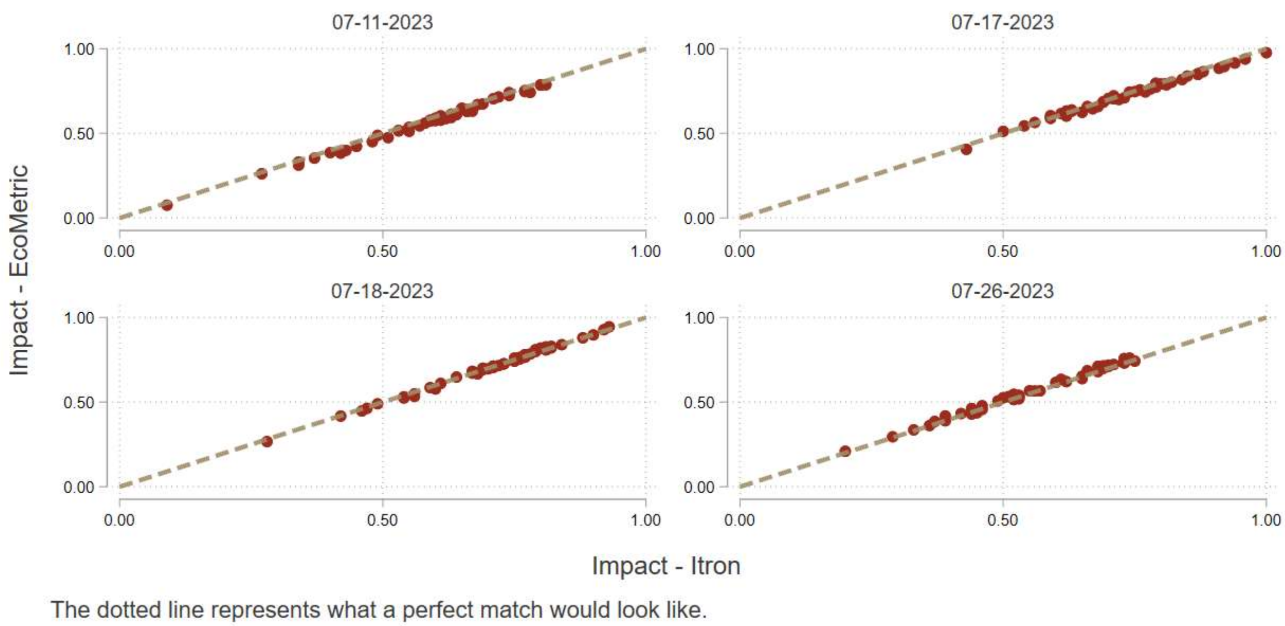


Table 33: Residential DCU Impact Estimates (kW/device) by Date and Time[14]

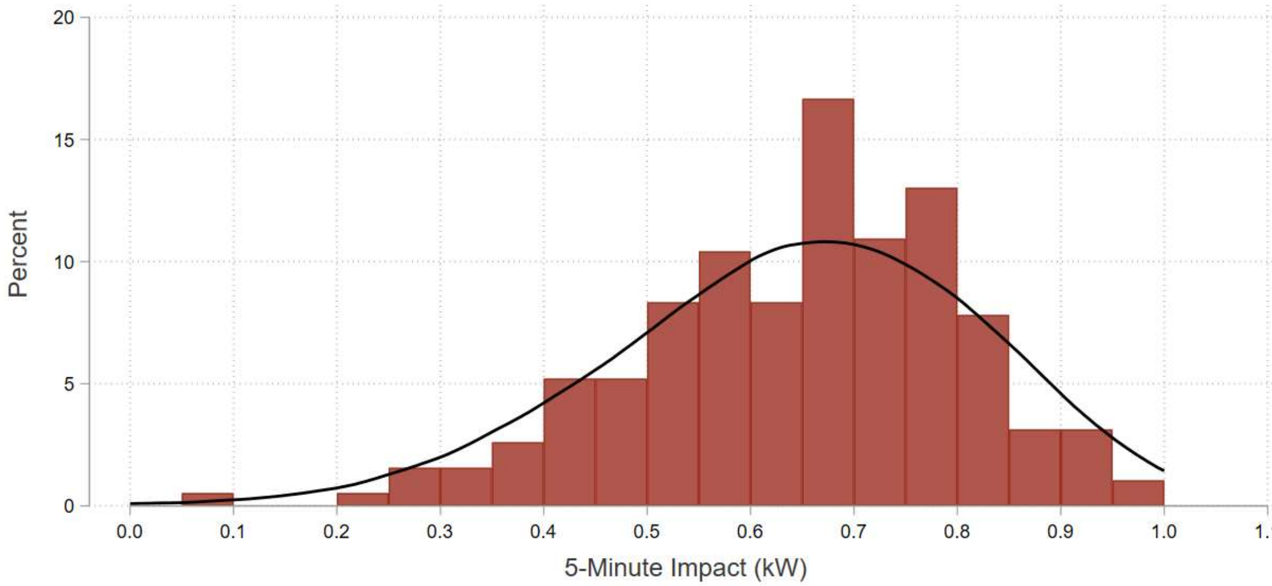
Date	Hour Ending (MDT)					
	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
7/11/2023			0.81*	0.80*	0.69	0.61
7/17/2023	0.76*	0.77*	0.91*	1.00*		
7/18/2023	0.90*	0.93*	0.80*	0.69*		
7/26/2023			0.75*	0.74*	0.57*	0.53

6.1.1.8 Verified Ex Post Impacts

For the Residential DCU segment, Itron's per device kW impact estimate for the 2023 season is the maximum difference between 5-minute rolling average loads for the control and curtailment groups (1.00 kW). (See Section 6.1.1.1 for more details.) The critical word here is *maximum*. The EcoMetric team feels that using the maximum difference overstates the amount of load shed produced by a typical Power Saver DR event by counting favorable noise. This is especially true from a system planning perspective, as using the maximum is a poor basis for the estimated load relief upon dispatch. Figure 18 shows the distribution of impacts at the 5-minute level –1.00 kW clearly overstates the center of the distribution.

14 Source: Itron's 2023 PNM Power Saver Program Report. Table 37.

Figure 18: Distribution of 5-Minute Residential DCU Impacts



Respectively, the mean and median are 0.64 kW and 0.67 kW.

Rather than the maximum difference, the EcoMetric team feels that using an average impact across an hour returns an unbiased estimate of Power Saver program impacts during DR events. To account for differences between the two M&V groups, the EcoMetric team opted for a difference-in-difference approach for estimating ex post impacts. This approach was described in Section 6.1.1.2. Results for the 2023 DR season are summarized in Table 34. Qualifying event hours are denoted with an asterisk (*). Note that the curtailment group rotated between events, which is why the sign of the non-event-day difference changes from one event to the next.

Table 34: Impact Calculations

Date	# of Curtailed Devices in Sample	Hour Ending (MDT)	Temp. (F)	Control kW	Curtail kW	Non-Event Diff. (kW)	Impact (kW)
7/11/2023	125	17*	99	1.46	0.84	-0.03	0.65
		18*	99	1.47	0.80	-0.01	0.68
		19	100	1.30	0.75	0.04	0.52
		20	99	1.17	0.72	0.07	0.39
7/17/2023	124	15*	96	0.74	1.35	-0.07	0.54
		16*	98	0.73	1.42	-0.07	0.61
		17*	101	0.74	1.53	-0.03	0.75
		18*	102	0.80	1.64	-0.01	0.84
7/18/2023	126	17*	96	1.47	0.77	-0.07	0.76
		18*	100	1.52	0.73	-0.07	0.87
		19*	100	1.55	0.79	-0.03	0.79
		20*	102	1.38	0.82	-0.01	0.57
7/26/2023	126	17*	100	0.90	1.55	-0.03	0.62
		18*	101	0.78	1.45	-0.01	0.66
		19*	101	0.72	1.23	0.04	0.55
		20	99	0.74	1.16	0.07	0.49

The average impact during qualifying event hours was 0.64 kW. As of the end of summer 2023, there were 51,598 active residential DCUs. Thus, the average qualifying event hour aggregate impact was 33.11 MW. Adjusted for 86% operability, the aggregate impact was 28.48 MW.

Figure 19 visualizes the impact estimates and Figure 20 compares EcoMetric's ex post hourly impacts with the impacts calculated by Itron. The EcoMetric impact is lower in all cases, by about 0.12 kW on average.

Figure 19: Residential DCU DR Impacts by Date

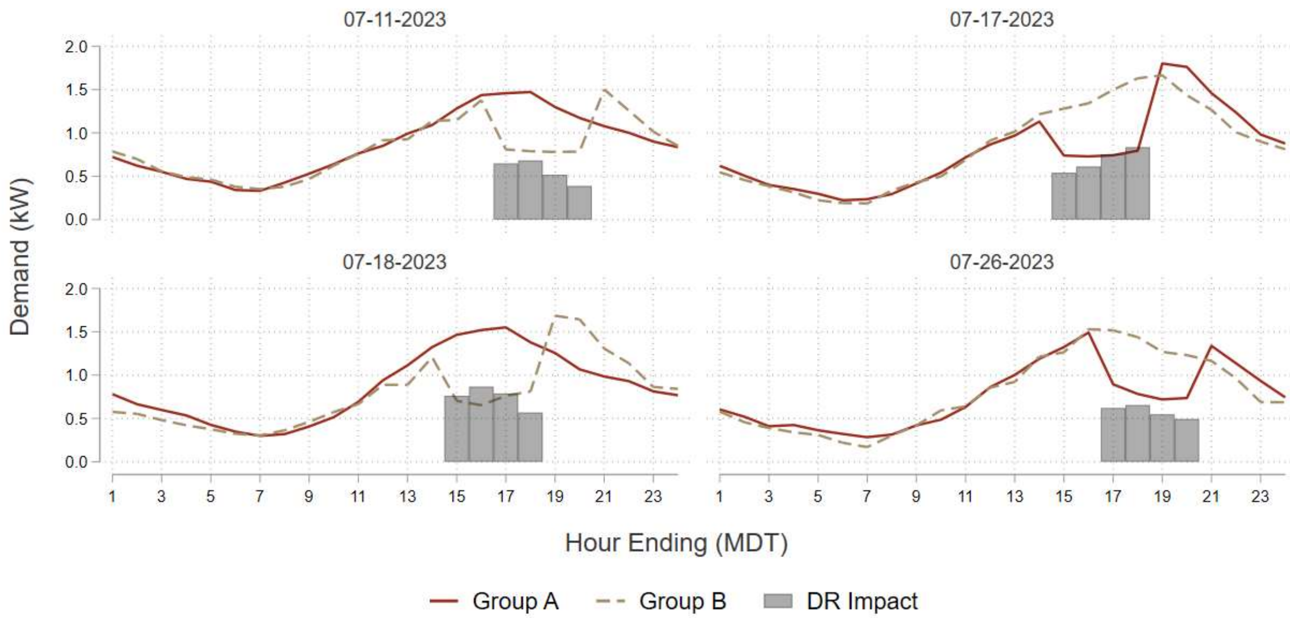
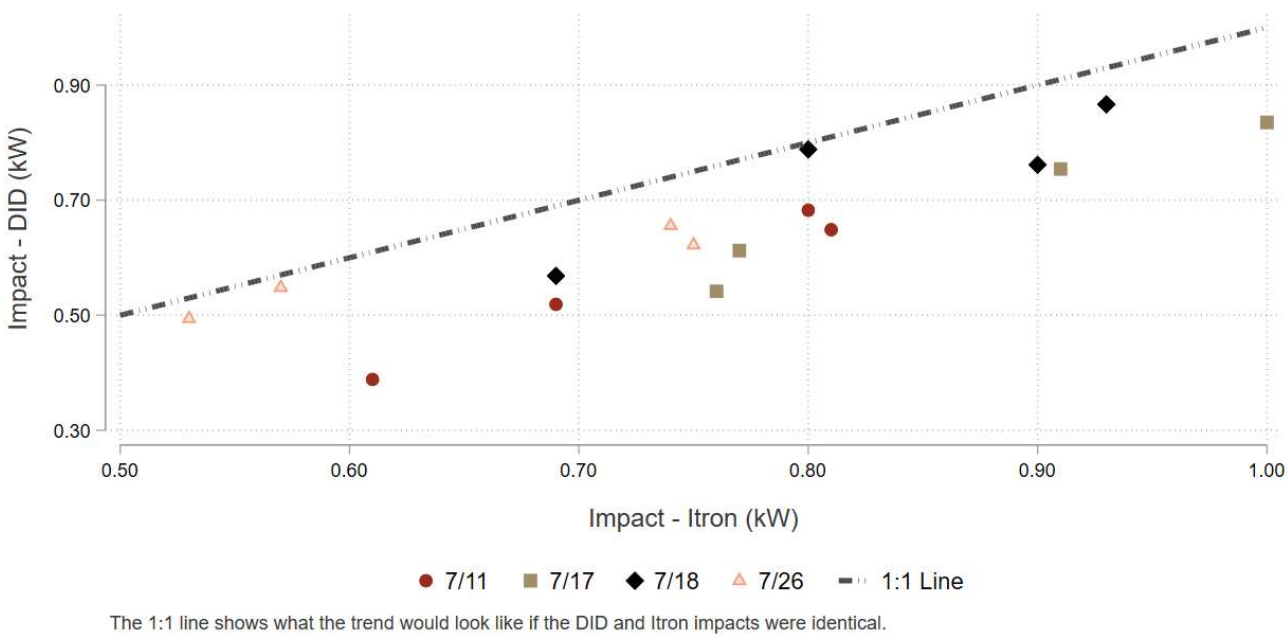


Figure 20: Comparison of EcoMetric Ex Post Impacts and Itron Impacts



6.1.1.8.1 Net Energy Savings

The EcoMetric team estimated net energy impacts for the Residential DCU program offering by summing ex post impacts from the onset of each event through the end of the event day. The calculation of impacts is exactly as described earlier in this section. Table 35 shows the energy savings estimates (per device) for each event day. On average, net daily energy savings were 1.53 kWh per device. Multiplying by the number of events (four) and the number of active devices (51,598) yields an aggregate savings estimate of 316.55 MWh for the Residential DCU segment. After applying the operability factor of 86%, the aggregate energy savings estimate is 272.23 MWh.

Table 35: Per Device Energy Savings by Event Day

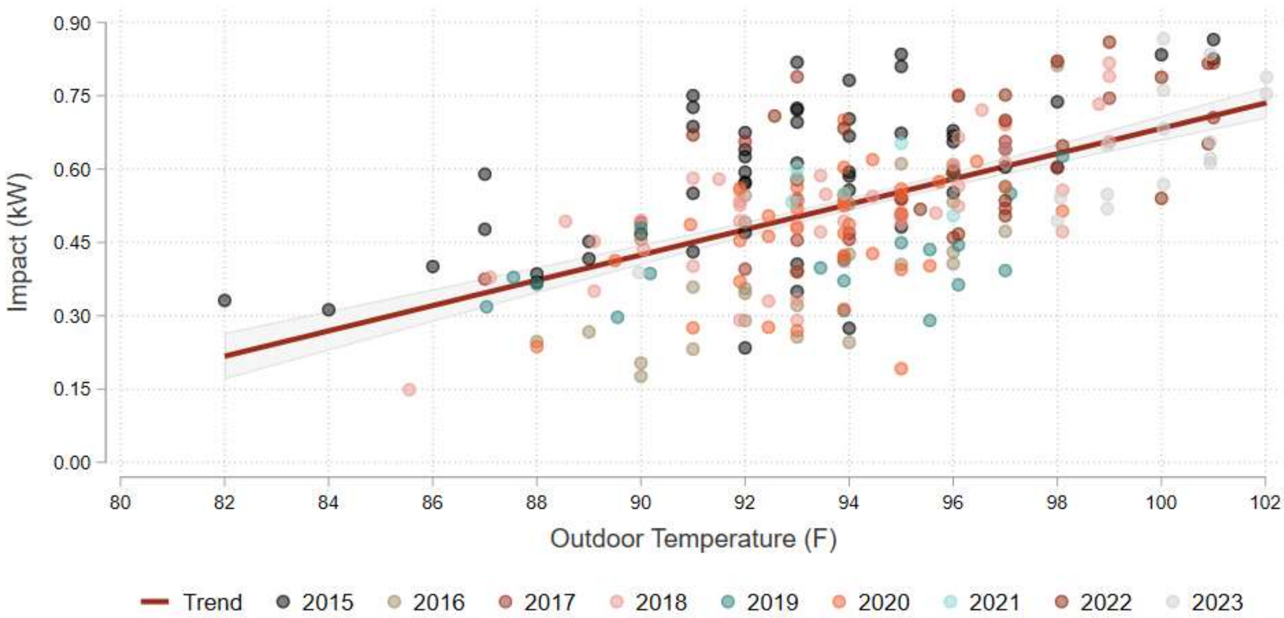
Date	Event Start (MDT)	Event Savings (kWh)	Snapback (kWh)	Net Savings (kWh)
7/11/2023	4:00 PM	2.24	-0.81	1.43
7/17/2023	2:00 PM	2.74	-1.03	1.71
7/18/2023	2:00 PM	2.98	-1.66	1.32
7/26/2023	4:00 PM	2.32	-0.65	1.67
Average		**2.57**	**-1.04**	**1.53**

6.1.1.9 Ex Ante Impacts

While ex post impact estimates serve to measure prior program performance, ex ante impact estimates are forward-looking. In other words, ex ante estimates represent expected demand reductions in future years at peaking conditions.

To develop an ex ante impact estimate for the Residential DCU component of Power Saver, the EcoMetric team leveraged linear regression to model historical ex post impacts as a function of temperature and time. The specification of the ex ante regression model was shown in Section 6.1.1.5. Figure 21 highlights the relationship between historical ex post impact estimates (2015-2023) and outdoor air temperature (in Albuquerque). There is a clear trend in the figure – the hotter it is outside, the greater the impacts tend to be.

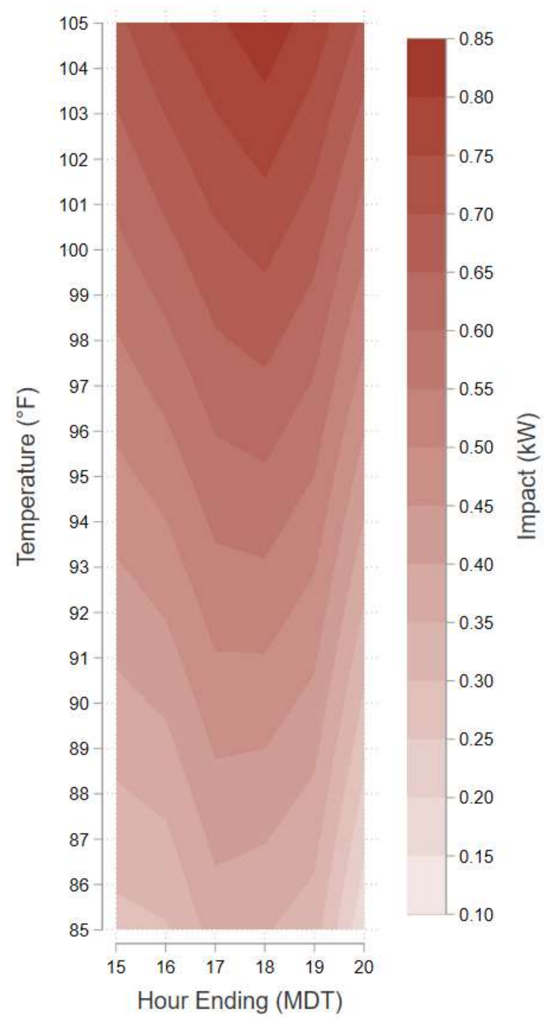
Figure 21: Hourly Impacts against Outdoor Temperature (F)



Using the regression coefficients from the ex ante model, the EcoMetric team created a time-temperature matrix (TTM) that shows expected load reductions (per device) for different outdoor temperatures and at different times of the day. The TTM is shown in Table 36. The EcoMetric team predicts that the impact of a Residential DCU DR event at peaking conditions (5:00 PM – 6:00 PM MDT when outdoor temperature is 100 degrees) is 0.71 kW per device.

Table 36: Residential DCU Time-Temperature Matrix

Temp	Hour Ending MDT					
	15	16	17	18	19	20
105	0.69	0.75	0.79	0.83	0.78	0.69
104	0.67	0.72	0.77	0.81	0.75	0.66
103	0.65	0.70	0.75	0.78	0.73	0.64
102	0.63	0.68	0.73	0.76	0.71	0.61
101	0.61	0.66	0.71	0.74	0.69	0.58
100	0.59	0.63	0.69	0.71	0.66	0.56
99	0.57	0.61	0.66	0.69	0.64	0.53
98	0.55	0.59	0.64	0.66	0.62	0.51
97	0.53	0.57	0.62	0.64	0.59	0.48
96	0.51	0.54	0.60	0.62	0.57	0.45
95	0.49	0.52	0.58	0.59	0.55	0.43
94	0.47	0.50	0.56	0.57	0.53	0.40
93	0.44	0.48	0.54	0.55	0.50	0.37
92	0.42	0.45	0.52	0.52	0.48	0.35
91	0.40	0.43	0.50	0.50	0.46	0.32
90	0.38	0.41	0.48	0.47	0.44	0.29
89	0.36	0.39	0.45	0.45	0.41	0.27
88	0.34	0.36	0.43	0.43	0.39	0.24
87	0.32	0.34	0.41	0.40	0.37	0.21
86	0.30	0.32	0.39	0.38	0.34	0.19
85	0.28	0.30	0.37	0.36	0.32	0.16



To estimate Residential DCU resource capability on aggregate, the number of active devices can be multiplied by the values shown in Table 36. As of the end of summer 2023, there were 51,598 active residential DCUs. Thus, the expected aggregate impact of an event hour ending at 6:00 PM (MDT) when the outdoor temperature is 100 degrees would be 36.74 MW. Residential DCU results are subject to an operability adjustment to better reflect the fact that not all devices in the population will be able to curtail load when called due to damage, wiring, or connection issues. The operability-adjusted aggregate impact is 86% of the unadjusted impact, or 31.60 MW.

RESIDENTIAL THERMOSTATS

The Power Saver program includes three residential smart thermostat components: Two-Way Smart Thermostats, BYOT Honeywell, and BYOT Nest. Each component has its own curtailment strategy. For the Two-Way group, an algorithm is used that bases the curtailment on runtime from the previous hour. For the BYOT Honeywell group, devices are curtailed using a 50% cycling strategy performed by the vendor. For the BYOT Nest group, thermostat setpoints are increased by three degrees. These three strategies produce different curtailment shapes. During the event, portfolio load is relatively stable under the Two-Way strategy and relatively choppy under the BYOT Honeywell strategy (see Figure 15). The BYOT Nest strategy produces large impacts at the beginning of the event, but these impacts taper off throughout the event. In the remainder of this report, we will refer to these three components as the Residential Thermostat component. We analyze them separately but report on them in aggregate where possible.

For the Residential Thermostat component, impacts are a function of usage during the curtailment event and usage on high load days preceding the event. Subsequent sections detail our validation of the impacts calculated by Itron, our independent impact analysis for the 2023 events, and our forward-looking ex ante impacts for various time/temperature scenarios.

6.1.1.10 Validation of Reported Ex Post Impacts

After receiving the participant load data from Itron, the EcoMetric team attempted to reproduce the impacts in Itron's Power Saver impact evaluation report. By date and time, Itron's impacts for each of the three thermostat segments are shown in Table 37. Note that an asterisk (*) denotes a qualifying event hour. For each segment, the maximum impact during qualifying event hours serves as Itron's settlement kW reduction/device for the 2023 season (before applying the online adjustment). With some very minor variations, we successfully replicated Itron's reported impacts following the methodology laid out in Itron's report.

Table 37: Residential Thermostat Impact Estimates (kW/device) by Component, Date, and Time

Component	Date	Hour Ending (MDT)			
		5:00 PM	6:00 PM	7:00 PM	8:00 PM
Two-Way	7/11/2023	1.70*	1.88*	1.90	1.78
	7/26/2023	1.80*	1.89*	1.89*	1.72
BYOT Honeywell	7/11/2023	1.77*	1.86*	1.73	1.50
	7/26/2023	1.87*	1.76*	1.58*	1.26
BYOT Nest	7/11/2023	1.79*	1.20*	0.83	0.71
	7/26/2023	1.74*	1.07*	0.85*	0.69

6.1.1.11 Verified Ex Post Impacts

As discussed in Section 6.1.1.4, the EcoMetric team thinks the method Itron uses to estimate impacts for the Residential Thermostat program offerings overstates the true average impact. Our method for estimating impacts differed from Itron's just slightly – in any place where Itron summarized with a maximum, we replaced it with an average. For each event hour during the 2023 DR season, Table 38 shows the impact estimates produced by the EcoMetric team.[15] Qualifying event hours are denoted with an asterisk (*).

Table 38: Residential Thermostat Impact Results

Segment	Date	# of Curtailed Devices	Hour Ending (MDT)	Temp. (F)	CBL kW	Observed kW	Impact (kW)
Two-Way	7/11/2023	497	16*	100	2.38	1.15	1.33
			17*	99	2.54	0.84	1.80
			18	90	2.59	0.87	1.82

15 Note that the Residential Thermostat devices include a 0.1 kW adjustment to the impact to account for the thermostat curtailment on the air handler fan for systems set to "auto".

Segment	Date	# of Curtailed Devices	Hour Ending (MDT)	Temp. (F)	CBL kW	Observed kW	Impact (kW)
			19	90	2.39	0.86	1.63
	7/26/2023	514	16*	101	2.44	1.16	1.37
			17*	99	2.54	0.87	1.77
			18*	98	2.57	0.89	1.78
			19	94	2.36	0.90	1.56
BYOT Honeywell	7/11/2023	277	16*	100	1.80	1.01	0.90
			17*	99	1.94	1.10	0.93
			18	90	1.89	1.16	0.83
			19	90	1.78	1.19	0.69
	7/26/2023	277	16*	101	1.84	1.02	0.92
			17*	99	1.87	1.14	0.83
			18*	98	1.74	1.17	0.67
			19	94	1.54	1.16	0.48
BYOT Nest	7/11/2023	1,906	16*	100	2.42	0.93	1.60
			17*	99	2.60	1.67	1.03
			18	90	2.62	1.93	0.78
			19	90	2.48	1.89	0.68
	7/26/2023	1,919	16*	101	2.39	1.01	1.49
			17*	99	2.55	1.67	0.97
			18*	98	2.54	1.85	0.80
			19	94	2.34	1.83	0.61

The device-weighted average impact during qualifying event hours was 1.23 kW (1.61 for Two-Way, 0.85 for BYOT Honeywell, and 1.18 for BYOT Nest). As of the end of summer 2023, there were 3,366 active Residential Thermostat devices (760 for Two-Way, 434 for BYOT Honeywell, and 2,172 for BYOT Nest). Thus, the average qualifying event hour aggregate impact was 4.15 MW. After applying online adjustment factors (78% for Two-Way, 74% for BYOT Honeywell, and 93% for BYOT Nest), the average aggregate impact was 3.60 MW.

Figure 22, Figure 23, and Figure 24 show event-day loads and baselines for each of the three thermostat components.

Figure 22: Two-Way Smart Thermostat DR Impacts by Date

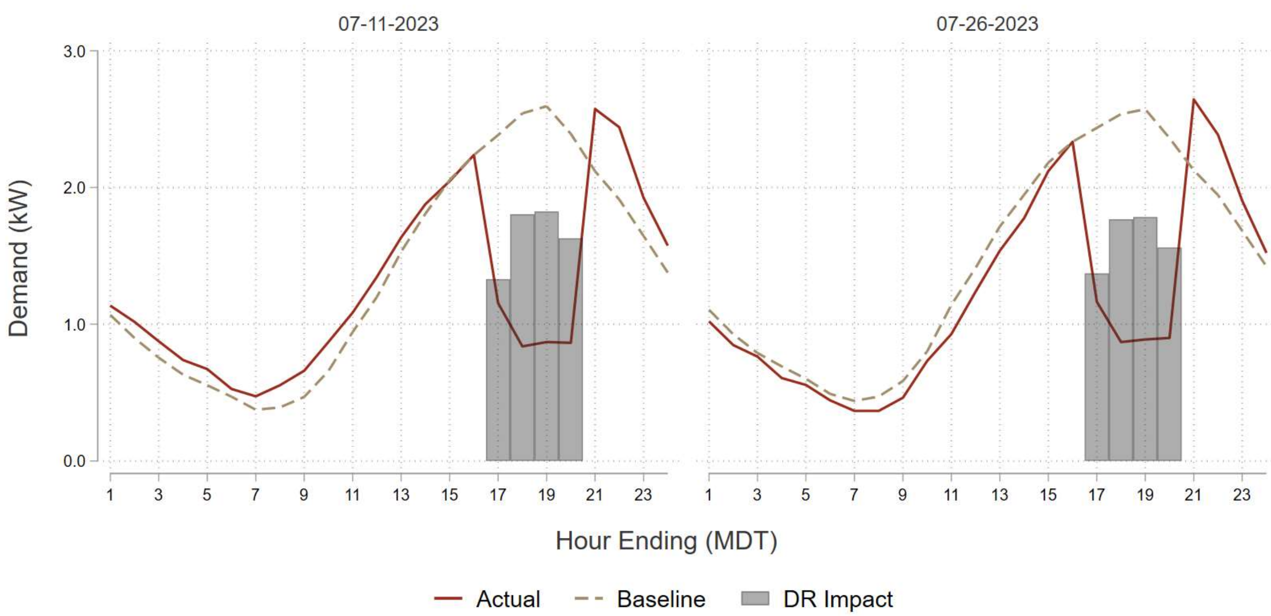


Figure 23: BYOT Honeywell DR Impacts by Date

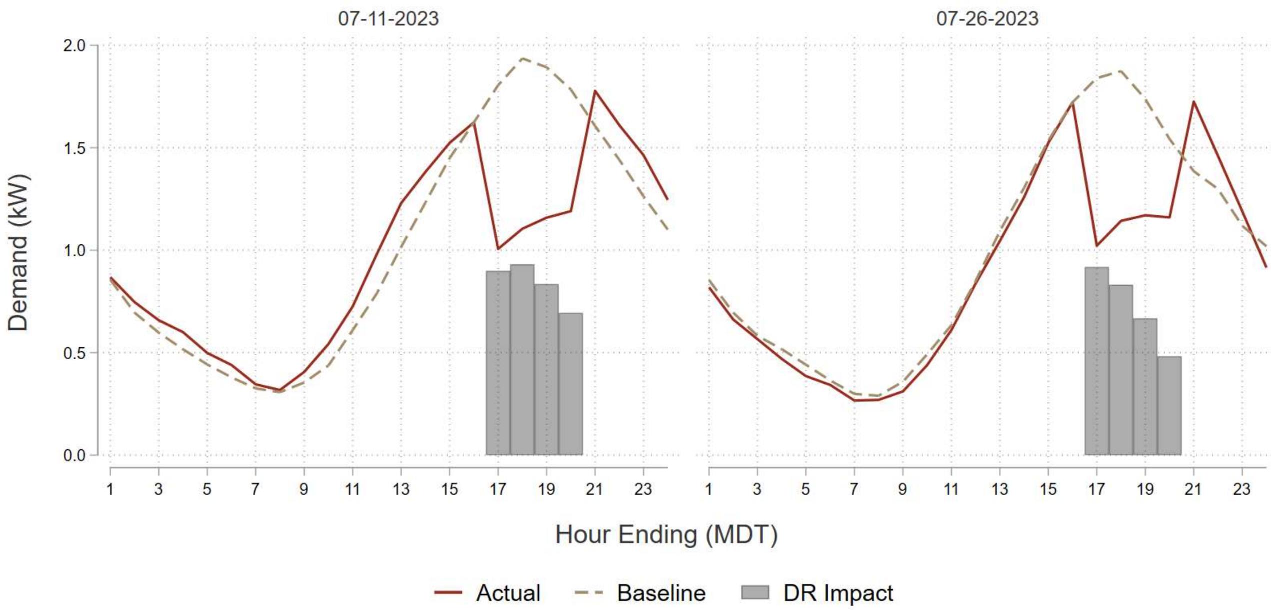
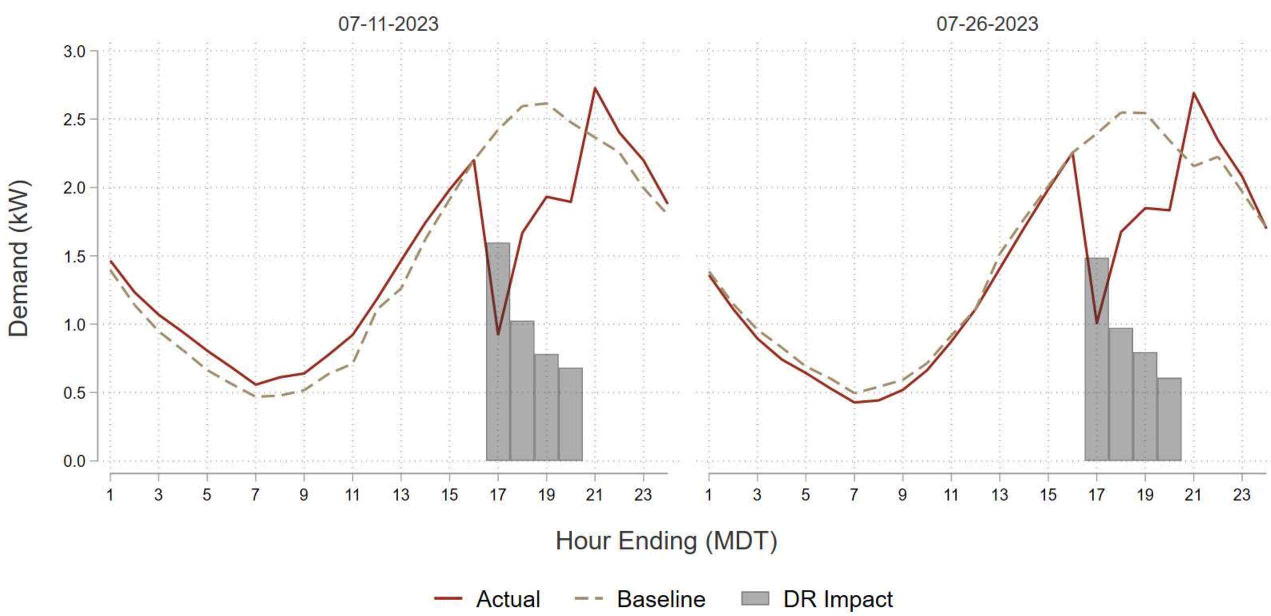


Figure 24: BYOT Nest DR Impacts by Date



6.1.1.11.1 Net Energy Savings

The EcoMetric team estimated net energy impacts for the Residential Thermostat component by summing ex post impacts from the onset of each event through the end of the event day. The calculation of impacts is exactly as described earlier in this section. Table 39 shows the energy savings estimates for each event day. On average, net daily energy savings were 5.57 kWh per Two-Way device, 2.85 kWh per BYOT Honeywell device, and 3.60 kWh per BYOT Nest device. Multiplying these estimates by the number of event days (two) and the number of active devices (760 for Two-Way, 434 for BYOT Honeywell, and 2,172 for BYOT Nest) yields an aggregate savings estimate of 26.59 MWh for the Residential Thermostat component. After applying the relevant online factors (0.78 for Two-Way, 0.74 for BYOT Honeywell, and 0.93 for BYOT Nest), the aggregate energy savings estimate is 22.99 MWh.

Table 39: Per Device Energy Savings by Event Day

Segment	Date	Event Start (MDT)	Event Savings (kWh)	Snapback (kWh)	Net Savings (kWh)
Two-Way	7/11/2023	4:00 PM	6.59	-1.06	5.53
	7/26/2023	4:00 PM	6.48	-0.88	5.61
	Average		**6.53**	**-0.97**	**5.57**
BYOT Honeywell	7/11/2023	4:00 PM	3.36	-0.29	3.07
	7/26/2023	4:00 PM	2.90	-0.27	2.63
	Average		**3.13**	**-0.28**	**2.85**
BYOT Nest	7/11/2023	4:00 PM	4.09	-0.39	3.70
	7/26/2023	4:00 PM	3.87	-0.36	3.51
	Average		**3.98**	**-0.37**	**3.60**

6.1.1.12 Ex Ante Impacts

While ex post impact estimates serve to measure prior program performance, ex ante impact estimates are forward-looking. In other words, ex ante estimates represent expected demand reductions in future years at peaking conditions.

To develop an ex ante impact estimate for the Residential Thermostat components of Power Saver, the EcoMetric team leveraged linear regression to model historical ex post impacts as a function of temperature and time. The specification of the ex ante regression model was shown in Section 6.1.1.5. Each of the three thermostat components was analyzed separately. Figure 25 and Figure 26 highlight the relationship between historical ex post impact estimates and outdoor air temperature (in Albuquerque) for the Two-Way and BYOT Honeywell. The trends vary by component, but impacts tend to be larger when it is hotter outside. For the BYOT Nest component, we did not have sufficient data to build an ex ante model and simply took the average of the hourly impacts from 2023.

Figure 25: Hourly Impacts against Outdoor Temperature (F), Two-Way

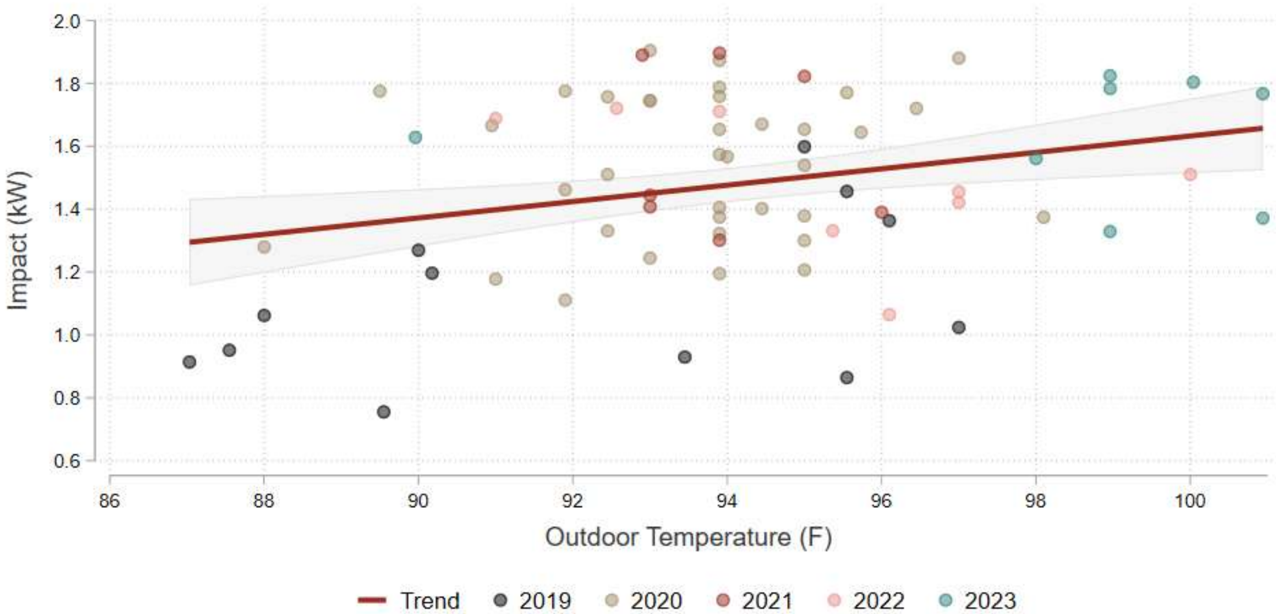
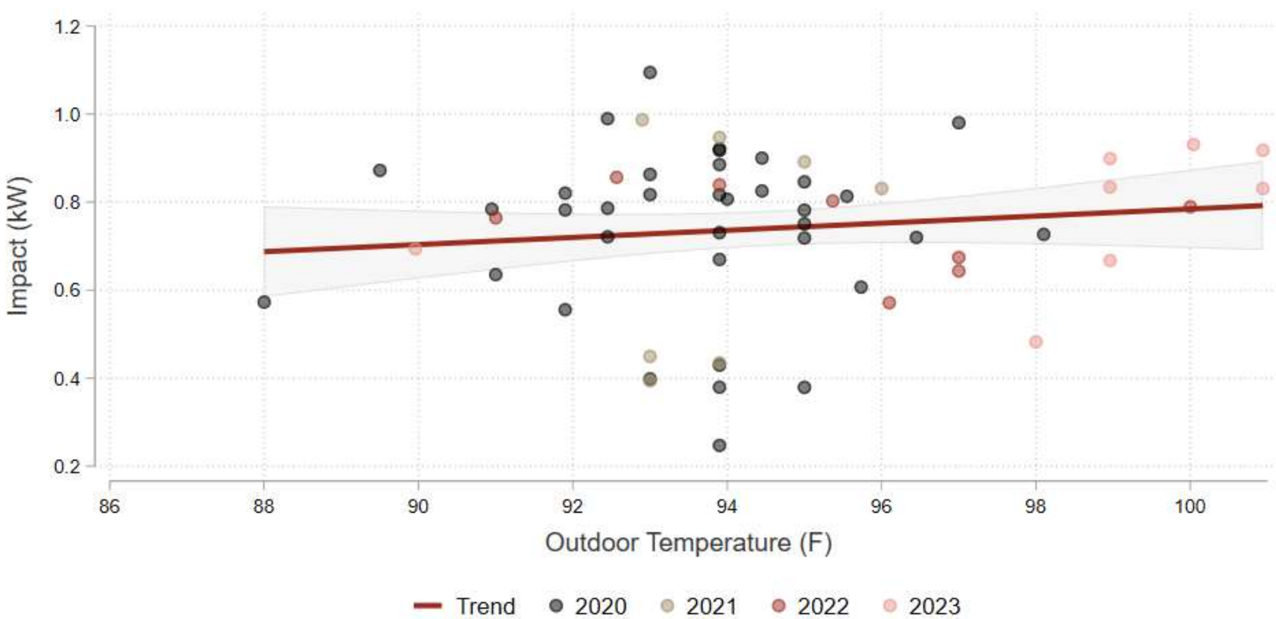


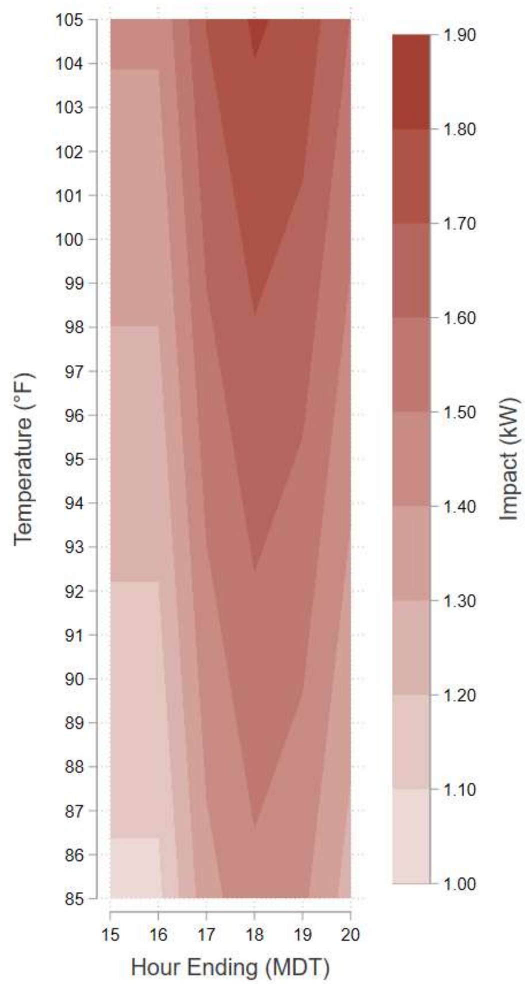
Figure 26: Hourly Impacts against Outdoor Temperature (F), BYOT Honeywell



Using the regression coefficients from the ex ante models, the EcoMetric team created TTMs that show expected load reductions (per device) for different outdoor temperatures and at different times of the day. The TTMs for the Two-Way and BYOT Honeywell components are shown in Table 40 and Table 41. As noted, we did not build an ex ante model for BYOT Nest due to insufficient data. The EcoMetric team predicts that the impact of a Residential Two-Way Smart Thermostat DR event at peaking conditions (5:00 PM – 6:00 PM MDT when outdoor temperature is 100 degrees) is 1.73 kW per device. For BYOT Honeywell and BYOT Nest, our estimates are 0.82 per device and 1.00 per device respectively.

Table 40: Two-Way Smart Thermostat Time-Temperature Matrix

Temp	Hour Ending MDT				
	16	17	18	19	20
105	1.42	1.70	1.82	1.76	1.60
104	1.40	1.69	1.80	1.75	1.58
103	1.39	1.67	1.78	1.73	1.56
102	1.37	1.65	1.76	1.71	1.55
101	1.35	1.64	1.75	1.69	1.53
100	1.33	1.62	1.73	1.68	1.51
99	1.32	1.60	1.71	1.66	1.49
98	1.30	1.58	1.70	1.64	1.48
97	1.28	1.57	1.68	1.63	1.46
96	1.27	1.55	1.66	1.61	1.44
95	1.25	1.53	1.64	1.59	1.43
94	1.23	1.52	1.63	1.57	1.41
93	1.21	1.50	1.61	1.56	1.39
92	1.20	1.48	1.59	1.54	1.37
91	1.18	1.46	1.58	1.52	1.36
90	1.16	1.45	1.56	1.51	1.34
89	1.15	1.43	1.54	1.49	1.32
88	1.13	1.41	1.52	1.47	1.31
87	1.11	1.40	1.51	1.45	1.29
86	1.09	1.38	1.49	1.44	1.27
85	1.08	1.36	1.47	1.42	1.25

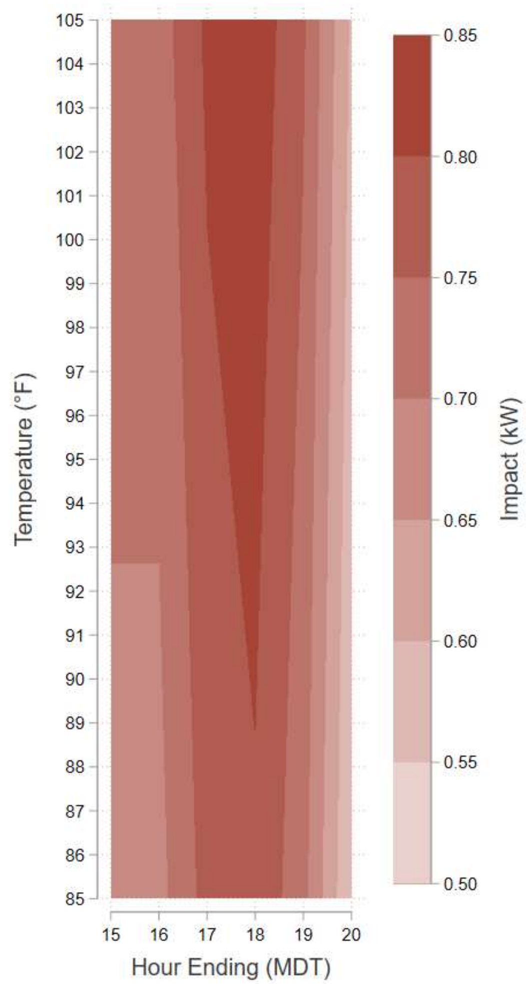


To estimate Two-Way Smart Thermostat resource capability on aggregate, the number of active facilities can be multiplied by the values shown in Table 40. As of the end of summer 2023, there were 760 active Two-Way Smart Thermostat devices. Thus, the expected aggregate impact of an event hour ending at 6:00 PM (MDT) when the outdoor temperature is 100 degrees would be 1.31

MW. Two-Way Smart Thermostat results are subject to an offline adjustment to reflect the fact that not all thermostats in the population will be able to curtail load when called due to being offline. The offline-adjusted aggregate impact is 78% of the unadjusted impact, or 1.03 MW.

Table 41: BYOT Honeywell Time-Temperature Matrix

Temp	Hour Ending MDT				
	16	17	18	19	20
105	0.73	0.81	0.83	0.76	0.59
104	0.72	0.81	0.83	0.76	0.59
103	0.72	0.81	0.83	0.75	0.59
102	0.72	0.80	0.83	0.75	0.59
101	0.72	0.80	0.83	0.75	0.58
100	0.72	0.80	0.82	0.75	0.58
99	0.71	0.80	0.82	0.74	0.58
98	0.71	0.80	0.82	0.74	0.58
97	0.71	0.79	0.82	0.74	0.58
96	0.71	0.79	0.82	0.74	0.57
95	0.70	0.79	0.81	0.74	0.57
94	0.70	0.79	0.81	0.73	0.57
93	0.70	0.79	0.81	0.73	0.57
92	0.70	0.78	0.81	0.73	0.57
91	0.70	0.78	0.80	0.73	0.56
90	0.69	0.78	0.80	0.73	0.56
89	0.69	0.78	0.80	0.72	0.56
88	0.69	0.77	0.80	0.72	0.56
87	0.69	0.77	0.80	0.72	0.55
86	0.69	0.77	0.79	0.72	0.55
85	0.68	0.77	0.79	0.72	0.55



As of the end of summer 2023, there were 434 active BYOT Honeywell devices and 2,172 active BYOT Nest devices. Thus, the expected aggregate impact of an event hour ending at 6:00 PM (MDT) when the outdoor temperature is 100 degrees would be 0.36 MW for BYOT Honeywell and 2.17 MW for BYOT Nest. Both segments are subject to an offline adjustment to reflect the fact that not all thermostats in the population will be able to curtail load when called due to being offline. The offline-adjusted aggregate impact for BYOT Honeywell is 74% of the unadjusted impact, or 0.26 MW. The offline-adjusted aggregate impact for BYOT Nest is 93% of the unadjusted impact, or 2.02 MW.

In aggregate, the offline-adjusted impact for the Residential Thermostat components during peaking conditions is 3.31 MW.

SMALL COMMERCIAL RESULTS

For the Small Commercial program component, usage during the curtailment event is compared to usage on high load days preceding the event. This section reviews the Small Commercial impacts calculated by Itron and validated by the EcoMetric team. Additionally, we provide feedback on the evaluation approach used by Itron and provide an alternative impact analysis for summer 2023 events. Finally, multiple years of event history are combined to develop ex ante impacts for various temperature scenarios.

6.1.1.13 Validation of Reported Ex Post Impacts

After receiving the participant load data from Itron, the EcoMetric team attempted to reproduce the impacts in Itron’s Power Saver impact evaluation report. Figure 27 compares the impacts as calculated by Itron and by EcoMetric at the 5-minute level for each event day. There is nearly perfect alignment. The average difference between Itron’s impacts and EcoMetric’s validated impacts is 0.0001 kW (with EcoMetric’s validated impacts being slightly smaller, on average). For reference, Itron’s Small Commercial DCU impact estimates are shown in Table 42. Note that an asterisk (*) denotes a qualifying event hour. The maximum impact during qualifying event hours was 1.29 kW per device for the Small Commercial DCU class without any adjustment for operability.

Figure 27: Small Commercial Impact Verification

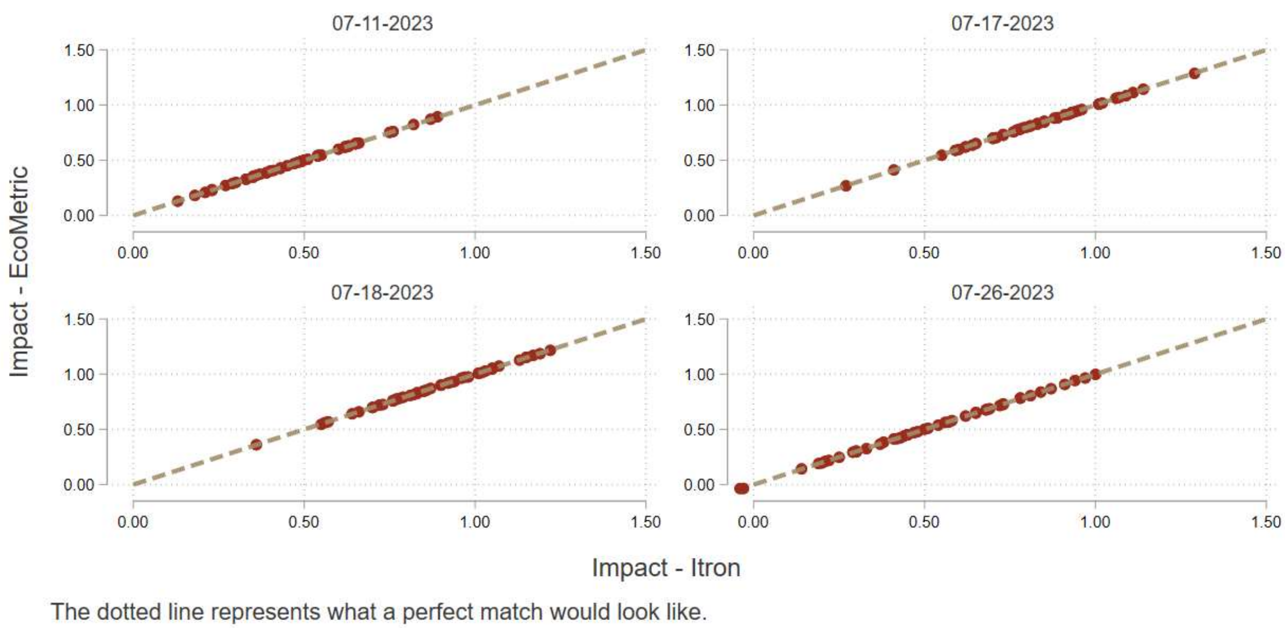


Table 42: Small Commercial DCU Impact Estimates (kW/device) by Date and Time[16]

Date	Hour Ending (MDT)					
	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
7/11/2023			0.89*	0.75*	0.62	0.50
7/17/2023	1.29*	0.96*	1.06*	0.93*		
7/18/2023	1.22*	1.15*	1.19*	1.02*		
7/26/2023			1.00*	0.94*	0.78*	0.45

6.1.1.14 Verified Ex Post Impacts

As discussed in Section 6.1.1.4, the EcoMetric team thinks the method used to estimate impacts for the Small Commercial program offering overstates the true average impact. For each event hour

16 Source: Itron's 2023 PNM Power Saver Program Report. Table 38.

during the 2023 DR season, Table 43 shows the impact estimates produced by the EcoMetric team. Qualifying event hours are denoted with an asterisk (*). Our methods differed from Itron's in that any calculation based on a maximum was replaced with a calculation based on an average.

Table 43: Impact Calculations for the Small Commercial Segment

Date	Number of Curtailed Devices in Sample	Hour Ending (MDT)	Temp. (F)	CBL kW	Observed kW	Impact (kW)
7/11/2023	36	17*	100	1.82	1.19	0.63
		18*	99	1.73	1.19	0.54
		19	90	1.43	0.99	0.45
		20	90	1.12	0.79	0.32
7/17/2023	36	15*	101	2.28	1.39	0.90
		16*	102	2.12	1.31	0.81
		17*	101	2.11	1.24	0.87
		18*	102	2.03	1.29	0.74
7/18/2023	36	15*	100	2.40	1.51	0.89
		16*	102	2.23	1.33	0.90
		17*	100	2.22	1.33	0.89
		18*	97	2.13	1.32	0.81
7/26/2023	37	17*	101	1.82	1.18	0.65
		18*	99	1.63	0.98	0.64
		19*	98	1.27	0.73	0.54
		20	94	0.91	0.68	0.23

The average impact during qualifying event hours was 0.75 kW. As of the end of summer 2023, there were 6,042 active small commercial DCUs. Thus, the average qualifying event hour aggregate impact was 4.56 MW. Adjusted for 86% operability, the aggregate impact was 3.92 MW.

Figure 28 visualizes the impact estimates and Figure 29 compares EcoMetric's ex post hourly impacts with the impacts calculated by Itron. The EcoMetric impact is lower in all cases, by about 0.25 kW on average.

Figure 28: Small Commercial DCU DR Impacts by Date

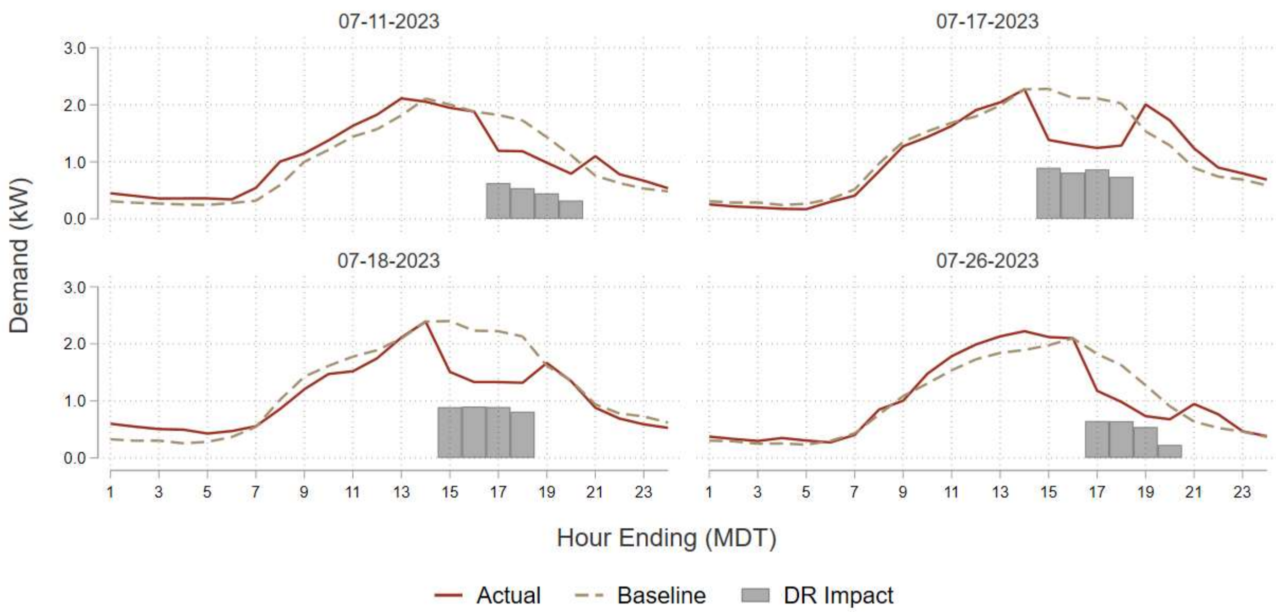
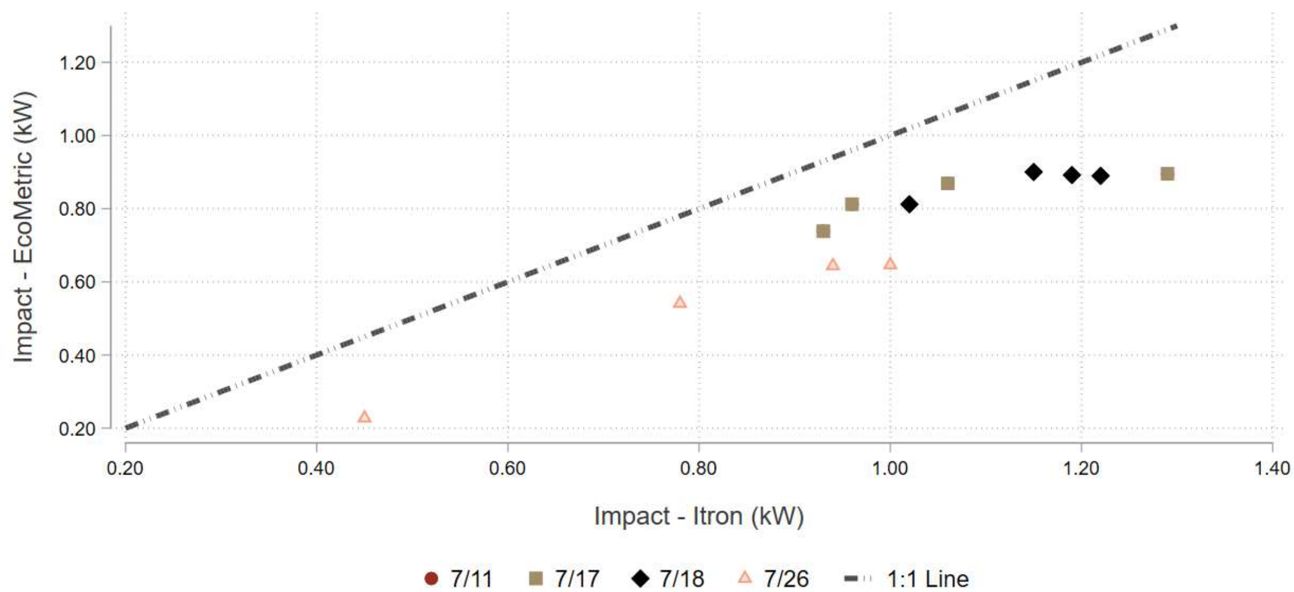


Figure 29: Comparison of EcoMetric Ex Post Impacts and Itron Impacts



The 1:1 line shows what the trend would look like if the EcoMetric and Itron impacts were identical.

6.1.1.14.1 Net Energy Savings

The EcoMetric team estimated net energy impacts for the Small Commercial program offering by summing ex post impacts from the onset of each event through the end of the event day. The calculation of impacts is exactly as described earlier in this section. Table 44 shows the energy savings estimates (per device) for each event day. On average, net daily energy savings were 2.07 kWh per device. Multiplying by the number of events (four) and the number of active devices (6,042) yields an aggregate savings estimate of 49.94 MWh for the Small Commercial DCU segment. After applying the operability factor of 86%, the aggregate energy savings estimate is 42.95 MWh.

Table 44: Per Device Energy Savings by Event Day

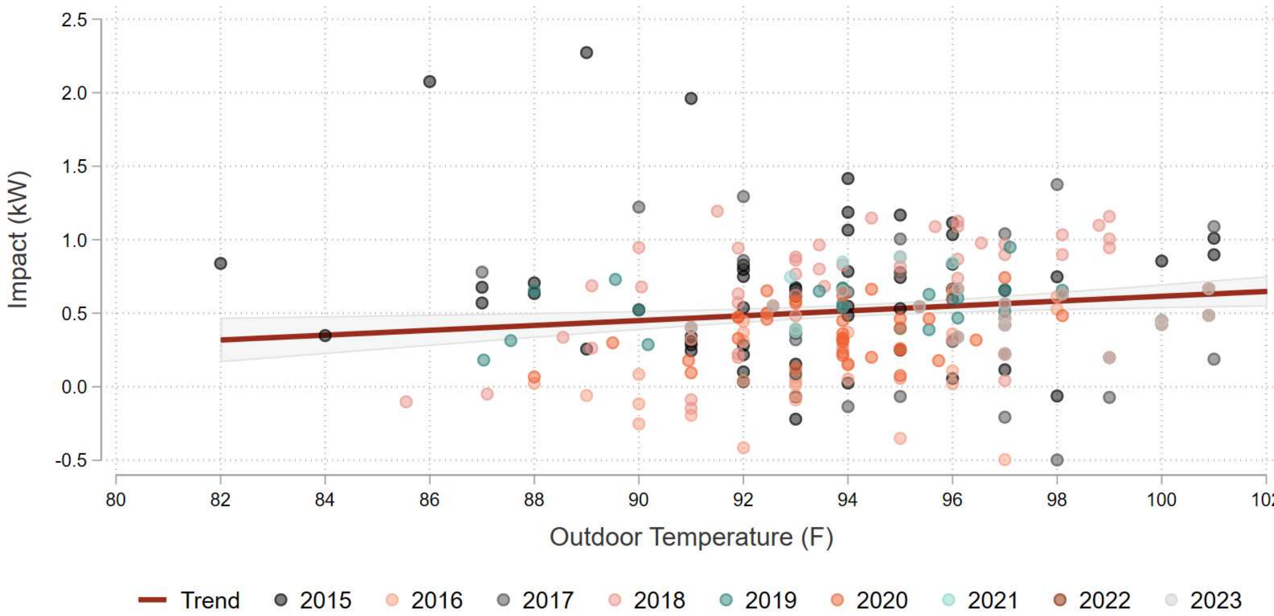
Date	Event Start (MDT)	Event Savings (kWh)	Snapback (kWh)	Net Savings (kWh)
7/11/2023	4:00 PM	1.94	-0.69	1.25
7/17/2023	2:00 PM	3.32	-1.62	1.69
7/18/2023	2:00 PM	3.49	0.34	3.83
7/26/2023	4:00 PM	2.06	-0.57	1.49
Average		**2.70**	**-0.64**	**2.07**

6.1.1.15 Ex Ante Impacts

While ex post impact estimates serve to measure prior program performance, ex ante impact estimates are forward-looking. In other words, ex ante estimates represent expected demand reductions in future years at peaking conditions.

To develop an ex ante impact estimate for the Small Commercial DCU component of Power Saver, the EcoMetric team leveraged linear regression to model historical ex post impacts as a function of temperature and time. The specification of the ex ante regression model was shown in Section 6.1.1.5. Figure 30 highlights the relationship between historical ex post impact estimates (2015-2023) and outdoor air temperature (in Albuquerque). The trend in temperature is quite subtle; there are only slight increases in impact magnitude as temperature increases.

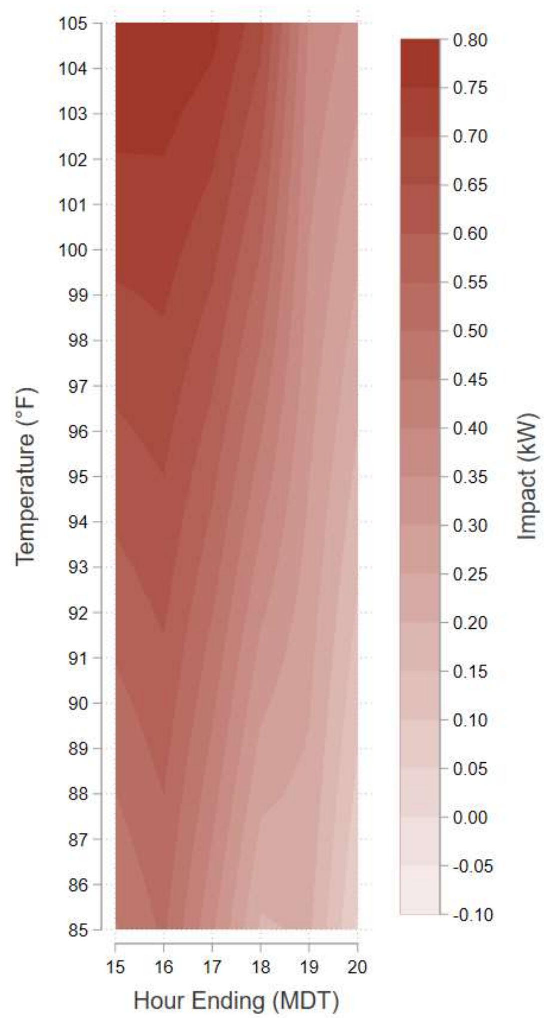
Figure 30: Hourly Impacts against Outdoor Temperature (F)



Using the regression coefficients from the ex ante model, the EcoMetric team created a TTM that shows expected load reductions (per device) for different outdoor temperatures and at different times of the day. The TTM is shown in Table 45. The EcoMetric team predicts that the impact of a Small Commercial DCU DR event at peaking conditions (5:00 PM – 6:00 PM MDT when outdoor temperature is 100 degrees) is 0.55 kW per device. The expected load impact is lower for the 5-6 PM interval relative to earlier in the day because of the small commercial load profile – there is less load available for curtailment in the evening (see Figure 28).

Table 45: Small Commercial Time-Temperature Matrix

Temp	Hour Ending MDT					
	15	16	17	18	19	20
105	0.80	0.79	0.77	0.67	0.39	0.33
104	0.78	0.78	0.75	0.65	0.39	0.32
103	0.76	0.76	0.73	0.62	0.38	0.30
102	0.75	0.75	0.71	0.60	0.37	0.29
101	0.73	0.73	0.69	0.57	0.36	0.27
100	0.71	0.72	0.67	0.55	0.35	0.26
99	0.69	0.71	0.64	0.53	0.34	0.24
98	0.68	0.69	0.62	0.50	0.33	0.23
97	0.66	0.68	0.60	0.48	0.32	0.22
96	0.64	0.66	0.58	0.45	0.31	0.20
95	0.62	0.65	0.56	0.43	0.30	0.19
94	0.61	0.64	0.54	0.41	0.29	0.17
93	0.59	0.62	0.52	0.38	0.28	0.16
92	0.57	0.61	0.50	0.36	0.27	0.14
91	0.55	0.59	0.48	0.33	0.26	0.13
90	0.53	0.58	0.46	0.31	0.26	0.12
89	0.52	0.56	0.44	0.29	0.25	0.10
88	0.50	0.55	0.42	0.26	0.24	0.09
87	0.48	0.54	0.40	0.24	0.23	0.07
86	0.46	0.52	0.38	0.22	0.22	0.06
85	0.45	0.51	0.36	0.19	0.21	0.04



To estimate Small Commercial DCU resource capability on aggregate, the number of active devices can be multiplied by the values shown in Table 45. As of the end of summer 2023, there were 6,042 active small commercial devices. Thus, the expected aggregate impact of an event hour ending at 6:00 PM (MDT) when the outdoor temperature is 100 degrees would be 3.33 MW. Small Commercial

DCU results are subject to an operability adjustment to better reflect the fact that not all devices in the population will be able to curtail load when called due to damage, wiring, or connection issues. The operability-adjusted aggregate impact is 86% of the unadjusted impact, or 2.86 MW.

MEDIUM COMMERCIAL

For the Medium Commercial program component, usage during the curtailment event is compared to usage on high load days preceding the event. This section reviews the Medium Commercial impacts calculated by Itron and validated by the EcoMetric team. Additionally, we provide feedback on the evaluation approach used by Itron and provide an alternative impact analysis for summer 2023 events. Finally, multiple years of event history are combined to develop ex ante impacts for various temperature scenarios.

6.1.1.16 Validation of Reported Ex Post Impacts

After receiving the participant load data from Itron, the EcoMetric team attempted to reproduce the impacts in Itron's Power Saver impact evaluation report. Figure 31 compares the impacts as calculated by Itron and by EcoMetric at the 5-minute level for each event day. There is nearly perfect alignment. The average difference between Itron's impacts and EcoMetric's validated impacts is less than 0.03 kW (with EcoMetric's validated impacts being slightly smaller, on average). For reference, Itron's Medium Commercial DCU impact estimates are shown in Table 46. Note that an asterisk (*) denotes a qualifying event hour. The maximum impact during qualifying event hours was 12.11 kW per facility for the Medium Commercial DCU class without any adjustment for operability.

Figure 31: Medium Commercial Impact Verification

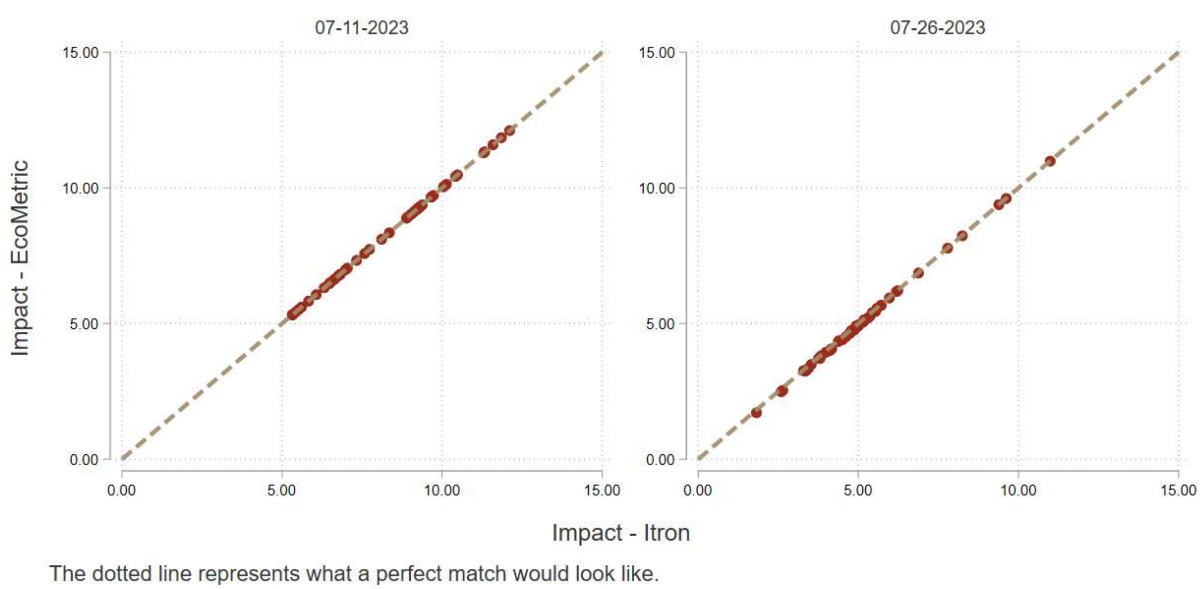


Table 46: Medium Commercial DCU Impact Estimates (kW/facility) by Date and Time[17]

Date	Hour Ending (MDT)			
	5:00 PM	6:00 PM	7:00 PM	8:00 PM
7/11/2023	12.11*	7.33*	9.29	10.42
7/26/2023	10.99*	5.97*	5.54*	4.87

6.1.1.17 Verified Ex Post Impacts

As discussed in Section 6.1.1.4, the EcoMetric team believes that the method used to estimate impacts for the Medium Commercial program offering overstates the true average impact. For each event hour during the 2023 DR season, Table 47 shows the impact estimates produced by the EcoMetric team. Qualifying event hours are denoted with an asterisk (*). Our methods differed from Itron's in that any calculation based on a maximum was replaced with a calculation based on an average.

17 Source: Itron's 2023 PNM Power Saver Program Report. Table 39.

Table 47: Medium Commercial Impact per Facility Results

Date	Number of Facilities in Sample	Hour Ending (MDT)	Temp. (F)	CBL kW	Observed kW	Impact (kW)
7/11/2023	55	17*	100	77.10	66.92	10.18
		18*	99	70.52	64.09	6.43
		19	90	66.60	59.61	6.98
		20	90	62.64	53.16	9.48
7/26/2023	55	17*	101	79.64	72.65	6.99
		18*	99	73.95	69.23	4.73
		19*	98	67.93	63.13	4.80
		20	94	59.68	56.06	3.62

The average impact during qualifying event hours was 6.63 kW per facility. As of the end of summer 2023, there were 3,247 active medium commercial DCUs across 426 facilities, indicating there were approximately 7.62 devices per facility. Thus, EcoMetric's per-device estimate during qualifying hours is 0.87 kW and the average qualifying event hour aggregate impact was 2.82 MW. Adjusted for 86% operability, the aggregate impact was 2.43 MW.

Figure 32 visualizes the impact estimates (per facility) and Figure 33 compares EcoMetric's ex post hourly impacts with the impacts calculated by Itron. The EcoMetric impact is lower in all cases, by about 1.66 kW on average.

Figure 32: Medium Commercial DCU DR Impacts by Date

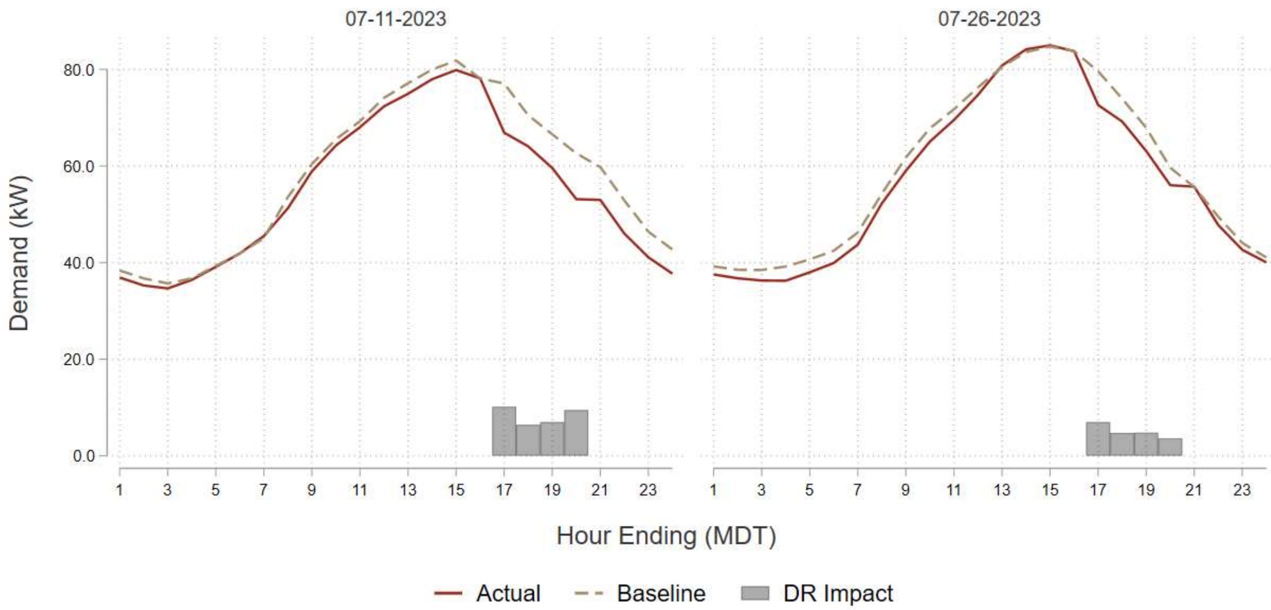
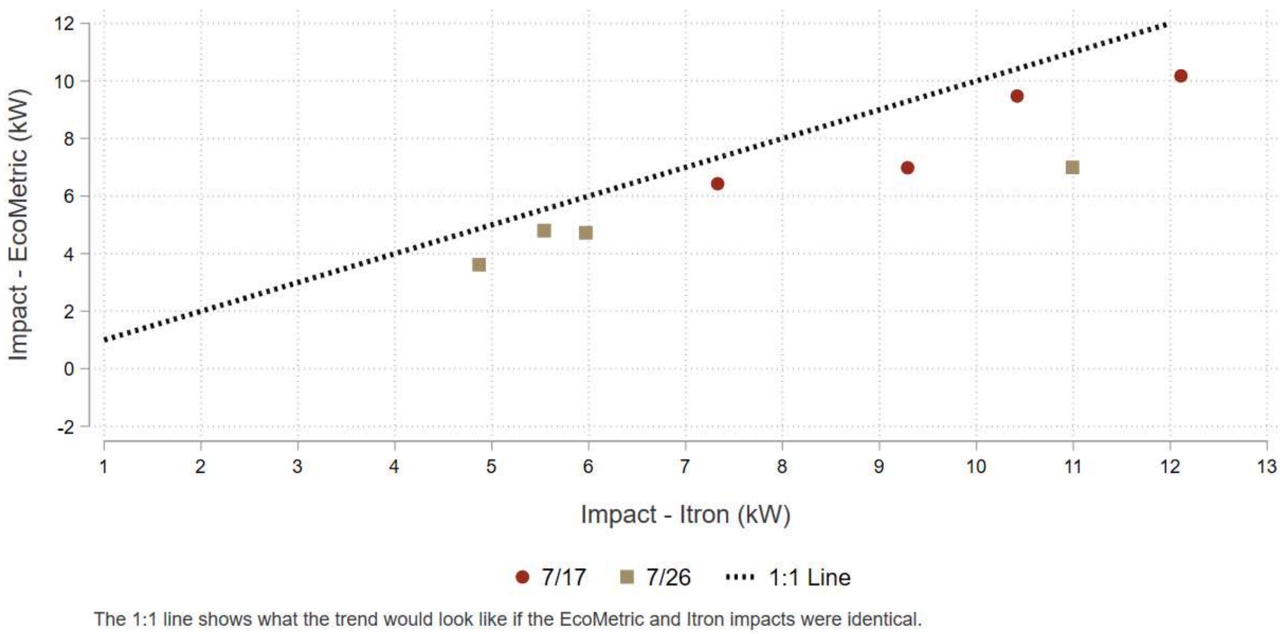


Figure 33: Comparison of EcoMetric Ex Post Impacts and Itron Impacts



6.1.1.17.1 Net Energy Savings

The EcoMetric team estimated net energy impacts for the Medium Commercial program offering by summing ex post impacts from the onset of each event through the end of the event day. The calculation of impacts is exactly as described earlier in this section. Table 48 shows the energy savings estimates (per facility) for each event day. On average, net daily energy savings were 40.60 kWh per facility. Multiplying this estimate by the number of events (two) and by the number of active facilities (426) yields an aggregate savings estimate of 34.59 MWh for the Medium Commercial program offering. After applying the 86% operability factor, the aggregate energy savings estimate is 29.75 MWh.

Table 48: Energy Savings per Facility by Event Day

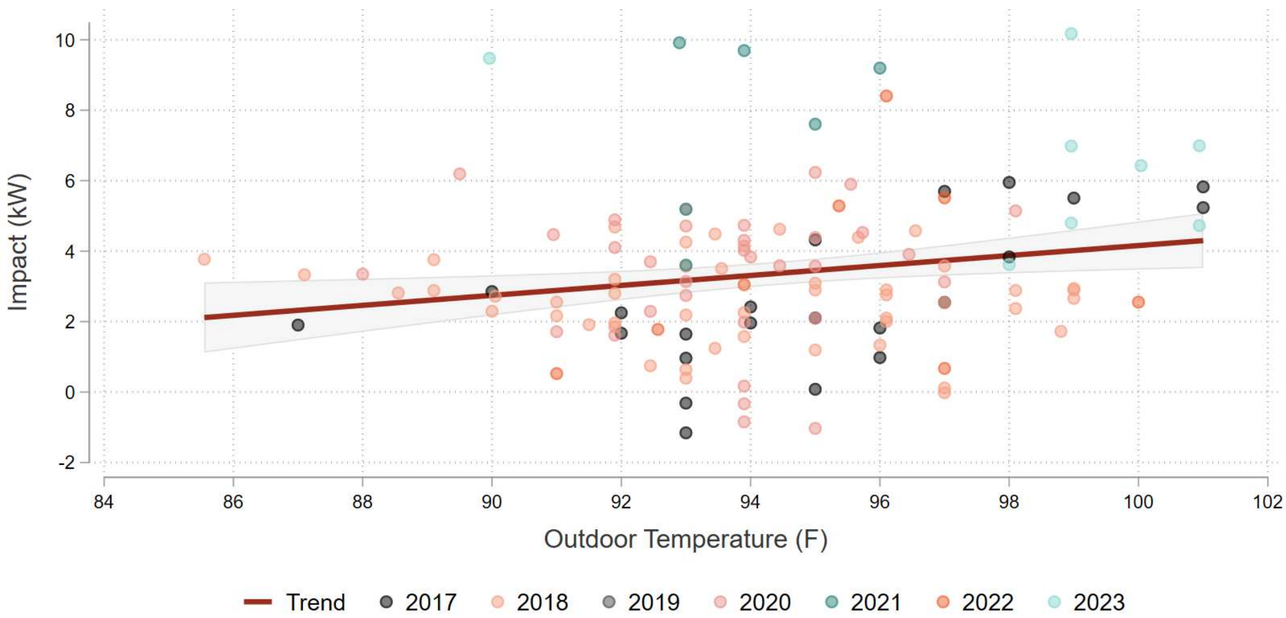
Date	Event Start (MDT)	Event Savings (kWh)	Snapback (kWh)	Net Savings (kWh)
6/10/2022	3:00 PM	33.06	23.95	57.01
7/19/2022	3:00 PM	20.14	4.05	24.19
Average		**26.60**	**14.00**	**40.60**

6.1.1.18 Ex Ante Impacts

While ex post impact estimates serve to measure prior program performance, ex ante impact estimates are forward-looking. In other words, ex ante estimates represent expected demand reductions in future years at peaking conditions.

To develop an ex ante impact estimate for the Medium Commercial DCU component of Power Saver, the EcoMetric team leveraged linear regression to model historical ex post impacts as a function of temperature and time. The specification of the ex ante regression model was shown in Section 6.1.1.5. Figure 34 highlights the relationship between historical ex post impact estimates (2017-2023) and outdoor air temperature (in Albuquerque). The trend in temperature is quite subtle; there are only slight increases in impact magnitude as temperature increases. With a small sample and large, variable customer loads, any change in sample composition can dramatically affect the overall result, meaning that any trends should be observed with caution.

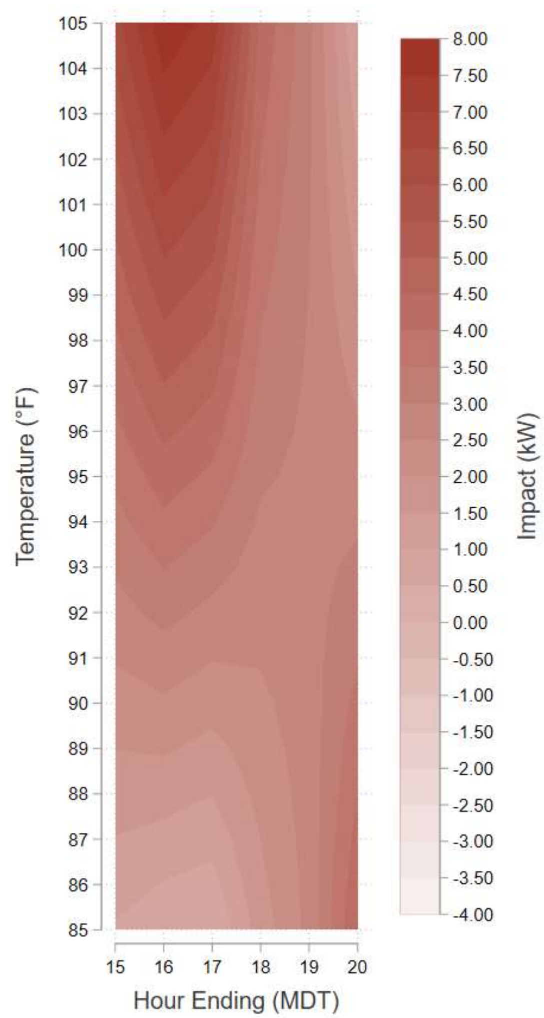
Figure 34: Hourly Impacts against Outdoor Temperature (F)



Using the regression coefficients from the ex ante model, the EcoMetric team created a TTM that shows expected load reductions (per facility) for different outdoor temperatures and at different times of the day. The TTM is shown in Table 49. Using the model, the EcoMetric team predicts that the impact of a Medium Commercial DR event at peaking conditions (5:00 PM – 6:00 PM MDT when outdoor temperature is 100 degrees) is 3.72 kW per facility, or 0.49 kW per device.

Table 49: Medium Commercial Time-Temperature Matrix

Temp	Hour Ending MDT					
	15	16	17	18	19	20
105	6.27	7.90	7.30	4.39	3.14	0.98
104	6.01	7.53	6.96	4.25	3.12	1.16
103	5.74	7.17	6.61	4.12	3.09	1.34
102	5.47	6.80	6.27	3.99	3.07	1.51
101	5.21	6.44	5.93	3.86	3.04	1.69
100	4.94	6.07	5.59	3.72	3.01	1.87
99	4.68	5.71	5.25	3.59	2.99	2.05
98	4.41	5.34	4.91	3.46	2.96	2.22
97	4.14	4.98	4.57	3.33	2.94	2.40
96	3.88	4.61	4.23	3.20	2.91	2.58
95	3.61	4.25	3.89	3.06	2.89	2.76
94	3.34	3.89	3.55	2.93	2.86	2.93
93	3.08	3.52	3.21	2.80	2.84	3.11
92	2.81	3.16	2.87	2.67	2.81	3.29
91	2.54	2.79	2.53	2.53	2.79	3.47
90	2.28	2.43	2.19	2.40	2.76	3.64
89	2.01	2.06	1.85	2.27	2.74	3.82
88	1.74	1.70	1.51	2.14	2.71	4.00
87	1.48	1.33	1.16	2.00	2.69	4.18
86	1.21	0.97	0.82	1.87	2.66	4.35
85	0.94	0.60	0.48	1.74	2.64	4.53



To estimate Medium Commercial DCU resource capability on aggregate, the number of active facilities can be multiplied by the values shown in Table 49. As of the end of summer 2023, there were 426 active Medium Commercial facilities. Thus, the expected aggregate impact of an event hour ending at 6:00 PM (MDT) when the outdoor temperature is 100 degrees would be 1.59 MW. Medium

Commercial DCU results are subject to an operability adjustment to better reflect the fact that not all devices in the population will be able to curtail load when called due to damage, wiring, or connection issues. The operability-adjusted aggregate impact is 86% of the unadjusted impact, or 1.36 MW.

RECOMMENDATIONS

After our review of the 2023 Power Saver program, the EcoMetric team offers the following recommendations:

- Ex post impacts provide a helpful look at program performance. For planning purposes, a consistent, weather-normalized impact estimate should be used. The EcoMetric team recommends that ex ante program impacts from 5:00 PM to 6:00 PM MDT at 100°F, de-rated for operability, be used for reporting, cost-effectiveness, and planning.
- The Itron contract definition of capacity performance is upwardly biased by capturing favorable noise along with the program impact. If there is a chance to review the terms, we recommend collapsing to the hourly mean rather than the maximum.
- The connected load assumption Itron uses to convert air conditioner runtime to electric demand for the thermostat program components is high given the average air conditioner size in the region. It is also higher than the assumed value in the smart thermostat protocol of the New Mexico TRM. We revised the assumption for the ex post analysis of the BYOT components, but not for Two-Way because Itron technicians record A/C nameplate information during installation of Two-Way thermostats. Currently the BYOT and Two-Way thermostat offerings represent a small fraction of the Power Saver resource capability, but as they grow it will be important to base the load impact calculations on sound assumptions.
- For the BYOT Nest component, thermostat setpoints are increased by three degrees during the event (while the other residential thermostat components use a cycling strategy). This results in relatively large impacts in the first event hour that get increasingly smaller throughout the event. If this shape is a concern for PNM, consider discussing the curtailment algorithm with Nest. Using different offsets in each event hour (+2 in the first, +3 in the second, and +4 in the third and fourth) could flatten out the impacts, or Nest could implement a cycling strategy similar to the other components.

6.2 PEAK SAVER

INTRODUCTION

Public Service New Mexico (PNM) offers the Peak Saver program to non-residential customers with peak load contributions of at least 50 kW. The program compensates participants for reducing electric load upon dispatch during periods of high system load. Generac implemented the Peak Saver program in 2023, handling the enrollment, dispatch, and settlement with participating customers. During the 2023 demand response season, there were 160 participating facilities and two demand response events. Table 50 summarizes the events.

Table 50: 2023 Peak Saver Event Summary

Date	Day of Week	Participants	Start Time (MDT)	End Time (MDT)	Daily High at KABQ (F)
07/11/2023	Tuesday	160	4:00 PM	8:00 PM	100
07/26/2023	Wednesday	160	4:00 PM	8:00 PM	101

After the 2023 demand response (DR) season concluded, Generac provided the EcoMetric team with one-minute interval load data and end-of-season summary information on performance metrics for each site/event combination. The interval data spanned from July 1st to July 31st and included load impacts calculated using a customer baseline (CBL) method outlined in the PNM-Generac contract. A CBL is an estimate of participant loads absent the DR event dispatch, and load impacts are the difference between CBL and the metered load during the event. The relevant CBLs were also included in the one-minute load data.

Using these data sources, the EcoMetric team completed our verified savings analysis. The three key steps in the analysis were:

1) Reproducing the performance estimates calculated by Generac using the contractually-agreed upon CBL method;
2) Assessing the accuracy of the contract CBL method by examining its ability to predict loads on non-event weekdays; and
3) Modifying the CBL methodology to reduce bias and calculate verified impacts for each event.

Table 51 shows a high-level comparison of reported and verified demand and energy impacts. Regarding energy impacts, note reported values only reflect event hours and evaluated values reflect event hours reductions net of load shifted to non-event hours. Subsequent sections describe the findings of our analysis in greater detail.

Table 51: High-Level Results

Date	Demand (MW)			Energy (MWh)		
	Reported	Evaluated	Realization Rate	Reported	Evaluated	Realization Rate
07/11/2023	33.7	15.6	46.2%	136.5	64.6	47.1%
07/26/2023	37.8	16.3	43.1%	149.0	47.1	31.6%
Average / Total	**35.7**	**15.9**	**44.6%**	**285.6**	**111.5**	**39.0%**

Public Service New Mexico (PNM) offers the Peak Saver program to non-residential customers with peak load contributions of at least 50 kW. The program compensates participants for reducing electric load upon dispatch during periods of high system load. Generac implemented the Peak Saver program in 2023, handling the enrollment, dispatch, and settlement with participating customers. During the 2023 demand response season, there were 160 participating facilities and two demand response events. Table 52 summarizes the events.

Table 52: 2023 Peak Saver Event Summary

Date	Day of Week	Participants	Start Time (MDT)	End Time (MDT)	Daily High at KABQ (F)
07/11/2023	Tuesday	160	4:00 PM	8:00 PM	100
07/26/2023	Wednesday	160	4:00 PM	8:00 PM	101

After the 2023 demand response (DR) season concluded, Generac provided the EcoMetric team with one-minute interval load data and end-of-season summary information on performance metrics for each site/event combination. The interval data spanned from July 1st to July 31st and included load impacts calculated using a customer baseline (CBL) method outlined in the PNM-Generac contract. A CBL is an estimate of participant loads absent the DR event dispatch, and load impacts are the difference between CBL and the metered load during the event. The relevant CBLs were also included in the one-minute load data.

Using these data sources, the EcoMetric team completed our verified savings analysis. The three key steps in the analysis were:

4) Reproducing the performance estimates calculated by Generac using the contractually-agreed upon CBL method;
5) Assessing the accuracy of the contract CBL method by examining its ability to predict loads on non-event weekdays; and
6) Modifying the CBL methodology to reduce bias and calculate verified impacts for each event.

Table 53 shows a high-level comparison of reported and verified demand and energy impacts. Regarding energy impacts, note reported values only reflect event hours and evaluated values reflect event hours reductions net of load shifted to non-event hours. Subsequent sections describe the findings of our analysis in greater detail.

Table 53: High-Level Results

Date	Demand (MW)			Energy (MWh)		
	Reported	Evaluated	Realization Rate	Reported	Evaluated	Realization Rate
07/11/2023	33.7	15.6	46.2%	136.5	64.6	47.1%
07/26/2023	37.8	16.3	43.1%	149.0	47.1	31.6%
Average / Total	**35.7**	**15.9**	**44.6%**	**285.6**	**111.5**	**39.0%**

VALIDATION OF SETTLEMENT CALCULATIONS

The settlement calculations called for a "high 3-of-5" baseline with an uncapped, asymmetric day-of adjustment.[18] To determine the high 3-of-5 days, the following process was used:

Select the five non-holiday, non-event weekdays that immediately precede the event; and

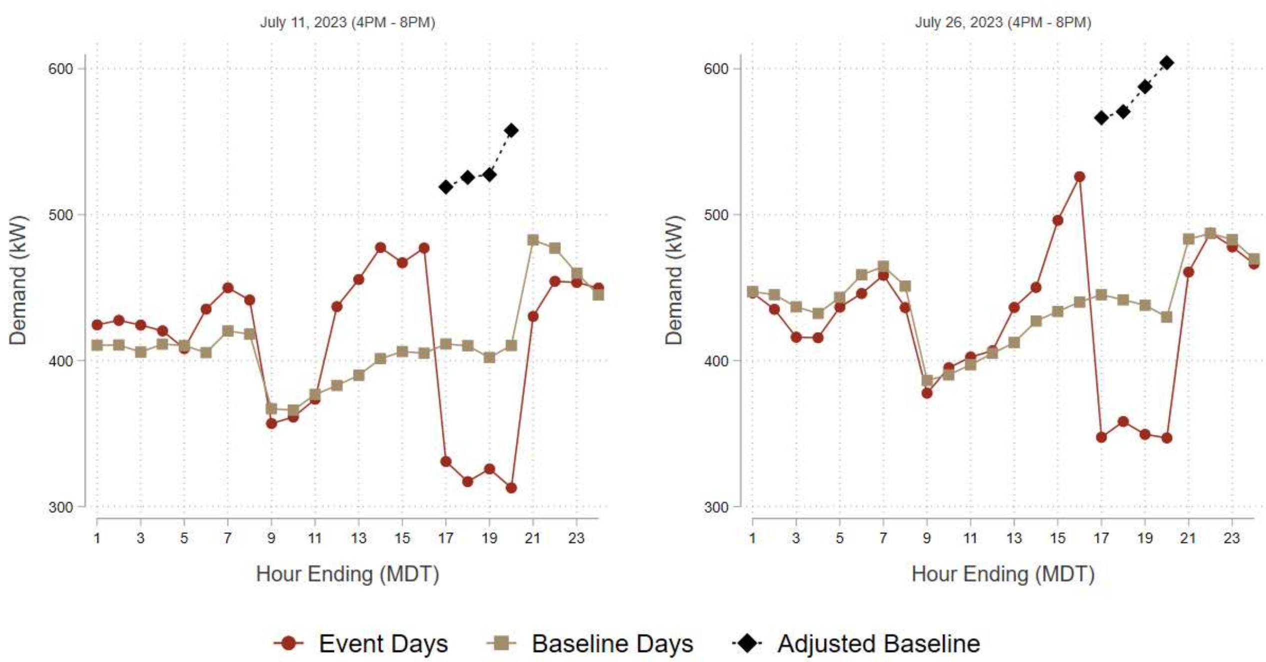
18 One participant in the portfolio with solar and battery storage does not receive this adjustment in Generac's analysis.

Out of those five days, pick the three days with the highest average demand during the hours in which the event occurred. In the case of a tie, the baseline day chosen was the one closest to the event day.

Our team was successful in replicating almost all of the settlement baselines. Generac's average settlement baseline for all sites and event hours was 557.37 kW, while our team's average settlement baseline was 557.36 kW. Any variances between the settlement baseline and our team's baseline were minimal, with differences typically less than 0.01 percent. The Generac baseline calculations adhered to a highly consistent rule set, except for one participant with solar and negative loads during daytime hours. The baseline calculations for this site did not include the adjustment.

Figure 35 shows the average hourly event day loads for the full population, the average hourly loads on the high 3-of-5 baseline days, and the average hourly baselines for the event intervals. Note dispatch hours were the same across events days (4:00 PM to 8:00 PM on July 11th and July 26th).

Figure 35: Peak Saver Loads and Baselines



Once we validated that the baselines were calculated according to the contract methods, our team proceeded to the performance metric calculations. The performance metrics are defined as follows:

- **10-Minute Participant Capacity Performance** – The difference between the CBL and the lowest actual electrical demand measured by a one-minute interval reading between eight and ten minutes after the start of an event.

Average Participant Capacity Performance – The average difference between the CBL and the participant's actual electric demand beginning ten minutes after the initiation of the event.

Participant Event Capacity Performance – Weighted average of 10-Minute Participant Capacity Performance (40% weight) and Average Participant Capacity Performance (60% weight).

Energy Delivered – The difference (in kWh) between the adjusted CBL and the metered load summed across all DR event hours.

Using the settlement baselines, all performance calculations were replicated without problem. Table 54 shows portfolio performance metrics by date.

Table 54: Peak Saver Performance Metrics by Date – Contract Settlement Method

Date	10-Minute Participant Capacity (kW)	Average Participant Capacity (kW)	Participant Event Capacity Performance (kW)	Energy Delivered (kWh)
07/11/2023	32,386	33,933	33,669	136,550
07/26/2023	37,863	37,547	37,811	149,030
Average	**35,124**	**35,740**	**35,740**	**142,790**

ASSESSMENT OF CBL ACCURACY

Developing an unbiased prediction of what load would have been absent a demand response event is essential to producing a defensible demand response impact estimate. This hypothetical non-event load is the customer baseline (CBL). If the CBL methodology tends to produce unbiased estimates of load (i.e., average error of zero), then demand response impact estimates will also be unbiased. If the CBL tends to overpredict or underpredict load, then demand response impacts will be overstated or understated.

This section details our review of the Generac contract CBL methodology (described at the beginning of Validation of Settlement Calculations). Specifically, we assess the ability of the CBL methodology to predict load on non-event weekdays, and we explore the distribution of adjustment factors.

6.1.1.19 Placebo Event Analysis

Assessing the accuracy of a baseline on an event day is not possible because the counterfactual is unknown. In other words, we do not know what the demand would have been if the event was not called. However, on non-event weekdays there is no demand response, so using the same algorithm to generate a baseline should reasonably predict the metered load. For these days, the true value of demand response is 0 kW so if the baseline yields a non-zero impact estimate, it can be attributed to error. Individual errors are expected as the lookback window is not intended to be a perfect predictor of future load. That said, an unbiased baseline methodology should produce a distribution of errors which is centered around zero, on average.

To evaluate the accuracy of the settlement CBL, the EcoMetric team analyzed the central tendency of prediction errors by creating placebo event days from each non-event weekday for which there was sufficient data to calculate a high 3-of-5 baseline. (Note we only have interval data for the month of July, so other months in the 2023 DR season were not included in this assessment.) The team assumed that each placebo event would start at 4:00 PM and last for four hours until 8:00 PM. This timing mimics historical Peak Saver DR events. For each placebo event, the aggregate hourly CBL was calculated by summing the average hourly CBLs during the event window at each site. The same method was used to calculate the aggregate metered load. Since demand response was not dispatched, the impact estimate (the difference between CBL and metered load) should be zero. Any deviation from zero is considered error. Notably, negative impacts were not zeroed out, and sites with solar power were excluded from this analysis. For sites with solar, the baseline adjustment mechanism used in the settlement CBL is affected by cloud coverage as well as gross load. That is problematic, of course, but it is a separate issue that we did not want to confound with the results of the exercise described in this section.

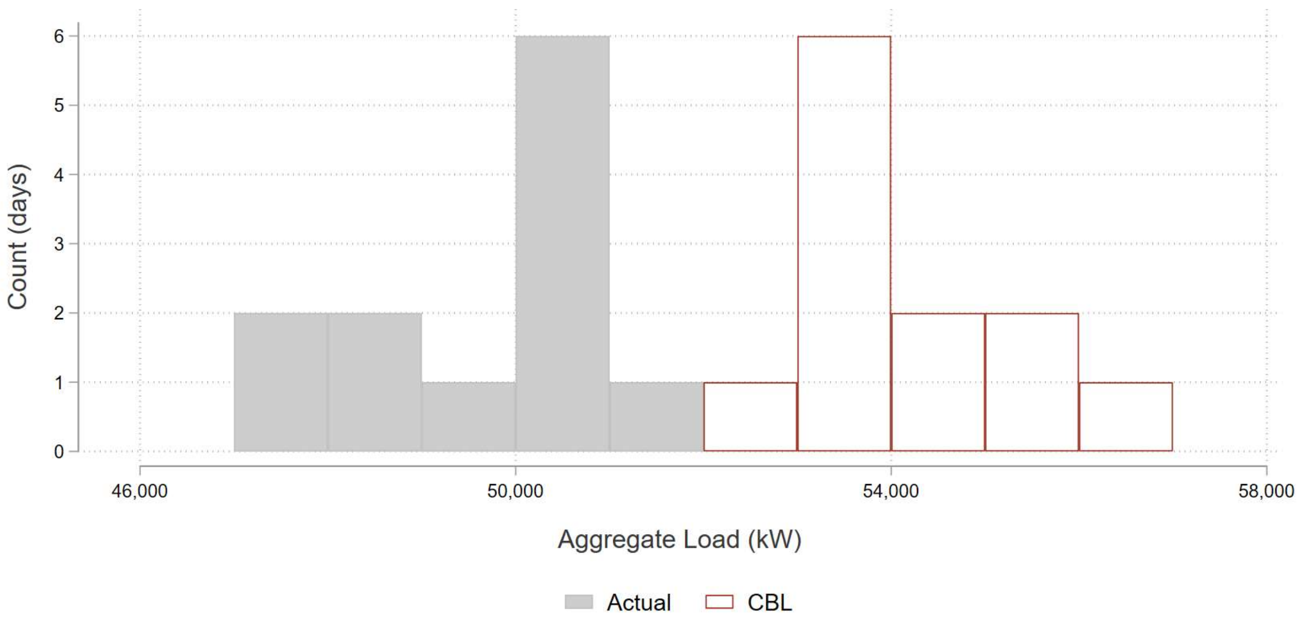
Results for the settlement baseline, aggregated by month, are shown in Table 55. On average, the baseline produced about 4.6 MW of upwards bias (meaning the baseline overstated load by 4.6 MW).

Table 55: CBL Accuracy Assessment for Placebo Events

Number of Placebo Events	Avg. Daily High Temp at KABQ	Avg. Aggregate Metered Load (kW)	Avg. Aggregate CBL (kW)	Avg. Error (kW)
12	100.0	49,562	54,167	4,605

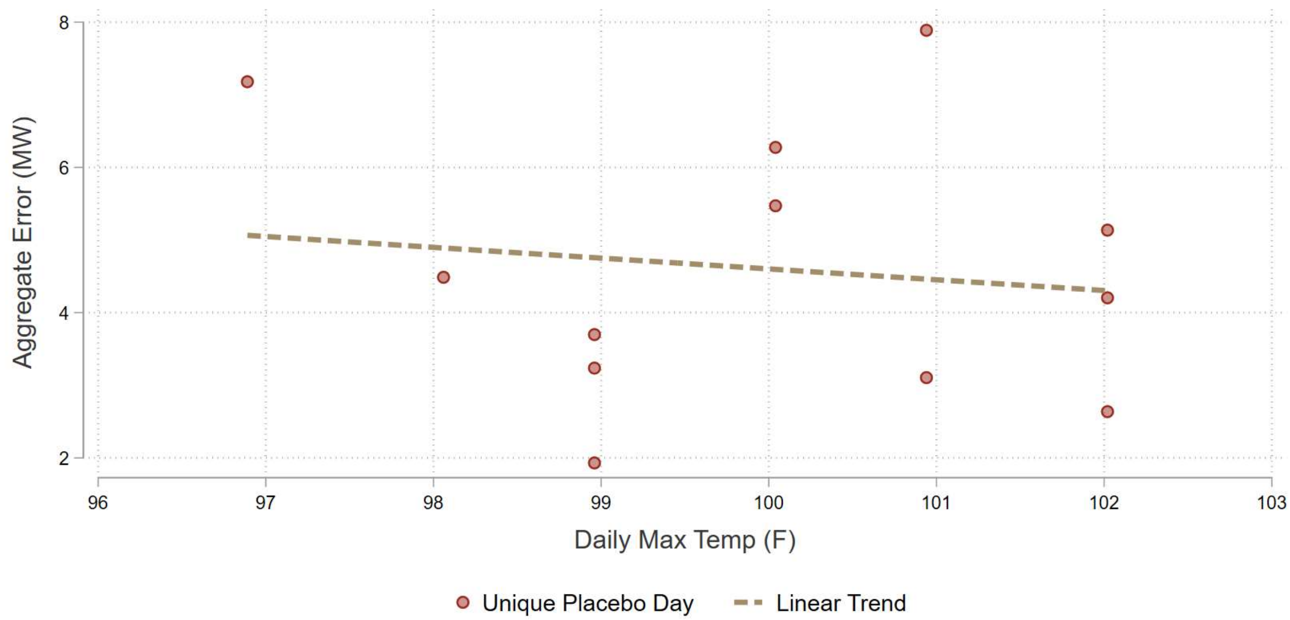
Figure 36 compares actual aggregate load from the placebo event days (gray bars) to aggregate baselines (translucent bars). Ideally, the two distributions would be approximately identical. It is clear from the distribution that the CBL is upward biased.

Figure 36: Histogram of Placebo Event Days – Settlement Method



The placebo days summarized in Table 55 are not perfect representations of actual event days, which tend to be the hottest days of the summer. DR events are called because system operators expect higher than normal loads which will approach the constraints of the system. As a result, the performance of a baseline on hot days is much more important for assessing accuracy than its performance on a mild day. As shown in Figure 37, there isn't much of a relationship between bias and temperature. The average error on a placebo day with a maximum temperature of at least 100 degrees was still over 4.1 MW.

Figure 37: Generac Average Aggregate Baseline Error vs. Temperature



The EcoMetric Team believes that the primary reason for the large errors in the settlement CBL is the asymmetric application of the weather-sensitive adjustment. The baseline can only be adjusted up, not down, which naturally biases the error upward. The unadjusted baseline actually produces less aggregate error than the adjusted baseline. While adjusting the baseline using event day loads has been shown to improve accuracy, the adjustment needs to be bi-directional. In most organized demand response markets, including PJM, CAISO, and ISO New England, a symmetric adjustment is employed.

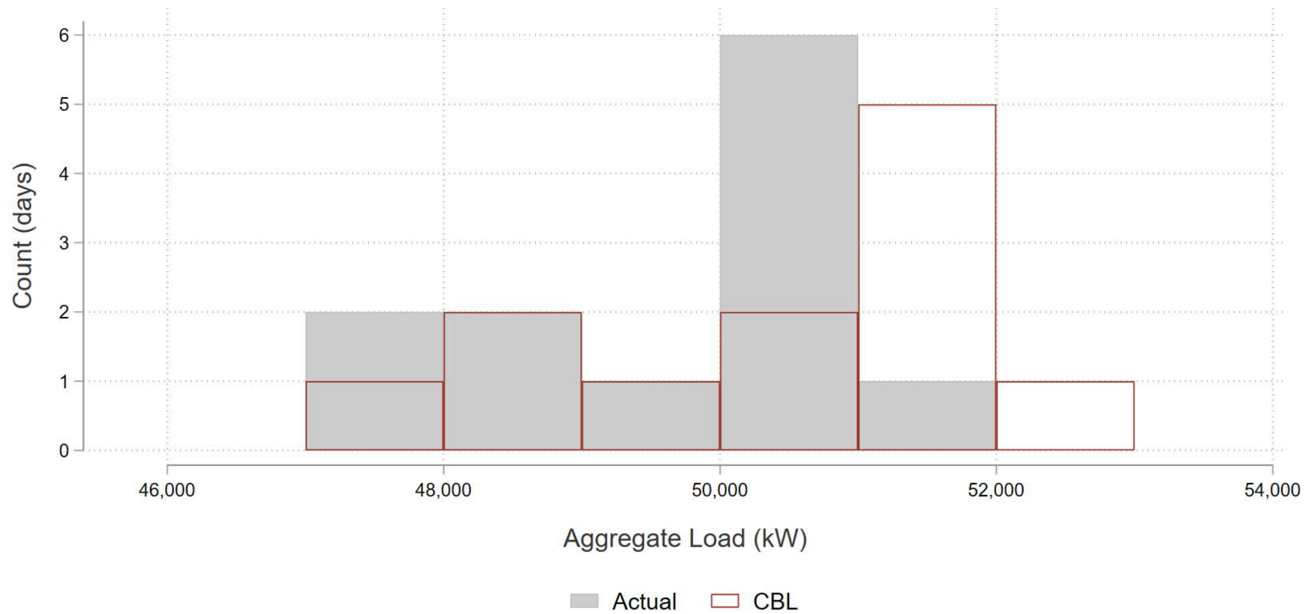
To demonstrate the impact of a symmetric adjustment, we modified the CBL methodology to allow for adjustments in both directions. Using this new adjusted baseline, we conducted the same accuracy test described earlier. The results, presented in Table 56, show an average error of less than 0.9 MW.

Table 56: Accuracy Assessment with Symmetric Adjustment

Number of Placebo Events	Avg. Daily High Temp at KABQ	Avg. Aggregate Metered Load (kW)	Avg. Aggregate CBL (kW)	Avg. Error (kW)
12	100.0	49,562	50,436	874

Figure 38 shows the same histogram as Figure 36 but using the symmetric adjustment rather than the asymmetric adjustment. It is clear that the actual and counterfactual loads are better aligned in this case.

Figure 38: Histogram of Placebo Event Days – Symmetric Adjustment



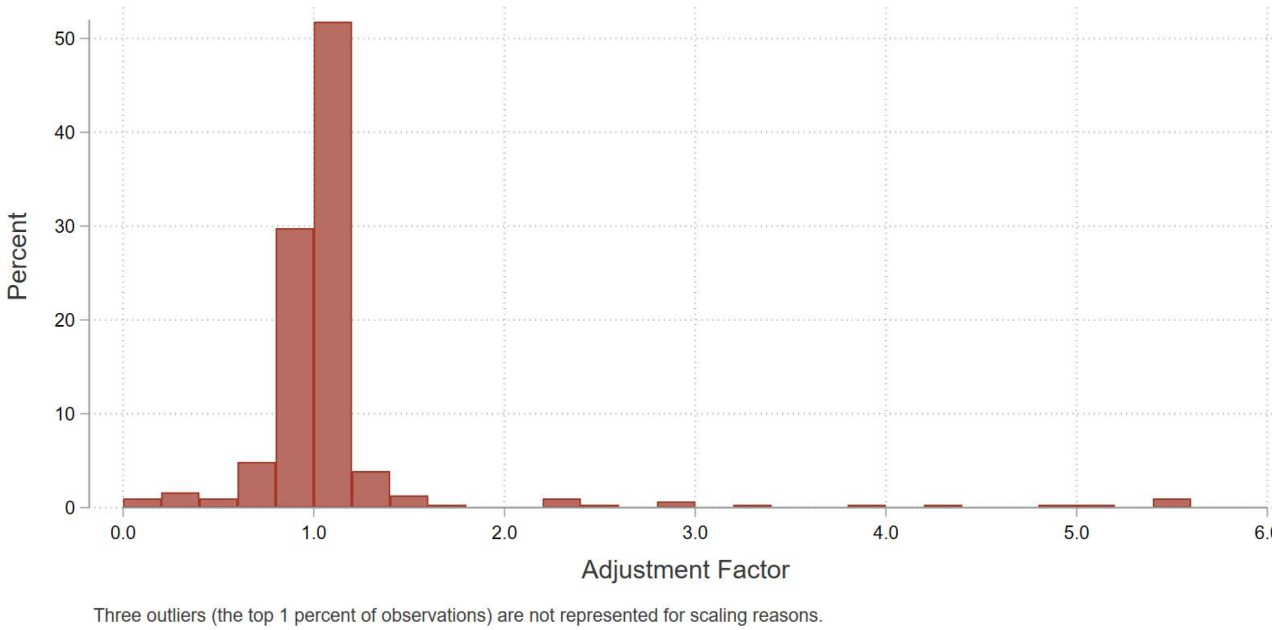
Using an asymmetric adjustment yielded an upward bias of 4.6 MW, and using a symmetric adjustment yielded an upward bias under 0.9 MW. While the baseline with a symmetric adjustment still overestimates on average, the distribution of errors falls on both sides of zero and the mean prediction is much closer to true load.

6.1.1.20 Adjustment Factors

As demonstrated above, the application of the adjustment factor plays a significant role in the accuracy of the CBL. Because the adjustment in the settlement CBL is applied as a multiplicative adjustment, even values that appear close to 1 (i.e., 1.1) can result in significant adjustments for large customers. The average symmetric adjustment factor across event days and sites was 1.20. The median factor, which is unaffected by extreme values, was 1.02.

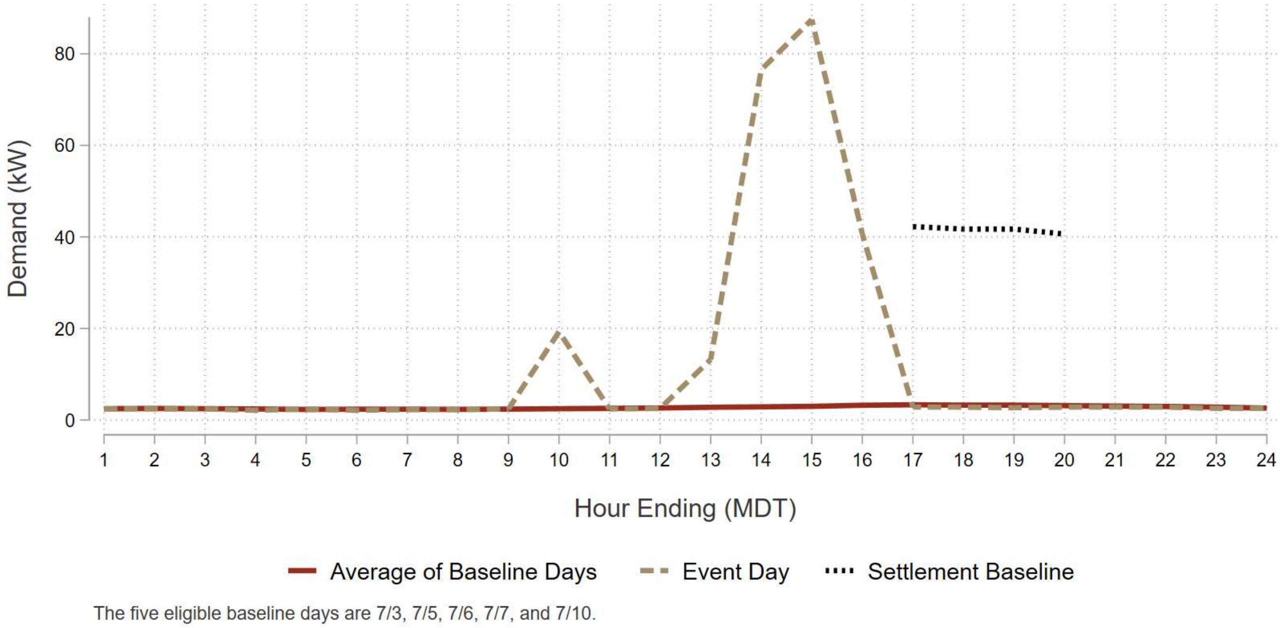
Figure 39 shows the distribution of adjustment factors (except for the top 1 percent of observations). Recall that the adjustment factors are only applied if they increase the baseline in the contract CBL. In other words, any factor less than one is rounded up to one. In the majority of cases, the adjustments produced baseline values that were reasonable in the context of the participant's distribution of load throughout the summer. Still, there were a handful of adjustment factors larger than two. Even for the most extreme cases of weather sensitivity, adjusting the baseline by a factor of two or more is dubious. Undoubtedly, leaving the asymmetric adjustment factor uncapped leads to an upwards bias in event day baselines, particularly when the adjustment is not symmetric. This again means impacts are, on average, being overstated using the settlement baseline calculation method. This can be addressed by subjecting the adjustment factor to a cap which prevents the adjustment factor (and the CBL) from taking on extreme values.

Figure 39: Distribution of Adjustment Factors



Extreme adjustment factors were relatively uncommon in the 2023 evaluation, with only one site receiving an adjustment larger than 10 (12). The EcoMetric team investigated load at this site to see if we could determine what happened. Figure 40 shows average hourly demand for the baseline days and hourly demand for the event day in question. The settlement baseline is orders of magnitude higher than the hourly demand during the event hours. The customer's average metered load during event window was less than 3 kW. Perhaps the site did curtail load during the event, but a baseline of 40 kW is unreasonable for this site. This investigation helps to highlight the problematic nature of an uncapped adjustment in conjunction with erratic load patterns.

Figure 40: Investigating a Large Adjustment Factor



For sites with solar power, the adjustment factor is dependent on a cloud coverage effect that is not accounted for. If cloud cover begins mid-way through the adjustment window on the event day, net utility-supplied load for the hour will increase. If the lookback days were all sunny, then average load during the adjustment window on the lookback days will necessarily be lower than average load during the same window on the event day. This will result in a large adjustment ratio.

A similar effect may occur if sites engage in pre-cooling or pre-pumping in response to the pending demand response event. There is nothing wrong or nefarious about such behavior, but when this occurs, the adjustment factor will be artificially inflated.

The adjustment factor is intended to correct for the differences in load between event and baseline days that result from the non-random selection of event-days. Event days are typically the hottest days of the summer and, as such, may be reasonably expected to have higher demand than baseline days. However, a weather adjustment need not be applied to sites which do not have weather sensitive load. It is our view that sites identified as weather sensitive are the only ones which should receive an adjustment to the baseline (excluding those with solar power and those who pre-pump in preparation for the demand response event).

EVALUATED IMPACTS

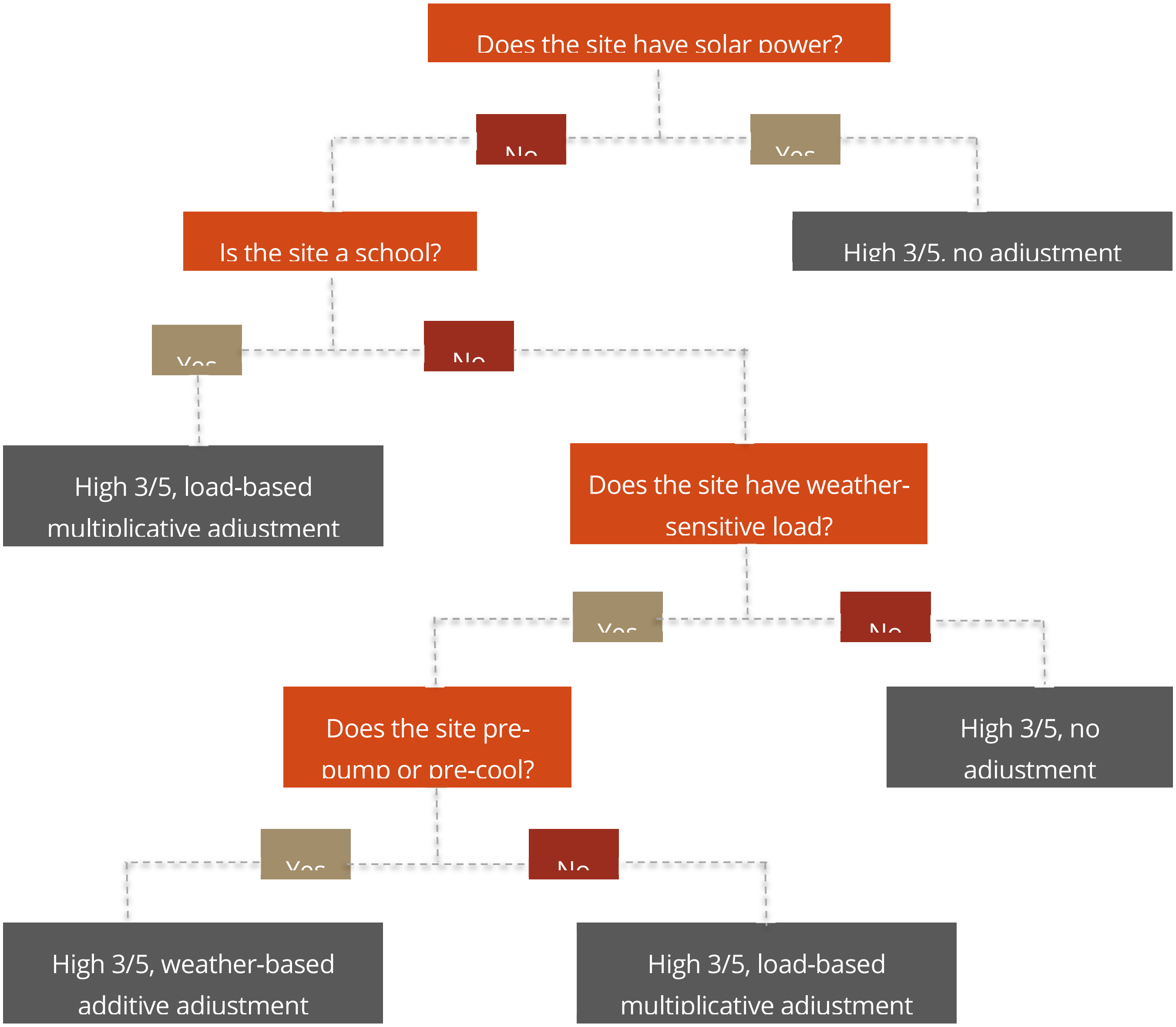
6.1.1.21 Approach

Based on our review of the contract CBL methodology used to generate the settlement baselines and impact estimates, the EcoMetric team calculated the evaluated CBL (and the performance metrics they feed into) using the following methodology:

- The multiplicative adjustment factor is symmetric, meaning it can increase or decrease baselines, rather than only serving to increase baselines;
- The multiplicative adjustment factor is capped at ±20 percent rather than uncapped;
- The multiplicative adjustment factor is only applied to sites that (1) have weather sensitive loads, (2) do not have solar power, and (3) do not pre-pump or pre-cool prior to demand response events; and
- For sites that meet the first two requirements listed above but not the third, an additive adjustment factor based on weather was applied rather than an adjustment factor based on pre-event load.

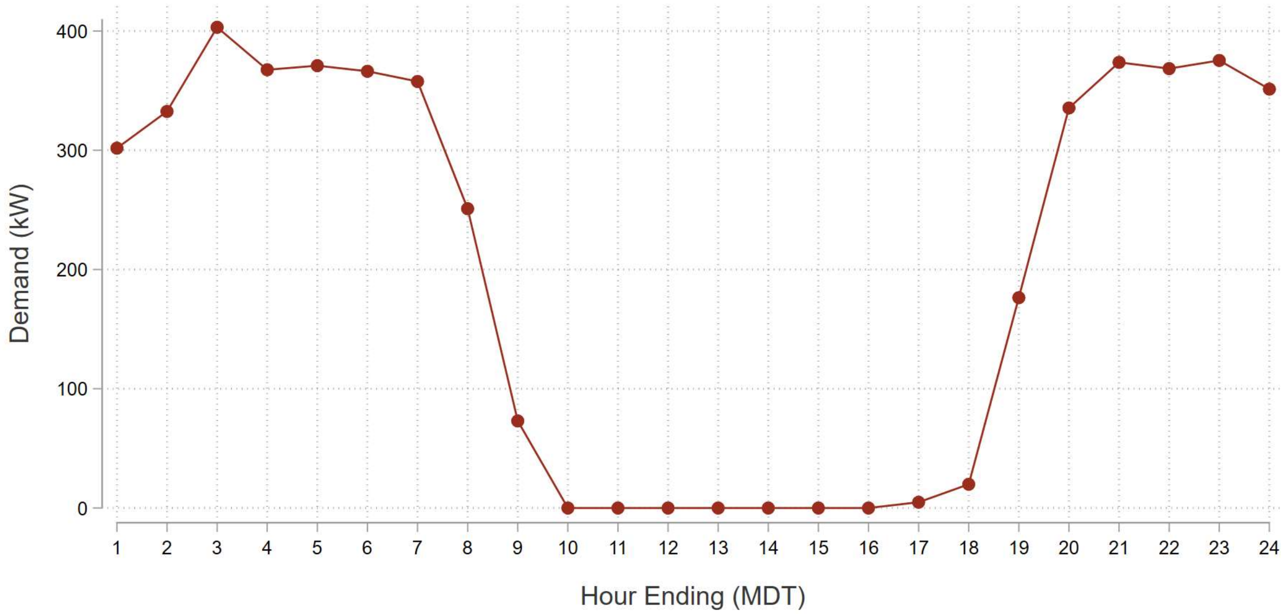
Additionally, all schools without solar power were given the load-based multiplicative adjustment factor. A CBL method flow chart is presented in Figure 41.

Figure 41: Adjustment Factor Assignment



To determine which sites have solar power, our team reviewed hourly load profiles for the full population of program participants. Sites that showed the distinct solar net load profile, as in Figure 42, were treated as solar sites. Additionally, Generac provided the EcoMetric team with a list of sites with known solar power. In total, 26 of 160 sites were considered sites with solar power.

Figure 42: Example of Solar Load Profile



Regarding weather-sensitive loads, the EcoMetric team estimated weather sensitivity at each site by assessing the relationship between load and temperature during the event hours (4:00 PM – 8:00 PM) on non-event, non-holiday weekdays during July 2023. Sites were considered to be weather sensitive if (1) the correlation between temperature and load was positive and (2) temperature was found to be a statistically significant predictor of load (at the 5% significance level). In total, 83 of the 160 sites met these criteria.

Regarding pre-pumping or pre-cooling, our team reviewed hourly load profiles on event days and baseline days for the full population of program participants. Figure 43 illustrates this exercise. Sites with a notable incline in pre-event load, relative to load during the same hours on baseline days, were treated as pre-pumpers or pre-coolers. This behavior is reasonable for a demand response participant. The issue is that pre-pumping behavior inflates the baseline adjustment, which is calculated based on pre-event load. In total, only 9 of 159 sites were considered pre-pumpers. (Note we're using "pre-pumping" as a catch-all term to identify any load-shifting behaviors that precede a DR event.)

Figure 43: Example of Pre-Pumper Load Profile

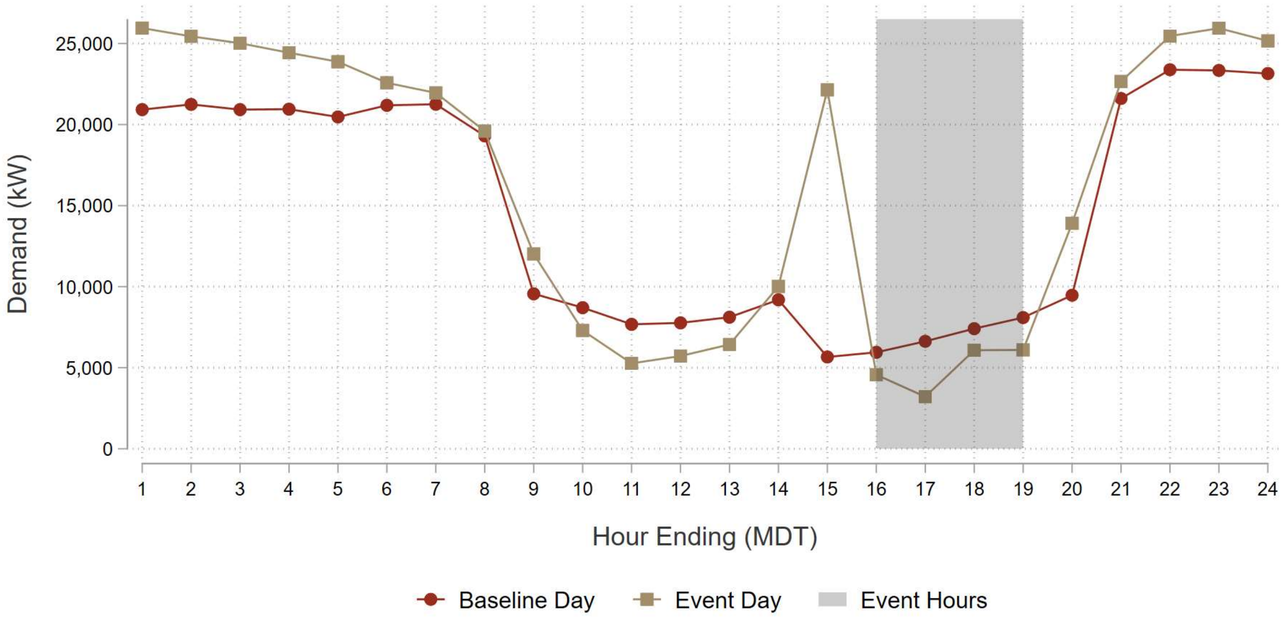


Table 57 shows the distribution of CBL methodology for the 2023 verified savings analysis. Note the weather-based adjustment is an additive adjustment similar to the weather-based adjustment used by PJM.[19] The adjustment is calculated as:

$$Adjustment = Slope * (\Delta_{Temp})$$

In the equation above, "Slope" is a value that quantifies the relationship between outdoor temperature and load for the facility (i.e., for each one-degree increase in temperature, how much does load increase on average?). This value is determined via the regression modeling. The second component, Δ_{Temp}, represents the difference between the average outdoor temperature during the event and the average outdoor temperature during the event window on the three selected baseline days.

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19 Available at https://www.pjm.com/-/media/markets-ops/demand-response/dsr-weather-sensitive-adjustment-using-wsa-factor-method.ashx?la=en

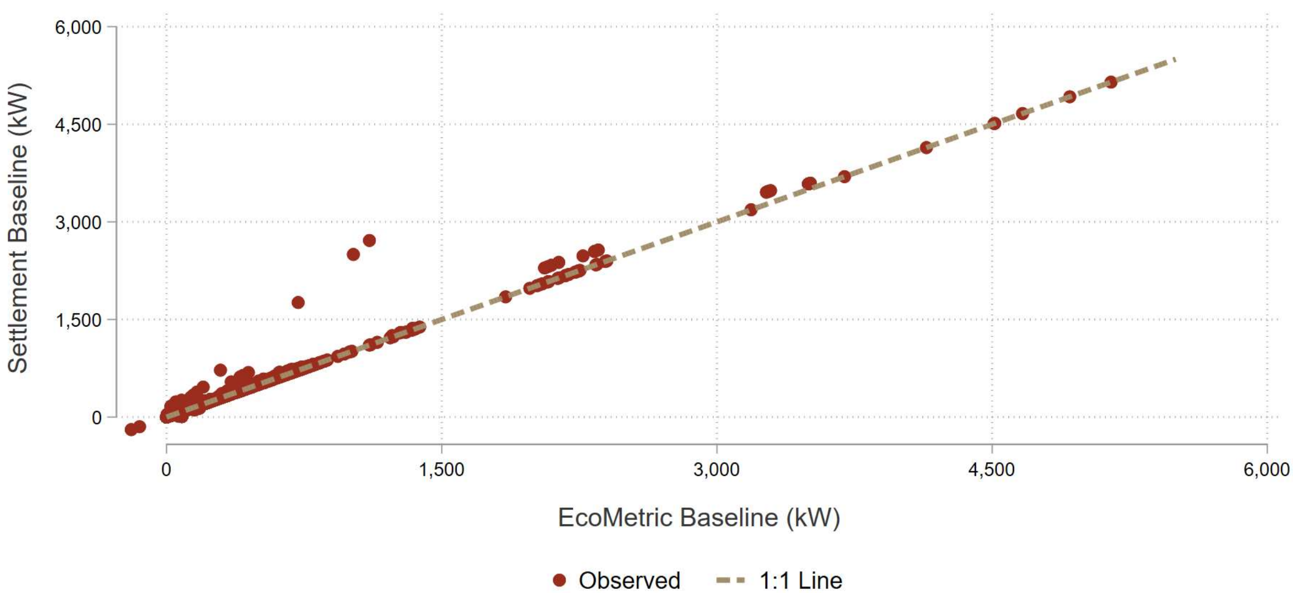
Table 57: Distribution of CBL Method

CBL Approach	Number of Sites
High 3/5, no adjustment	67
High 3/5, load-based multiplicative adjustment	92
High 3/5, weather-based additive adjustment	1
Total	**160**

6.1.1.22 CBL Comparison

Because the EcoMetric team calculated baselines in a manner that was similar to settlement baseline methodology, the baselines themselves were largely similar. The correlation between the two methods can be seen in Figure 44, which compares the baselines calculated by our team with the settlement baselines. One site, whose demand is significantly higher than the other sites, is shown in a separate figure (Figure 45) due to the vast difference in scale.

Figure 44: Baseline Comparison – All Sites but One



The 1:1 line represents what the trend would look like if the two methods produced identical baselines.

Figure 45: Baseline Comparison – Separate Site

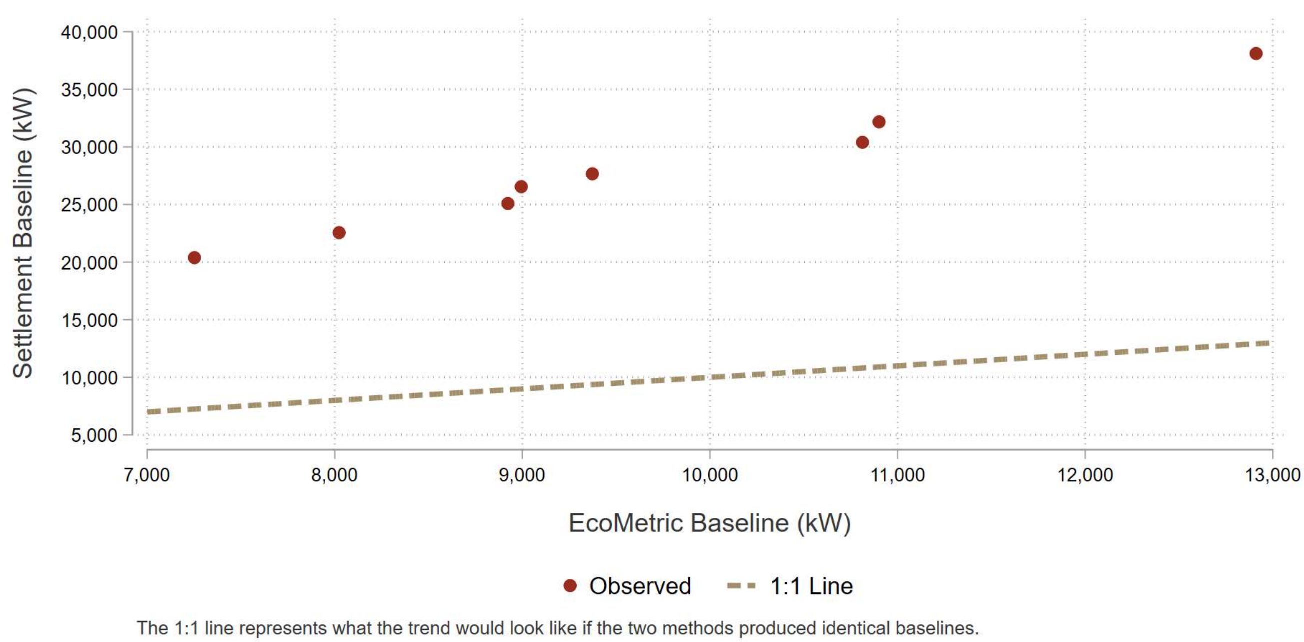


Table 58 and Table 59 show the average aggregate baseline under the settlement method and under the EcoMetric method. The settlement method is naturally going to produce a much larger baseline since it uses an asymmetric adjustment mechanism. Table 59 singles out a site that has significantly higher demand, which is absent from Table 58. This site accounts for 88 percent of the differences in baselines.

Table 58: Baseline Comparison – All Sites but One

Date	Settlement Baseline (kW)	EcoMetric Baseline (kW)	Difference (kW)
07/11/2023	60,586	57,693	2,893
07/26/2023	62,033	59,861	2,172
Average	**61,310**	**58,777**	**2,533**

Table 59: Baseline Comparison – Other Site

Date	Settlement Baseline (kW)	EcoMetric Baseline (kW)	Difference (kW)
07/11/2023	24,611	8,752	15,858
07/26/2023	31,126	10,545	20,582

Average	**27,869**	**9,649**	**18,220**

6.1.1.23 Performance Metrics

The results of the EcoMetric team's 2023 Peak Saver Demand Response evaluation are shown in Table 60. For comparison, the savings produced by the program implementer are shown in Table 61. Note that we do not zero out any negative performance metrics in our evaluated impacts but the program implementer does zero out the verified capacity performance if it is negative. On average, the verified capacity performance estimates using the EcoMetric methodology are 45 percent of the values calculated by Generac using the settlement CBL. The Assessment of CBL Accuracy section described some of the drivers leading to lower estimates for the EcoMetric method.

Table 60: Evaluated Performance Summary by Event

Date	10-Minute Capacity Performance (kW)	Average Capacity Performance (kW)	Verified Capacity Performance (kW)	Energy Performance During Event Hours (kWh)
07/11/2023	16,319	15,065	15,567	59,911
07/26/2023	18,766	14,634	16,287	57,245
Average	**17,543**	**14,850**	**15,927**	**58,578**

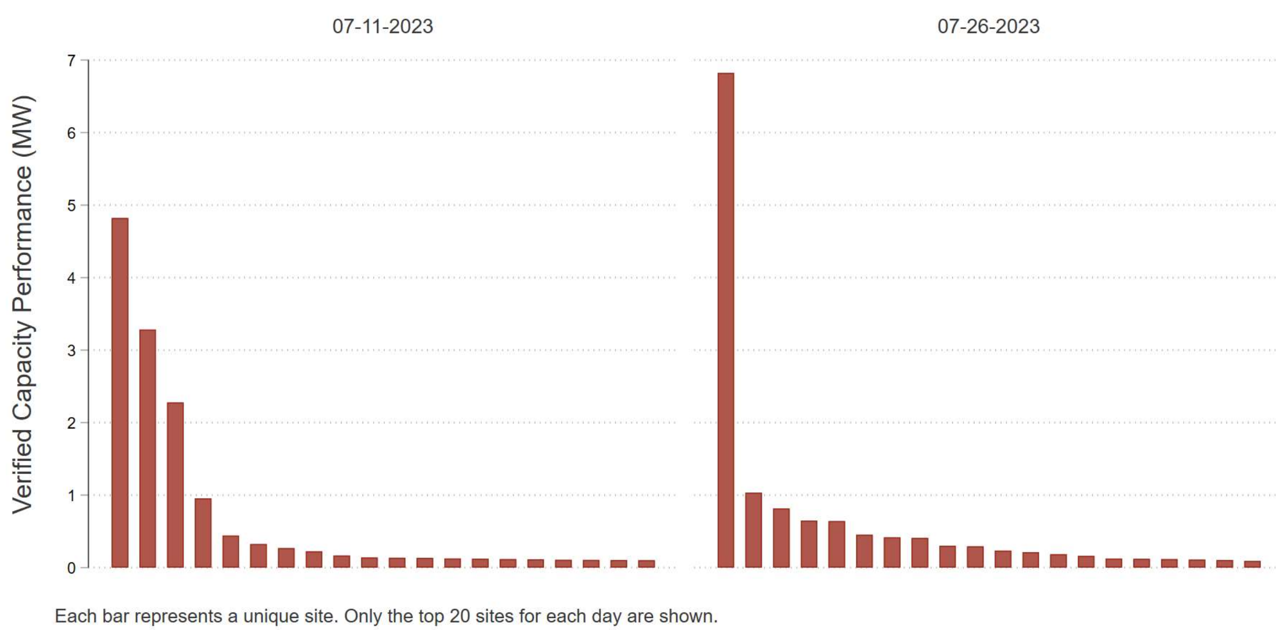
Table 61: Performance Summary – Program Implementer

Date	10-Minute Capacity Performance (kW)	Average Capacity Performance (kW)	Verified Capacity Performance (kW)	Energy Performance During Event Hours (kWh)
07/11/2023	32,386	33,933	33,669	136,550
07/26/2023	37,863	37,547	37,811	149,030
Average	**35,124**	**35,740**	**35,740**	**142,790**

Our findings indicate the Peak Saver program is approximately a 15.9 MW capacity resource, a slight increase relative to our 2022 analysis (15.4 MW). There was small variation in verified capacity performance between the two events in the 2023 season (15.6 MW on July 11th and 16.3 MW on July 26th). A few key sources of the variation in verified capacity performance include:

- **The program is top heavy.** Figure 46 shows participant-level verified capacity performance for each event day. It is clear that a handful of sites will drive the overall results. The top three sites (in terms of average demand reductions) accounted for approximately 52% of the verified capacity performance on July 11th event and 53% of the verified capacity performance on July 26th event. These three sites alone account for over half of the verified capacity performance, on average. The largest participant in the program contributed 4.8 MW on July 11th event and 6.8 MW on July 26th event.
- **Variation in reference loads.** Aggregate daily peak demand for the Peak Saver participant population ranged from about 67.5 MW to about 84.2 MW during the 2023 summer. This is a wide range (~17 MW) – so wide, in fact, it's larger than the average capacity performance for 2023 (15.9 MW). The amount of load a participant can shed is a function the amount of available load. A number of Peak Saver participants showed significant variation in reference loads from week-to-week (and even day-to-day).
- **Event conditions.** Average event hour temperature was 97°F with a range from 90°F to 101°F during 2023 event hours. Historically, demand reductions tend to be larger when temperatures are higher. Last year, temperatures ranged from 87°F to 100°F during event hours with a lower average event hour temperature at 94.5°F. Higher temperatures during event hours in 2023 could explain some of the improved performance of the Peak Saver program.

Figure 46: Site-Level Verified Capacity Performance by Date



6.1.1.24 Energy Savings

Table 62 compares aggregate energy savings during the event with the aggregate daily energy savings. Here, a "day" is defined as all hours following the beginning of the event (including the event hours), with the adjustment factor applied to all hours. For sites designated as pre-pumpers, we also include the hour before the event in the daily energy impact. Comparing the energy savings during the event and the daily energy savings helps illustrate the extent to which event load was shifted to other hours. In aggregate, there is not evidence of post-event snapback (though we do see some snapback when reviewing participants individually).

Table 62: Energy Savings – Pre-Event Hours, Event Hours, and Post-Event Hours

Date	Pre-Event Energy Impact (kWh)	Event Energy Impact (kWh)	Post-Event Energy Impact (kWh)	Daily Energy Impact (kWh)
07/11/2023	-11,146	59,911	15,597	64,632
07/26/2023	-15,510	57,245	5,406	47,140
Total	**-26,657**	**117,156**	**21,003**	**111,502**

RECOMMENDATIONS

After our review of the 2023 Peak Saver program, the EcoMetric team offers the following recommendations:

- Make the multiplicative adjustment symmetric rather than asymmetric. As discussed in the assessment of CBL accuracy presented in the Placebo Event Analysis section, using an asymmetric adjustment results in an upwards bias in the baseline. Biasing the baseline inherently biases the performance metrics. The bias is greatly reduced when using a symmetric adjustment.

Set a cap for the multiplicative adjustment factor to prevent unrealistic baselines.

Examine load data for solar patterns or pre-pumping/pre-cooling on event days. Pre-pumping/pre-cooling on event days is fine, but sites that do so should not receive the adjustment factor (or the adjustment factor should be based on weather rather than load). For sites with solar, consider using a smaller adjustment factor cap, using an additive adjustment, or removing the adjustment factor altogether.

Compare DR nominations with the average demand on typical summer afternoons. If any nominations seem too high, update them.

- PNM should also consider collecting all meter channels for sites with solar PV. This would allow the CBL to fully capture the load shape of sites that are net exporters during key times of day. It's possible that these sites reduced load and thus became larger exporters than they would have been on a non-event day, but the available data doesn't allow for a measurement. Also, an additive adjustment may work better than a multiplicative one for sites whose load can cross zero during the event period or adjustment window.
- Set DR performance equal to the battery discharge to measure the performance of solar + storage sites provided that the battery system records telemetry, the site does not discharge their battery on non-event days, and does not engage in other curtailment activities within the facility.

7 LOAD MANAGEMENT AS A RESOURCE

7.1 DEMAND RESPONSE PROGRAMS

On January 31, 2018, the New Mexico Public Regulation Commission (NMPRC) issued a final order in PNM's 2017 energy efficiency case that directs the independent program evaluator for PNM's energy efficiency and load management (LM) programs, to do the following:

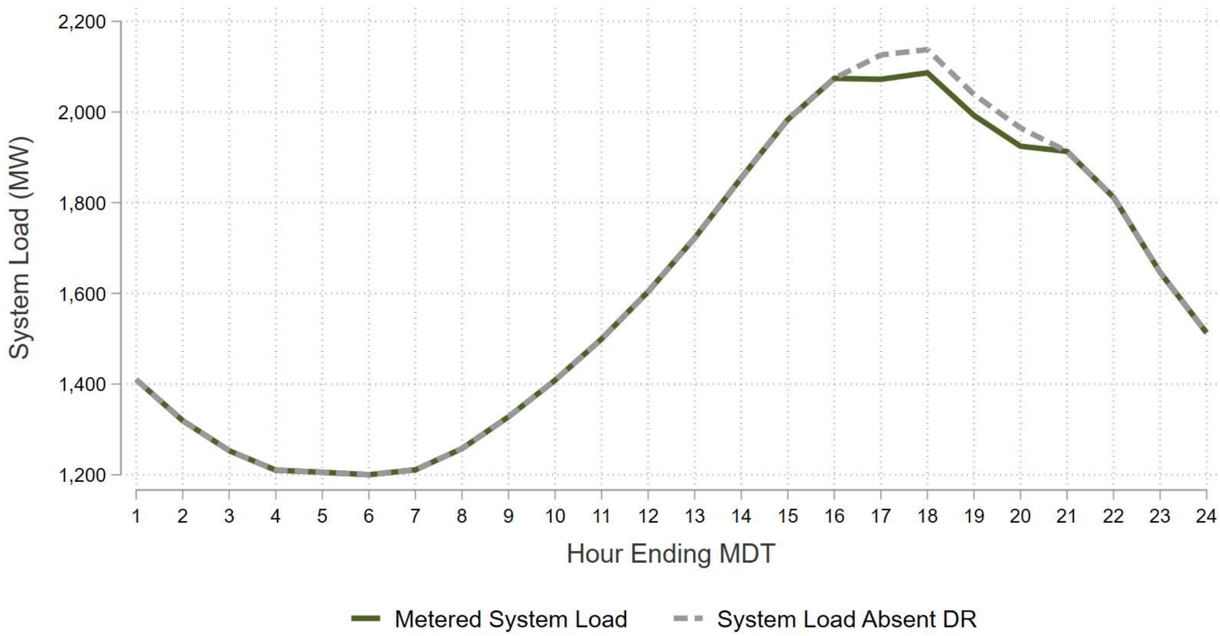
In PNM's future M&V reports, the independent evaluator shall verify that load reductions from deployment of PNM's LM programs avoided or offset the need for or use of additional peaking units or power purchases or shifted demand from peak to off peak period.

The evaluation team concludes that in 2023, the load management programs served as a capacity resource that avoided the need for additional supply-side peaking capacity. The summer of 2023 had both record levels of heat and gross demand, but only two events were called. The fact that the grid called for so few events illustrates the changing nature of reliability risk (when there is a risk that demand may exceed supply, or "loss of load risk") due to solar and other renewables shifting net demand (demand minus zero marginal cost renewables) away from summer afternoons and towards the summer evenings. In fact, PNM's most recent 2023 IRP predicts that the highest levels of loss load risk will be in the winter mornings by 2040.[20]

Figure 47 illustrates the benefits of the load management programs on system load for a high load DR event day in 2023. Metered gross load on PNM's system peaked at 2,086 MW on July 26, 2023, during hour ending 18:00 (Mountain Daylight Time). If we add back verified estimates of demand response performance, adjusted for line losses, the daily peak would have been 2,138 MW during hour ending 18:00 MDT. The load management programs flatten out system loads toward the top of the afternoon ramp, which reduces the quantity of peaking resources needed to balance the supply and demand.

20 2023 Integrated Resource Plan, section 7.3.5 https://www.pnmforwardtogether.com/assets/uploads/PNM-2023-IRP-Report-corrected-2023-12-18.pdf

Figure 47: PNM System Load July 26, 2023



The two PNM load management—or demand response—programs relied on similar analysis methods to estimate program impacts. Additional detail on the analysis methods used for both programs is included in Appendix E.

LOAD MANAGEMENT PROGRAMS AS A RESOURCE

PNM's demand side management portfolio includes both energy efficiency and demand response programs. While these two categories of programs both fall under the umbrella of demand side management, it is important to understand some key distinctions with respect to the nature of the resource provided. The two primary benefit streams from demand side management programs are:

- **Energy (kWh)** - the generation of electrical power over a fixed period of time. The avoided cost of energy is largely the cost of the fuel not burned in the marginal generating unit.
- **Capacity (kW)** - Capacity is the ability to provide energy when needed and assures that there will be sufficient resources to meet peak loads.

The primary objective of energy efficiency programs is to save energy. To the extent that the affected end-uses operate coincident with the system peak, energy efficiency measures will also provide capacity benefits. Demand response programs like Peak Saver and Power Saver are designed to provide capacity benefits. Their value lies in being able to reduce load quickly to balance the grid if needed. Demand response events typically result in net energy savings because the increased consumption following an event does not totally offset the reduced usage during an event. However, the distribution of benefits across resources is dominated by capacity.

Table 63 shows the energy and capacity benefits for the two demand response programs in 2023. Energy benefits amounted to less than one percent of Utility Cost Test (UCT) benefits, while capacity benefits accounted for more than 99 percent of the UCT benefits. This is different from PNM's energy efficiency programs, where capacity accounts for less than two-thirds of UCT benefits.

Table 63: 2023 Demand Response Program Benefits

Program	Energy Benefit ($1,000)	Capacity Benefit ($1000)	Percent Capacity
Power Saver	$6	$5,907	99.9%
Peak Saver	$2	$2,444	99.9%
Energy Efficiency Programs	$11,780	$20,830	63.9%

Another important distinction between energy efficiency and demand response is that demand response is a dispatchable resource and energy efficiency is not. When PNM supports an energy efficiency measure, the demand savings will remain present until the equipment reaches the end of its useful life. Demand response programs like Peak Saver and Power Saver are event-based resources that can be dispatched when needed. A critical thing to understand about dispatchable demand response resources is that they provide capacity benefits even if no events are called in a summer. How often demand response is dispatched and which units in the stack are displaced have almost no material impact on the cost effectiveness of demand response programs. In summer 2023, Peak Saver and Power Saver were dispatched twice (July 11th and July 26th).21

PNM's 2023 IRP estimates that their current peak summer load (which was forecast at approximately 2,000 MW in 2023), was expected to grow at 0.9% a year, resulting in a peak load of 2,129 MW in 2030 and a peak of almost 2,400 MW by 2043. This does not mean that each summer, peak loads will

21 There were two additional Power Saver M&V events during which only devices in the metering sample were dispatched.

equal 2,000 MW, because weather plays an important role in electric demand. Indeed, July 26th easily blew past 2,000 MW at its peak, even with the DR event being called. Figure 48 illustrates this relationship using PNM system loads (2018-2023) and weather records from KABQ's weather station in Albuquerque for the months of June through September.

System planners must design the system without knowing what weather conditions will be and ensure reliability even in extreme weather years. In addition to securing resources to meet forecasted demand, PNM planners maintain a reserve margin of resources above and beyond forecasted demand to ensure expected levels of reliability. In the 2023 IRP, PNM proposed a minimum reserve margin of 16 percent, a decrease (due to the retirement of baseload) from the prior IRP which has a reserve margin of 18 percent. This means that although peak demand is forecast at 2,000 MW, planners need at least 2,320 MW of capacity to satisfy resource requirements. If the peak load for a summer is 2,000 MW exactly and no resources experience outages or other disruptions, this means the 320 MW of capacity could go unused for the year. Summers like 2023 with temperatures above planning conditions underscore the importance of the reserve margin.

Figure 48: Daily Max PNM System Load and Temperature by Year, June-September

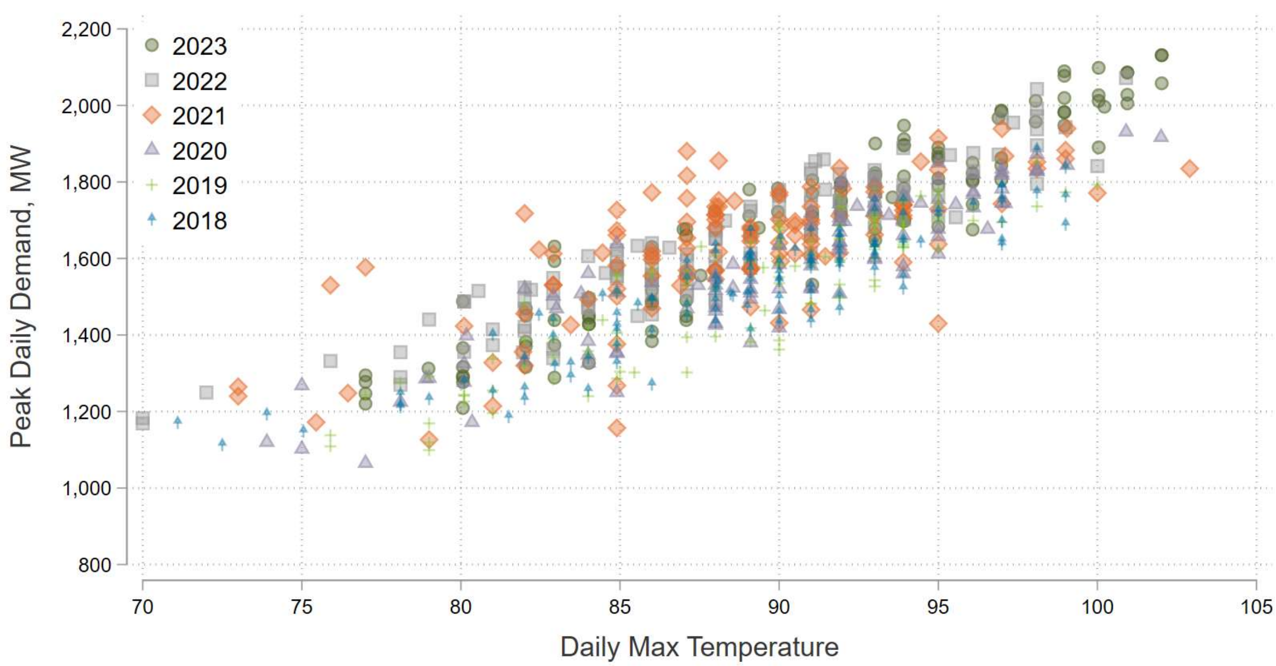
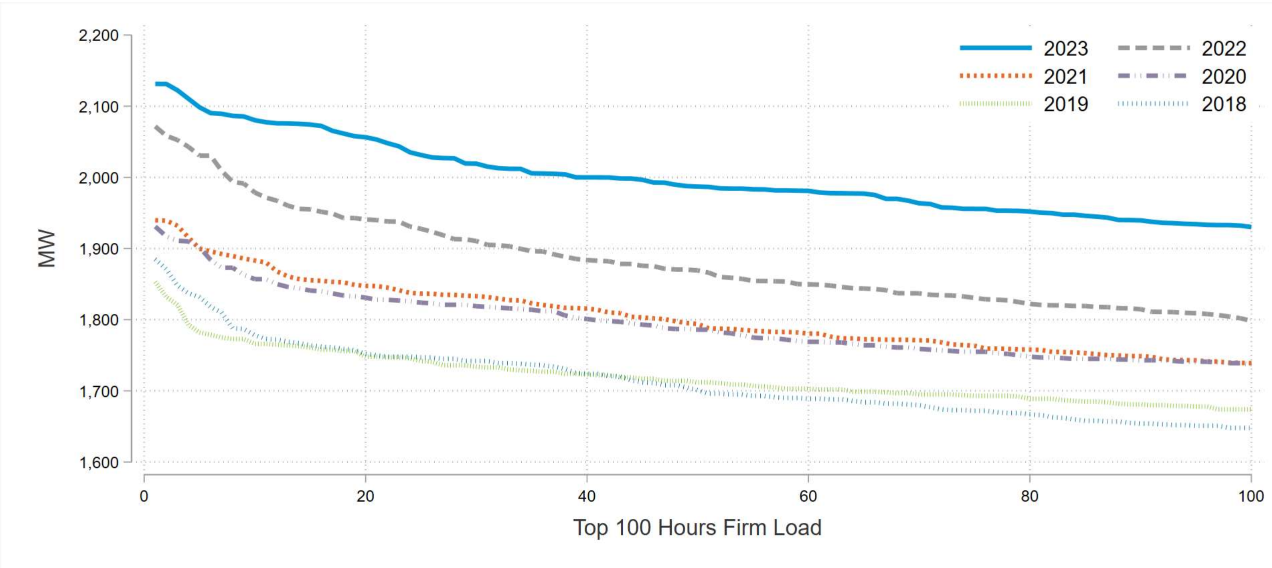


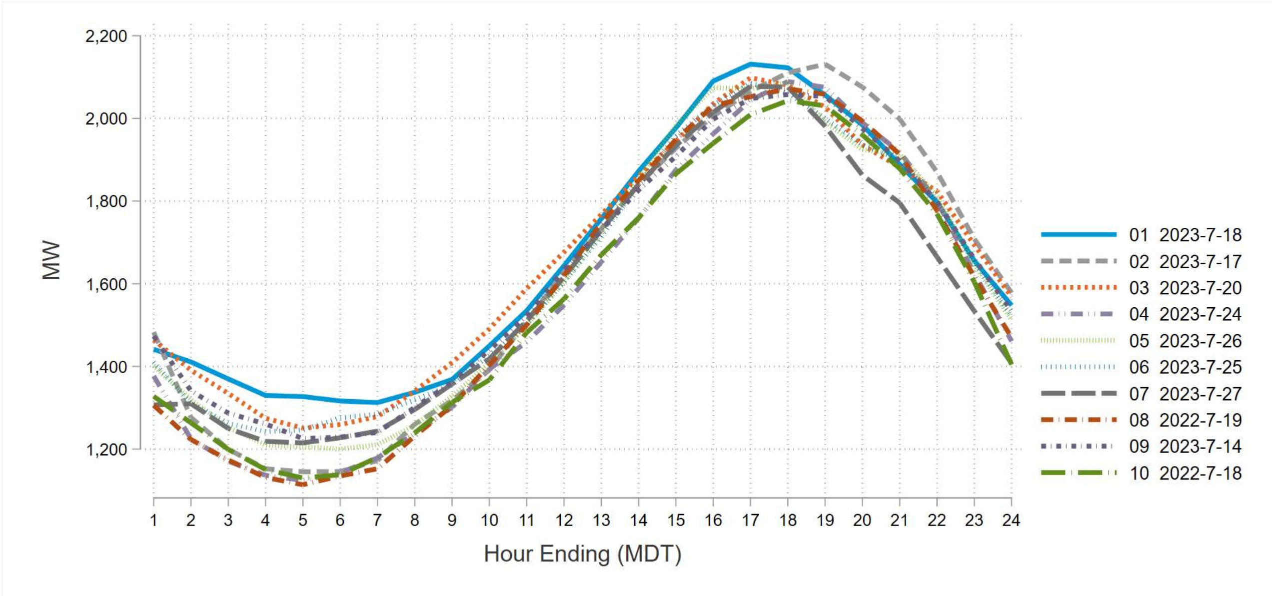
Figure 49 provides annual load duration curves for the top 100 hours of each year. Even within this very narrow portion of the year (1.1 percent of the hours in a year), the load duration curve has a very steep slope, especially at the very top. In 2023, there was a 51 MW difference between the top hour and the tenth-highest load hour for the year. Unlike prior years, though, these highs were spread across more days, with the top ten occurring on six different days. What is striking is how much higher the demand was in 2022 and then again in 2023.

Figure 49: Top 100 Hour Load Duration Curves 2018-2023



Dispatchable summer capacity resources like Peak Saver and Power Saver (which are only available in the summer) can be a good fit for the PNM system because peaks occur exclusively in the summer and are focused on specific afternoon and early evening hours. Figure 50 shows PNM's top 10 system load days of the last ten years. The top seven load days, and eight of the top ten, were in 2023, with 2022 accounting for the other two. The daily peaks occurred at hour ending 17 or 18 (4:00 p.m. to 5:00 p.m. and 5:00pm to 6:00pm) Mountain Daylight Time (MDT), but on July 17th, the peak occurred one hour later (from 6:00pm to 7:00 pm). All these days were weekdays.

Figure 50: Top 10 System Load Days 2014-2023



The reserve margin requirement is above and beyond the forecasted top hour. A supply-side resource like a natural gas peaking plant built to satisfy peaks plus reserve margin would operate very infrequently—which is not a cost-effective way to operate a power plant. Furthermore, PNM established a goal to be carbon-free by 2040. A fossil fuel peaking resource would be both economically challenged and work against PNM's stated decarbonization goals. Demand response resources work best when dispatched infrequently because it reduces fatigue of participants and limits the financial incentive the utility needs to provide. DR programs like Peak Saver and Power Saver are both aligned with PNM's environmental goals and avoid the costly capital investments of new generation resources.

The Peak Saver and Power Saver programs, however, also have several limitations, as described in the PNM 2023 IRP, and reflected in the 70% ELCC assigned to the LM programs. Specifically, demand response programs can only be dispatched for several hours at a time (events have historically been four hours in duration) and neither Peak Saver nor Power Saver can be called on weekends or the first weekday after a holiday weekend.

Like most vertically integrated utilities, PNM treats energy efficiency and demand response differently in its demand forecast and resource stack. Incremental energy efficiency (because it is not dispatchable) lowers the energy and demand forecast. Demand response programs (because they are dispatchable) are listed alongside power plants as resources available to meet demand. Like traditional supply-side resources, demand response programs have a position in the dispatch stack. Although there is no fuel cost associated with demand response programs, there is a definite relationship between how often demand response participants are dispatched and the cost of the resource.

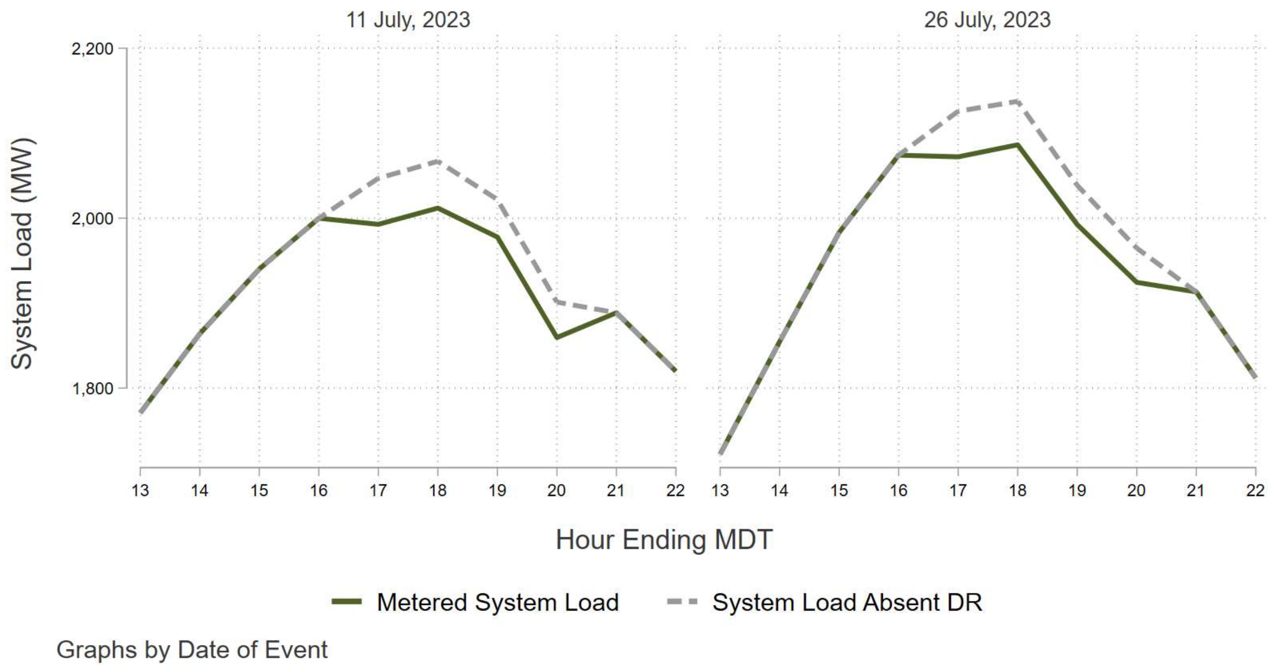
The EcoMetric team understands that demand response dispatch has a two-part trigger:

1. If the day-ahead temperature forecast is 96 degrees or higher.
2. A day-of assessment by the Power Operations and Whole Power Marketing departments to assess transmission/capacity constraints or generation issues. These groups also consider participant fatigue and will decide to not dispatch if there are no constraints.

The value in load management programs lies in being able to dispatch the resources when needed, and PNM staff are in the best position to determine when the assets are needed from an operational standpoint. Ideally, load management programs operate like an additional peaker plant, and are only deployed when most needed. Ideally, these events should be called when the grid is under the most amount of stress, when demand is highest, and supply can barely meet it.

In the past, those times would be in the afternoons on the hottest days. But despite 2023 having 8 of the top 10 hottest days of the last decade (Figure 50), only one of those days had an event called. And while in the past, most events were called to start on the hour ending at 2:00 pm MDT, both events this summer were called to start on the hour ending at 4:00 pm, which included the peak, but also was more hours *after* the gross peak (Figure 51).

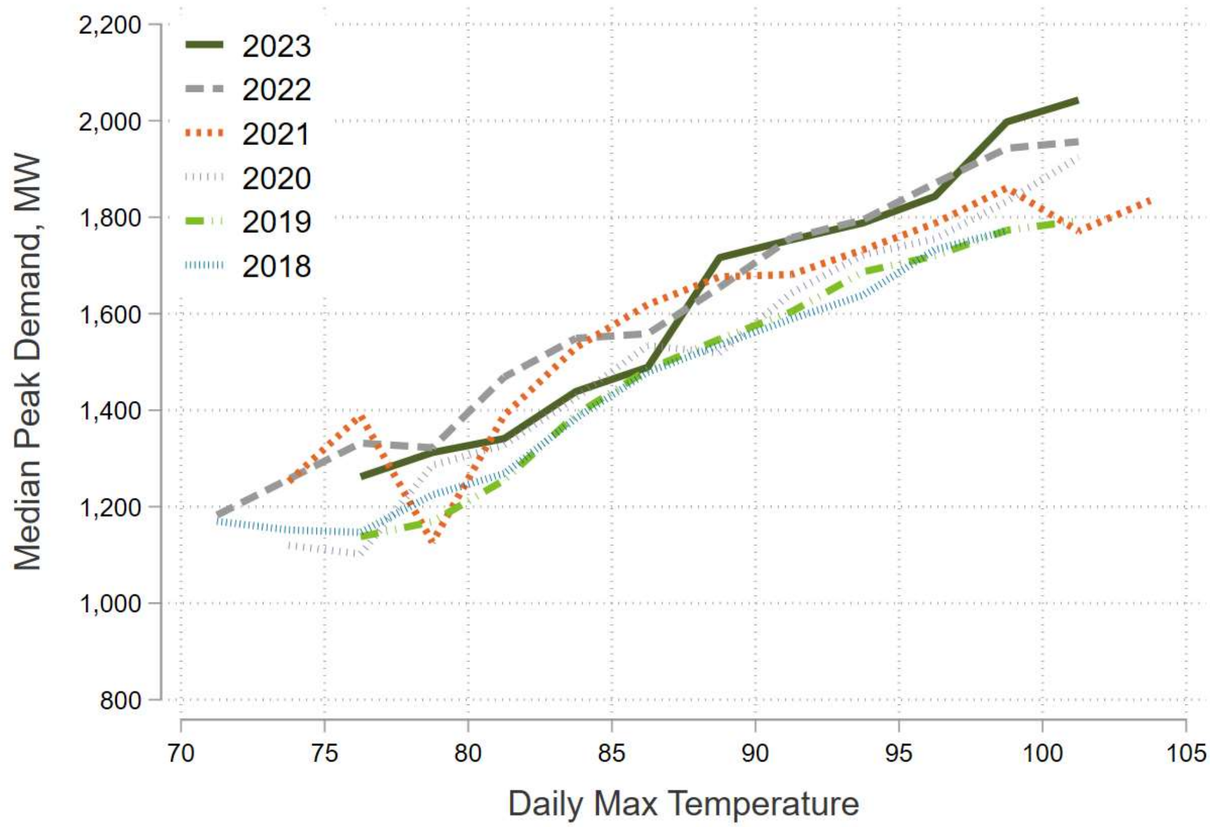
Figure 51: PNM Load on All Event Days, 2023



Why were events called so infrequently, despite record demand, and why were they called later? PNM greatly increased the solar supply in 2023: according to the 2023 IRP, Utility-Scale Solar PV Capacity rose from just under 400 MW in 2022 to just under 800 MW in 2023. If all the contracted and approved projects come online in the next three years, the capacity will double again. This is equivalent to a reduction in demand during the afternoon of spring and summer months of 400 MW, meaning that despite record gross demand, net demand was likely still manageable without deploying DR events. Events will continue to be called later into the evening hours and may not necessarily be called on the hottest days provided new solar keeps pace with new demand. Increasing, load management events may be tied to low renewable production rather than high gross loads.

While net demand is not resulting in many more called events, DR events could still increase in the short term if new solar doesn't keep up with projected levels of installations, because gross demand is growing independent of weather and climate trends. While 2023 had more hot days where the maximum temperature was above 100 degrees (12) than any other year (no other year in the past decade had more than three), Figure 52 shows that those days also resulted in more gross demand than similarly hot days in the past.

Figure 52: Median Daily Load Maximum by Daily Max Temp



If this growth in gross demand continues, and climate change ensures that temperatures above 100 degrees occur more frequently, DR events could be the key to preventing the need for more thermal generation capacity to be built or kept online past its retirement date. On the other hand, if renewables can continue to go online at the planned speed, net demand will stay steady, and DR events may only be needed sparingly when renewables underdeliver due to weather or base load is offline due to maintenance. We expect load management events to be:

- Later in the evening, targeting the net peak
- Shorter in duration as net peaks tend to be sharper than gross peaks
- Later in the summer, as solar production wanes

Because the capacity benefits are the dominant benefit stream for demand response programs, the primary research question for evaluation is “what kW reduction can each program be expected to provide if dispatched during system peak conditions?” This is why readers will note that the evaluation results in the Power Saver and Peak Saver impact results subchapters focus on inferences about expected, or *ex ante*, impacts at peaking conditions rather than simple averages of observed impacts during 2023 events. We analyzed the last six summers of Power Saver results to develop a time-temperature matrix and estimate the expected impact from 5:00 p.m. to 6:00 p.m. at 100 degrees Fahrenheit (F). Our verified savings analysis of PNM's load management program performance estimates approximately 58 MW of load reduction capability across Power Saver and Peak Saver at the system level.

The avoided cost of capacity value used to monetize capacity benefits from demand side management programs is $154/kW-year. This value is consistent with projections the evaluation team has seen in other jurisdictions of the cost a new combined-cycle natural gas plant would need in order to recover its capital investment and fixed costs, given reasonable expectations about future cost recovery over its economic life.22 The underlying premise is that the availability of PNM's demand response programs is allowing the utility to defer or avoid the construction or purchase of additional generation capacity. However, if very high demand days are more frequent with climate change, then either more events will need to be called, or the demand response programs will no longer be able to avoid adding more capacity, and their value may erode.

Looking forward, the current load management programs expire after 2026 and can be extended for another three years after that. The 2023 IRP counts them as having an Effective Load Carrying Capacity (ELCC) of 23 MW, although that is a very conservative estimate, as both events in 2023 produced over 50 MW of savings at their peaks. This resource will continue to serve PNM well when it is needed, preventing the need for maintaining expensive peaker plants that may only be needed twice a year.

Specific details on the Power Saver and Peak Saver programs are presented in the following two sections.

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22 In a low-carbon planning environment such as that conducted by PNM for the 2020 IRP in accordance with the New Mexico Energy Transition Act, an energy storage device or combustion turbine may be more appropriate alternative sources of generation capacity.

8.1 INTRODUCTION

The PNM Home Energy Reports (HER) program provides customers with information on their energy consumption that includes a "neighbor comparison" with a matched set of similar households. This normative comparison is delivered via email or regular mail and motivates recipients to conserve energy. The HER messaging also includes tips on how to reduce energy consumption. Almost half of PNM's 480,000 residential accounts received HERs in 2023.

In 2023, five waves (or cohorts) of households were active and received HERs. The first two waves, launched in 2021, were delivered as randomized controlled trials (RCTs) where the program implementer randomly assigned customers to either a treatment group (receives the HERs) or a control group (does not receive the HERs). The RCT framework facilitates the measurement of impacts. At a high level, consumption in the control group serves as a baseline for what consumption in the treatment group would be absent behavioral changes due to HER delivery. The other three waves recycle some control group homes from prior waves, meaning the experimental cells for these waves are not fully randomized. Thus, the latter three waves are not truly RCTs.

Table 64 summarizes the average number of active households for these five cohorts. Some waves receive communications exclusively via email, and the other waves receive paper HERs via delivery mail.

Table 64: PNM HER Cohorts Summary

Wave	Program Start Date	Treatment Group Size	Control Group Size
2021 Email	6/3/2021	120,442	13,639
2021 Paper	6/4/2021	29,864	12,822
2021 Email Expansion	12/4/2021	18,702	8,237
2023 Email Refill	6/6/2023	20,452	19,607
2023 Paper Expansion	1/21/2023	28,210	9,194

We estimate that the HER program delivered 9,219 MWh of energy savings and 2.17 MW of peak demand savings in program year 2023. Table 65 shows the gross energy and peak demand savings for each wave. We do not show a traditional realization rate calculation since the reported and verified savings span slightly different time periods. The reported savings span January to November 2023 while the verified savings cover November 2022 to October 2023. Statistically significant savings were only detected in the initial email and delivery mail waves from 2021. Additional details regarding our analysis are included in the sections that follow.

Table 65: PY2023 Gross Savings

Wave	Annual Energy Savings (MWh)		Peak Demand Savings (MW)	
	Reported	Verified	Reported	Verified
2021 Email	5,285	5,549	0.00	1.29
2021 Email Expansion	0	0	0.00	0.00
2021 Paper	3,745	3,671	0.00	0.88
2023 Email Refill	0	0	0.00	0.00
2023 Paper Expansion	566	0	0.00	0.00
Total	**9,597**	**9,219**	**0.00**	**2.17**

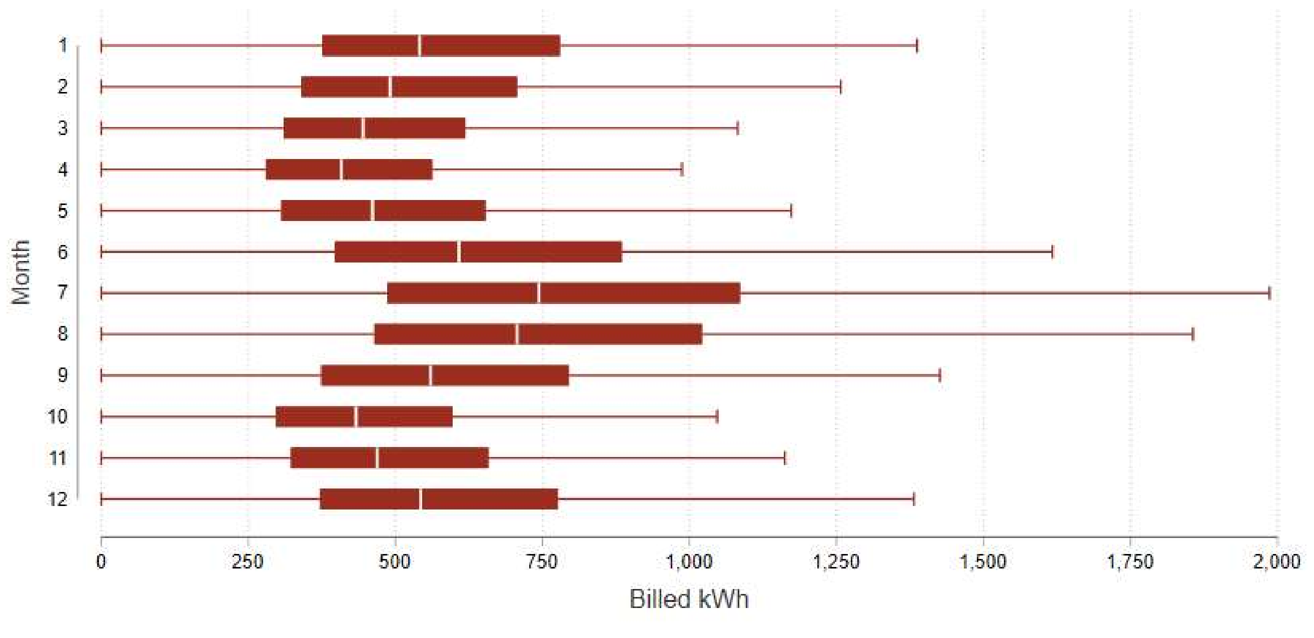
8.2 METHODOLOGY

INPUT DATA

The primary data used for this analysis was monthly electric billing data for the treatment and control group homes. Due to the timing of this analysis, we were not able to get a complete record of 2023 bills for the relevant homes. For most customers, our last bill comes from October 2023. This means we cannot directly estimate savings accrued in November 2023 or December 2023. Instead, we use savings from November 2022 and December 2022 as a proxy for November-December 2023 savings.

Some key fields in the billing data are billed consumption, cycle start date, and cycle end date. By month, Figure 53 shows the distribution of billed kWh across all bills in our data set (roughly 11 million total bills). Consumption is highest in the summer months and lowest in the shoulder months. For the waves that were launched in 2021, we had an average of 39 monthly records per home. For the waves that were launched in 2023, we had an average of 23 monthly records per home.

Figure 53: Distribution of Billed kWh by Month



CALENDARIZATION

Because billing cycles typically span two calendar months and read dates vary from customer to customer, we "calendarized" the billing data before estimating energy impacts. In calendarizing the data, the goal is to prorate billing data into a calendar month basis shared by all participants. This process is described through example below. Table 66 contains four months of simulated billing data. The data and time periods are hypothetical and not from an actual PNM customer.

Table 66: Simulated Billing Data

Billing Period	Nov 12th – Dec 11th	Dec 12th – Jan 11th	Jan 12th – Feb 11th	Feb 12th – Mar 11th
Usage (kWh)	559	650	548	506
Average Daily	18.63	20.97	17.68	18.07

For each billing period, average daily usage can be calculated by dividing total usage by the number of days in the billing period. For example, there are thirty days in the November 12th – December 11th billing period, so the average daily usage is 559 / 30 = 18.63 kWh. This value can then be assigned to each day in the billing period. Table 67 shows estimated daily usage for each day in December.23 Note that the first eleven days reflect the November 12th – December 11th billing period, and the last twenty days reflect the December 12th – January 11th billing period.

Table 67: Redistribute December Billing Data

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 18.63	2 18.63	3 18.63
4 18.63	5 18.63	6 18.63	7 18.63	8 18.63	9 18.63	10 18.63
11 18.63	12 20.97	13 20.97	14 20.97	15 20.97	16 20.97	17 20.97
18 20.97	19 20.97	20 20.97	21 20.97	22 20.97	23 20.97	24 20.97
25 20.97	26 20.97	27 20.97	28 20.97	29 20.97	30 20.97	31 20.97

Summing the estimated daily usage values within each month yields prorated consumption values. This is illustrated in Table 68 for December, January, and February.

Table 68: Calendarized Billing Data

Value	December 2022	January 2023	February 2023
Estimated kWh	11(18.63) + 20(20.97) = 624.33	11(20.97) + 20(17.68) = 584.27	11(17.68) + 17(18.07) = 501.67
Average Daily kWh	624.33 / 31 = 20.14	584.27 / 31 = 18.85	501.67 / 28 = 17.92

23 2022 calendar is used for this example.

ESTIMATING ANNUAL ENERGY IMPACTS

To calculate program savings for each wave, the EcoMetric team employed a Lagged Dependent Variable (LDV) regression model similar to the model Bidgely uses to calculate reported savings. Equation 1 shows the basic form of the LDV model. The LDV model is estimated exclusively using post-treatment observations ("post-only") but uses the average daily energy consumption from the month of interest prior to treatment (kWhi,m,y-n) as an independent variable.

Equation 1: LDV Model Specification

$$kWh_{imy} = \beta_0 + \sum_{m=1}^{12} \sum_{y=202}^{2023} (\beta_{my} * I_{my} * kWh_{i,m,y-n}) + \sum_{m=1}^{12} \sum_{y=2021}^{2023} (\tau_{my} * I_{my} * treatment_{imy}) + \varepsilon_{imy}$$

Table 69 provides information about the terms in the LDV model specification.

Table 69: LDV Model Definition of Terms

Variable	Definition
$\mathrm{kWh}_{\mathrm{imy}}$	Customer i's average daily energy usage in bill month m in year y.
β0	Intercept of the regression equation.
I_{my}	An indicator variable equal to one for each monthly bill month m, year y, and zero otherwise. This variable captures the effect of each billing period's deviation from the average energy use over the entire time series under investigation.
β_{my}	The coefficient on the bill month m, year y indicator variable.
$kWh_{i,m,y-n}$	The billed kWh for customer i in bill month m in the year prior to the assignment to treatment condition. The term n represents the number of years home i has been in the program. This term controls for variability in customer characteristics such as home size and heating fuel.
$\mathrm{treatment}_{\mathrm{imy}}$	The treatment indicator variable. Equal to one when the treatment is in effect for the treatment group. Zero otherwise. Always zero for the control group.
τ_{my}	The estimated treatment effect in kWh per day per customer; the main parameter of interest.
$\varepsilon_{\mathrm{imy}}$	The error term.

The LDV regression model returns an estimate of the average daily savings per treated household in month m and year y. To compute the aggregate MWh savings attributable to HER delivery for a specific wave, we multiply the estimated treatment effect (saved kWh per treatment home per day) by the number of days in each month and the number of active households in the treatment group.

ESTIMATING PEAK DEMAND IMPACTS

Since we cannot directly estimate peak demand savings with monthly billing data, the EcoMetric team used a New Mexico residential whole house electric load shape from NREL's ResStock load shape library[24] to distribute energy savings in the summer months to an hourly basis. This approach assumes that the HER effect is load-following.

Our peak demand multiplier was calculated as follows:

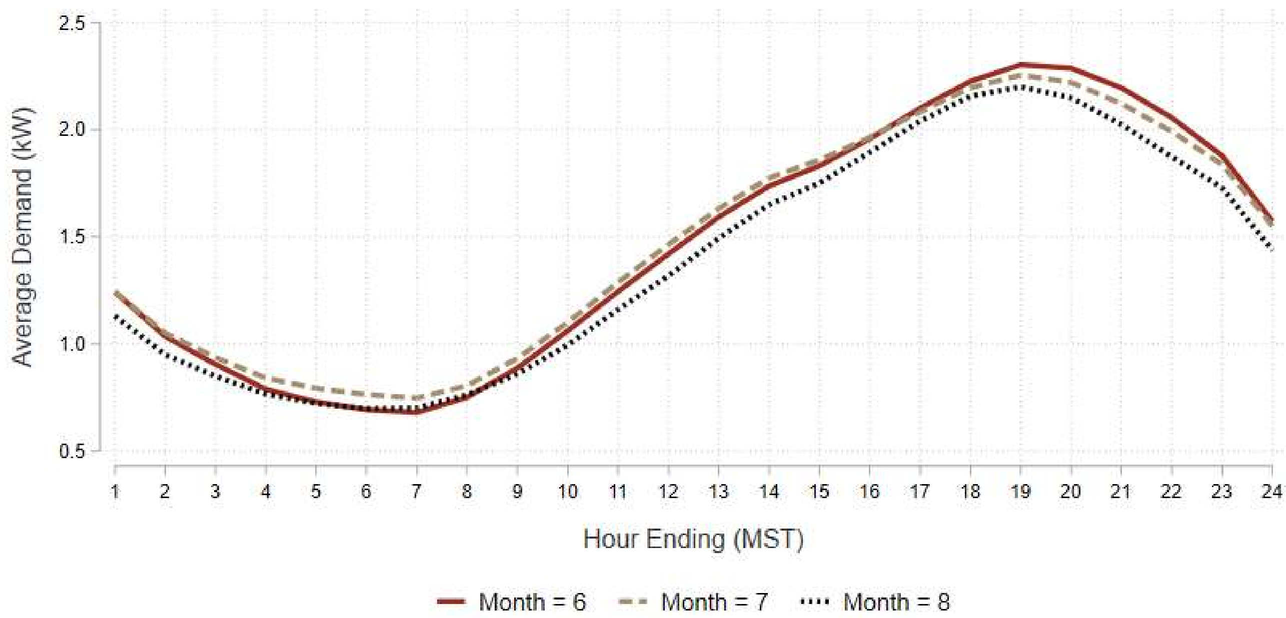
- We trimmed the New Mexico residential whole house electric load shape to June-August to reflect the summer peak period.[25] Figure 54 shows average hourly load profiles for each month. As expected, load climbs as outdoor temperature increases and peaks in the late afternoon.
- The ratio of average load during hour ending 18 (treating this as the peak hour) over average load for all hours and days of the summer peak period was calculated.
- The resulting value (1.519) was used as the peak demand multiplier. Peak demand savings are then calculated as:

$$Peak\ Demand\ Savings = \frac{Peak\ Months\ Energy\ Savings\ (MWh)}{2{,}208\ hours} * 1.519$$

24 https://www.nrel.gov/buildings/end-use-load-profiles.html

25 We're treating the summer peak period as June-August non-holidays weekdays during the 5-6 PM hour.

Figure 54: New Mexico Residential Load Profiles, June-August



8.3 RESULTS

GROUP EQUIVALENCE

Assuming treatment and control groups consume the same amount of energy *prior* to HER delivery, differences between the groups *after* HER delivery begins can be attributed to the HERs. Thus, one important step in our analysis is to compare pre-treatment consumption in the treatment and control groups for each wave. Ideally, average daily consumption is roughly the same between the two experimental groups.

The EcoMetric team assessed pre-treatment equivalence between the treatment and control groups in three ways. The first method was a visual comparison and the latter two were more scientific. Regarding the visual comparison, Figure 55 compares average daily consumption (pre-treatment) between the treatment and control groups for the 2021 Email and 2021 Paper waves. Figure 56 makes the same comparison for the 2021 Email Expansion and 2023 Paper Expansion waves. Finally, Figure 57 makes the comparison for the 2023 Email Refill wave. Pre-treatment differences between treatment and control groups are negligible amongst the initial and the expansion waves. For the 2023 Email Refill wave, differences between groups are not negligible. Control participants show higher consumption than treatment group participants in every pre-treatment month.

Figure 55: Pre-Treatment Equivalences – Initial Cohorts

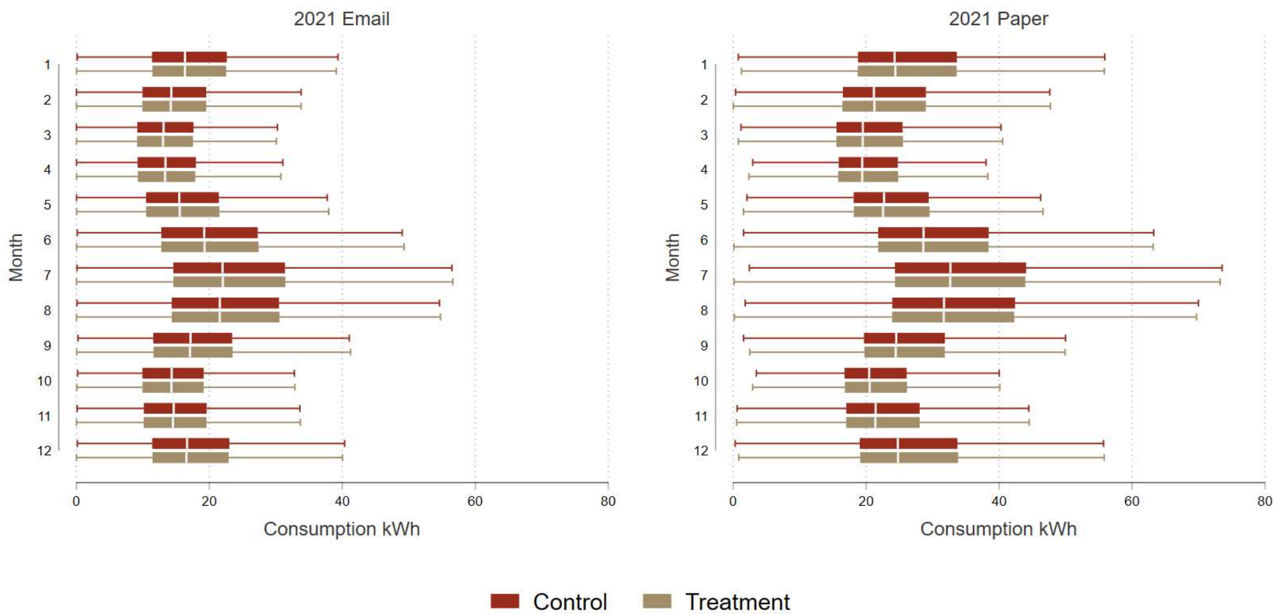


Figure 56: Pre-Treatment Equivalences – Expansion Cohorts

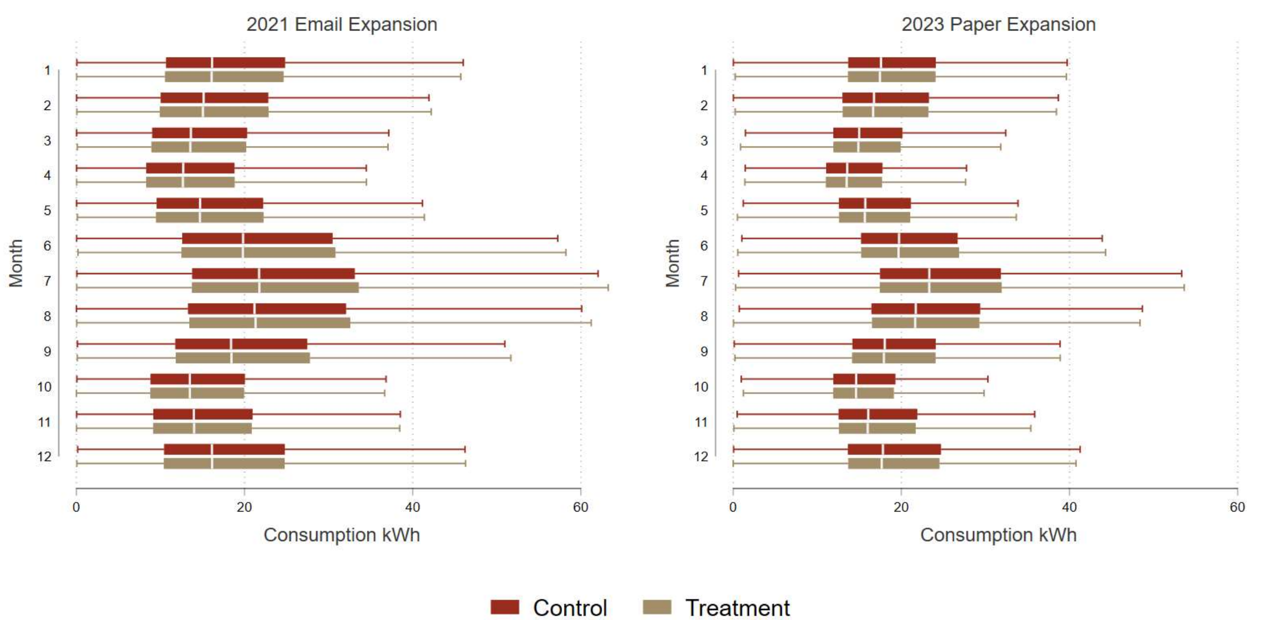
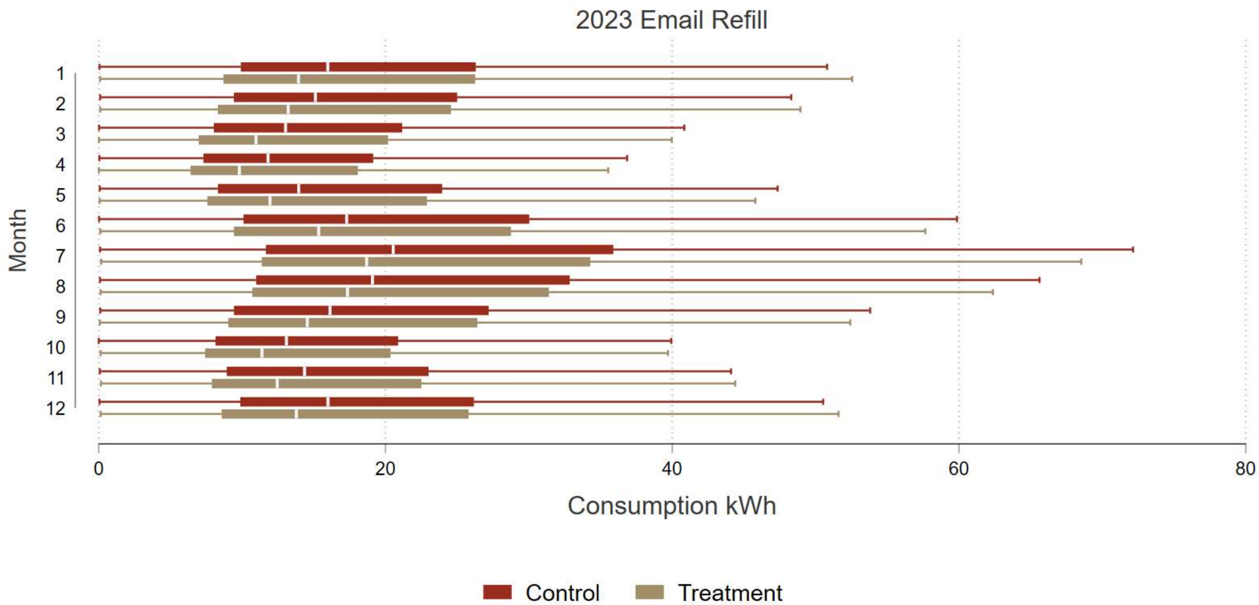


Figure 57: Pre-Treatment Equivalence – Refill Cohort



To corroborate findings from the visual inspection, our team also performed two scientific comparisons. The first method was a fixed effects regression model that estimates the difference in average daily consumption between the two groups. The second method was a t-test that compares average daily usage between treatment and control. The results of these tests, shown in Table 70, indicate there are not statistically significant pre-treatment differences between treatment and control groups in four of the five waves. In the fifth wave (2023 Email Refill), the EcoMetric team found differences in pre-treatment daily usage to be statistically significant (at the 5% significance level).

Interestingly, 31.8% of control group homes in the 2023 Email Refill wave were also used as controls in other waves, raising concern about the absence of randomization in the group assignment and potentially introducing noise into the estimated gross savings.[26] Selecting control group participants for reuse rather than random assignment carries the risk that certain characteristics or factors influencing their behavior may be confounding the effect, creating a scenario where the observed outcomes cannot be solely

26 For waves 2021 Email Expansion and 2023 Paper Expansion, the percentages are 17.7% and 18.0%, respectively.

attributed to HER delivery. The EcoMetric team decided to omit the 2023 Email Refill wave's impacts from the program savings estimates for 2023 based on the failed equivalence test shown in Table 70.

Table 70: Pre-Treatment Equivalence Tests on Daily Usage

Wave	Treatment Mean	Control Mean	FE Regression		T-Test
			Treatment Effect	P-Value[1]	P-value[1]
2021 Email	17.47	17.48	-0.02	0.77	0.53
2021 Email Expansion	18.97	18.96	0.02	0.89	0.74
2021 Paper	26.77	26.77	0.00	0.98	0.97
2023 Email Refill	20.79	20.64	0.16	0.40	0.01
2023 Paper Expansion	19.80	19.83	-0.03	0.68	0.37

[1] A p-value less than 0.05 indicates the difference between groups is non-trivial (i.e., statistically significant).

ANNUAL ENERGY SAVINGS

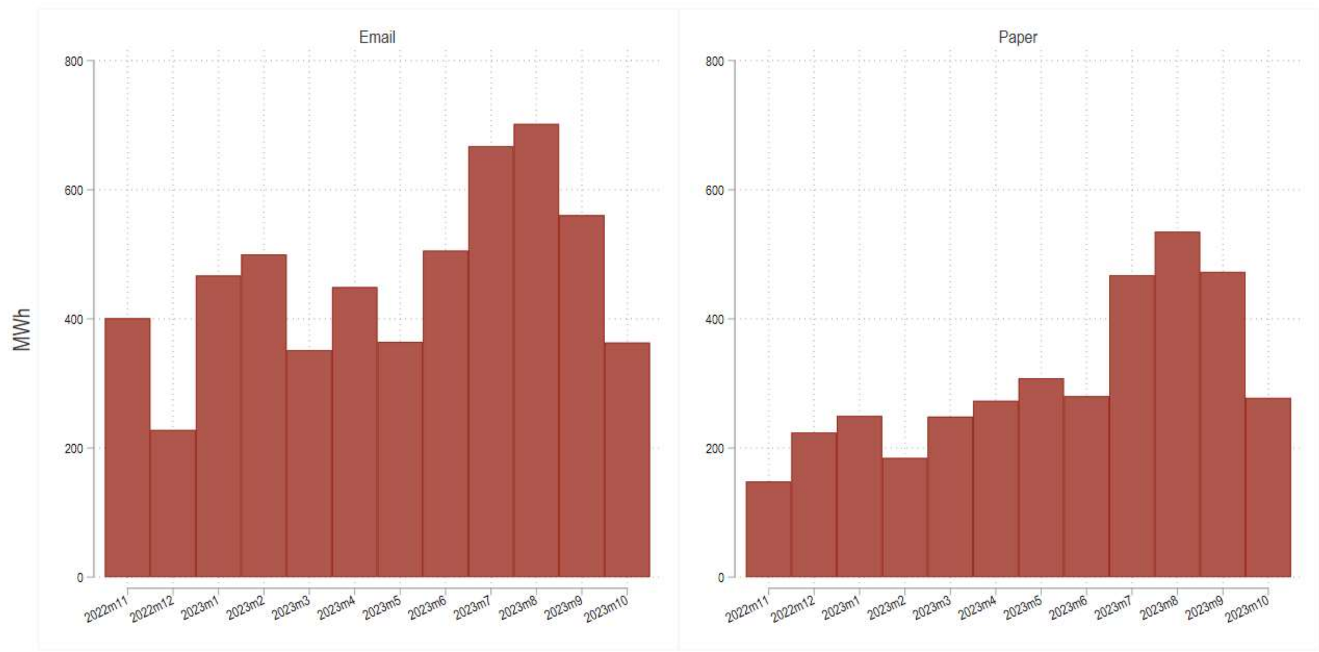
Statistically significant savings were only detected in the 2021 Email and 2021 Paper waves. A statistically significant *increase* in load was detected in the 2023 Email Refill group, but we are omitting impacts from this wave due to the failed equivalence check. Treatment effects in the two expansion waves were not found to be statistically significant. Gross MWh savings for each wave are shown in Table 71. The distribution of these savings throughout 2023 can be seen in Figure 58.

Table 71: 2023 Gross Energy Savings

Wave	Annual Energy Savings (MWh)
2021 Email	5,549
2021 Email Expansion	0
2021 Paper	3,671

Wave	Annual Energy Savings (MWh)
2023 Email Refill	0
2023 Paper Expansion	0
Total	**9,219**

Figure 58: Gross Monthly MWh Savings for 2021 Email and 2021 Paper Waves



By month, Figure 59, Figure 60, and Figure 61 show the treatment effect (kWh saved per home per day) for each wave. In these figures, negative values indicate energy savings. Note our decision to include or exclude savings is based on statistical significance over the 12-month period, not month-by-month.

Figure 59: Monthly Impacts – Initial Cohorts

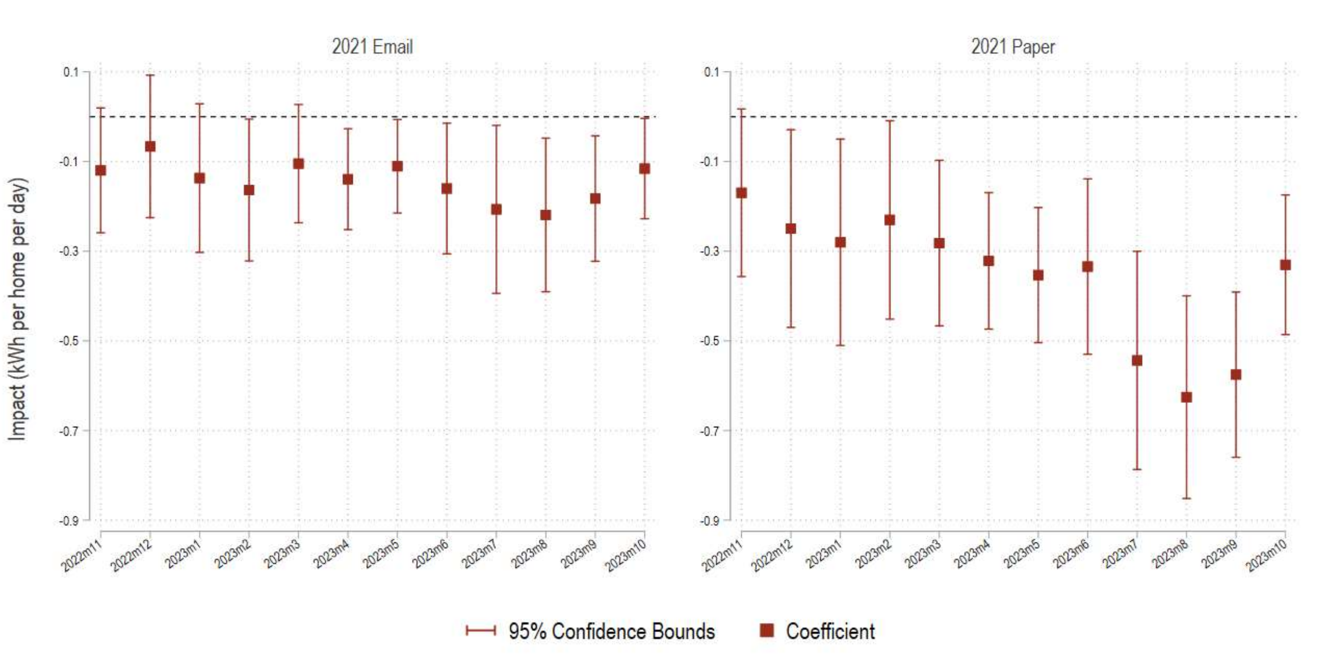


Figure 60: Monthly Impacts – Expansion Cohorts

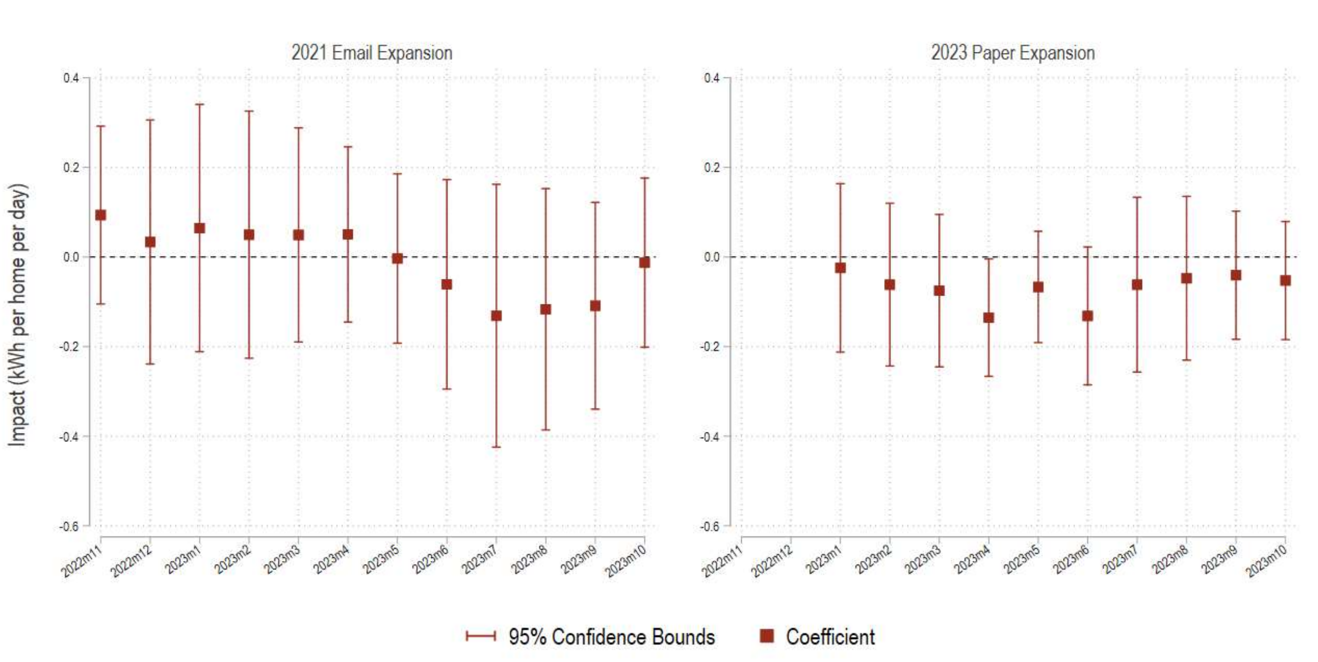
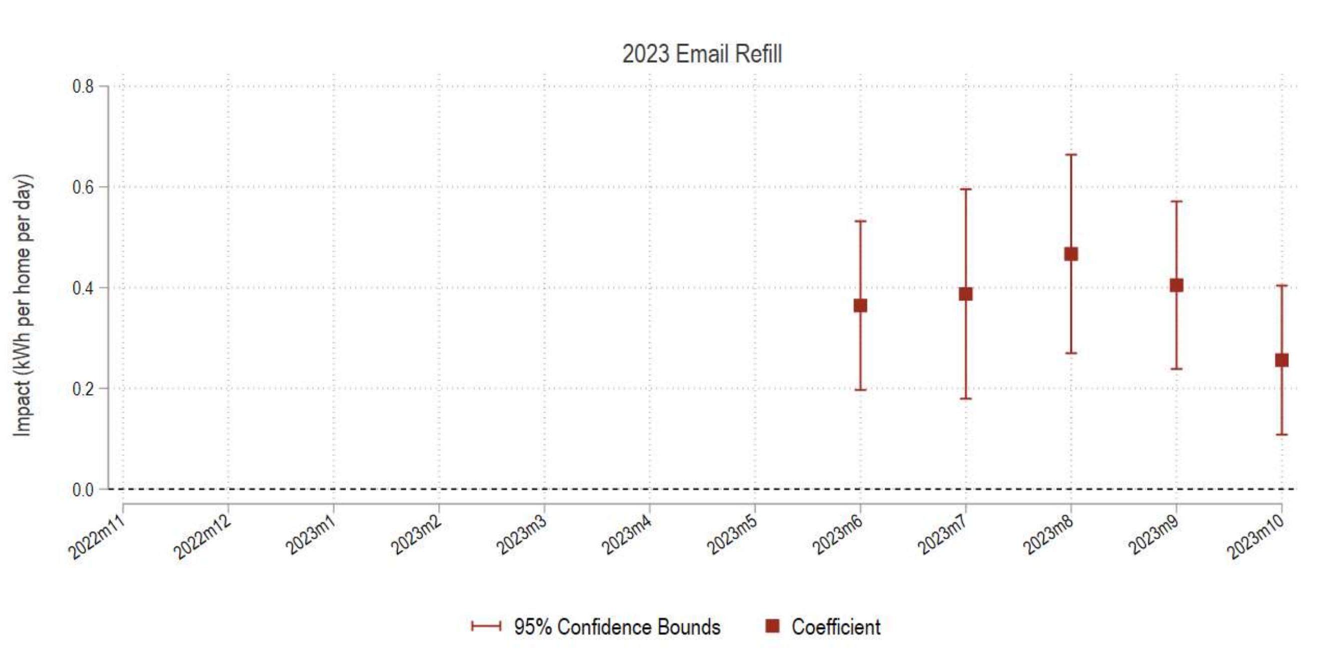


Figure 61: Monthly Impacts – Refill Cohort



PEAK DEMAND IMPACTS

As discussed in the Estimating Peak Demand Impacts section, we could not use monthly billing data to directly estimate peak demand savings. Instead, we used a peak demand multiplier (1.519) to calculate peak demand savings. The calculation was as follows:

$$Peak\ Demand\ Savings = \frac{Peak\ Months\ Energy\ Savings\ (MWh)}{2{,}208\ hours} * 1.519$$

The peak months energy savings (3,153 MWh) was converted to MW by dividing by 2208 hours and scaled by the peak demand multiplier (1.519). Thus, the peak demand savings is 2.17 MW. Peak demand savings by wave are shown in Table 72. Since three of the waves did not produce statistically significant energy savings, they also did not produce peak demand savings.

Table 72: 2023 Peak Demand Savings

Wave	Peak Demand Savings (MW)
2021 Email	1.29
2021 Email Expansion	0.00
2021 Paper	0.88
2023 Email Refill	0.00
2023 Paper Expansion	0.00

Wave	Peak Demand Savings (MW)
Total	2.17

ACTIVE TREATMENT COUNTS AND ATTRITION

Our active treatments counts were calculated using the raw, non-calendarized billing data. Treatment customers are considered active through the end of the month that they received their last bill. For example, if a customer received their last bill in the middle of August 2023, then they would be counted in June, July, and August 2023, but not in September or any month following. Figure 62 shows the active customer counts by wave and month, and Table 73 shows the number of active treatment group homes in January 2023 and in October 2023. The attrition rate is under 7% for both initial waves, but it's around 10% on average across the expansion and refill waves.

Figure 62: Active Treatment Counts

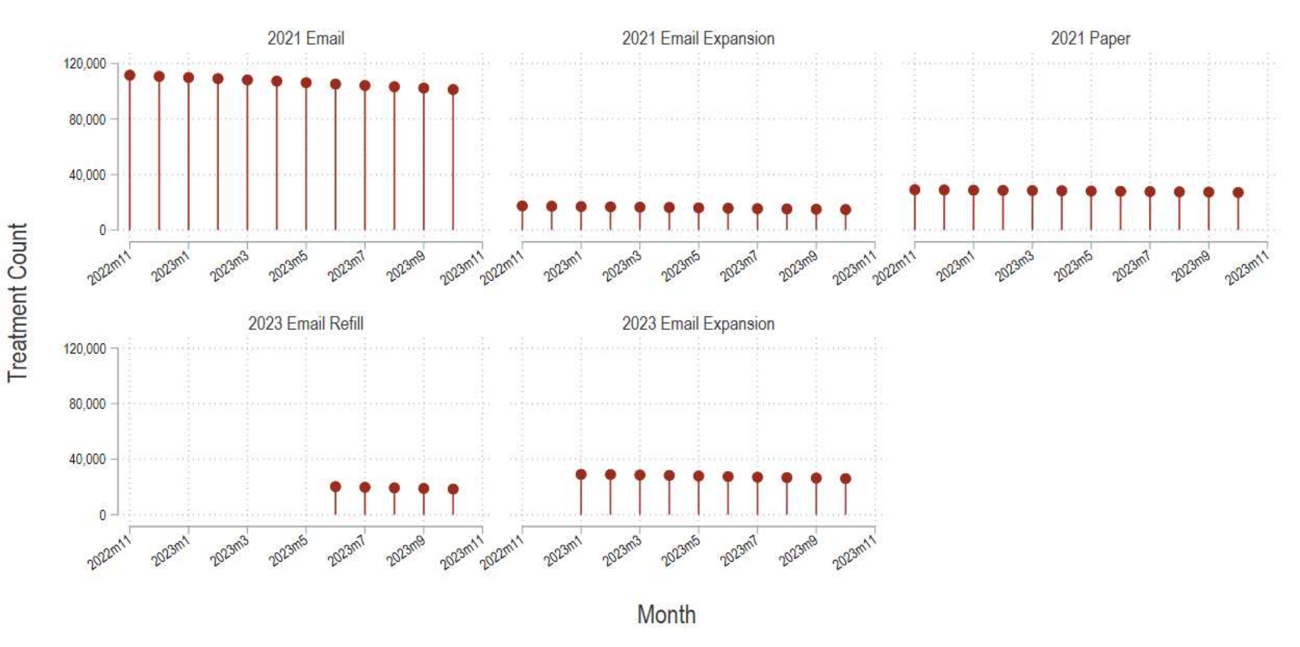


Table 73: Active Treatments by Month and Wave

Wave	Count of Treatment Homes in January 2023	Count of Treatment Homes in October 2023	Attrition Rate
2021 Email	109,942	101,266	7.9%
2021 Email Expansion	16,973	14,798	12.8%
2021 Paper	28,763	27,128	5.7%
2023 Email Refill	20,230[1]	18,472	8.7%
2023 Paper Expansion	29,069	26,045	10.4%

[1] This wave was launched mid-2023. This count comes from June 2023 rather than January 2023.

8.4 FINDINGS AND RECOMMENDATIONS

The EcoMetric team offers the following observations regarding the performance of the active cohorts in 2023:

- Verified savings for the Home Energy Reports program increased by over 300% compared to 2022. The increase has little to do with the increased number of homes treated in 2023. Rather the increased rate of savings among the two original waves from 2021 drives the growth in program savings.
- The EcoMetric team chose to estimate peak demand savings for the HER program even though PNM's implementer did not claim peak kW savings. While the load shape of behavioral savings cannot be measured without AMI, it would be virtually impossible to save 9,219 MWh amongst a diverse group of homes without lowering peak demand. We assume the savings are load following.
    - A shortcut PNM may wish to consider in 2024 is to divide the reported MWh savings for June-August by 1,454.
- The 2021 Email Expansion and 2023 Paper Expansion waves may need more frequent or aggressive messaging to produce statistically significant savings.
- The 2023 Email Refill group was not randomized, lacks equivalence, and therefore does not return reliable savings estimates. Since the launch was not properly implemented, we recommend dissolving this wave and requiring all new waves to be properly randomized.

9 COST EFFECTIVENESS RESULTS

Earlier chapters presented the UCT cost effectiveness results for those programs evaluated in 2023. This chapter presents a summary of the cost effectiveness calculations for all of the PY2023 PNM programs.

As discussed previously, in order to do the UCT calculation, the evaluation team obtained the following from PNM:

- Avoided cost of energy for Energy Efficiency and Demand Response (costs per kWh over a 20+ year time horizon);
- Avoided cost of capacity for Energy Efficiency and Demand Response (estimated cost of adding a kW/year of generation, transmission, and distribution to the system);
- Avoided cost of CO_2 (estimated monetary cost of CO_2 per kWh generated);
- Avoided transmission and distribution costs;
- Discount rate;
- Line loss factor; and
- Program costs (all expenditures associated with program delivery).

Additional considerations for the UCT as applied to the PNM programs:

- PNM does not quantify the avoided cost of transmission and distribution.
- PNM provided a levelized avoided cost of capacity, to which the discount rate was not applied further.
- The NMPRC allows for the benefits of low-income programs to be boosted by 20 percent to account for utility system economic benefits. PNM estimates the following proportions of low-income customers participate in their programs:
    - 100 percent of Low-Income Home Energy Checkup
    - 53 percent of Commercial Comprehensive - Multifamily
    - 100 percent of Easy Savings
    - 100 percent of Energy Smart
    - 40 percent of Home Works
    - 8 percent of Residential Behavioral HER

- 2 percent of New Home Construction

- Program costs were broken into the following categories:
  - Administration
  - Promotion
  - Measurement & Verification
  - Rebates
  - Third-Party Costs
  - Market Transformation

The results of the UCT for all programs based on net realized savings are shown below in Table 74. Overall, the PY2023 portfolio was found to have a UCT ratio of 1.30.

Table 74: PY2023 Cost Effectiveness

Program	Utility Cost Test (UCT)
Res Comp – Refrigerator Recycling	0.61
Res Comp – Home Energy Checkup	1.01
Res Comp – Home Energy Checkup LI	0.64
Res Comp – Residential Cooling	0.58
Residential Behavioral HER	0.71
Residential Lighting	1.86
Residential Products	2.40
Commercial Comprehensive	1.58
Commercial Comprehensive - Multifamily	1.09
Easy Savings	1.60
Energy Smart (MFA)	1.81
New Home Construction	0.95
PNM Home Works	1.85
Commercial Behavioral SEM	0.22
PNM Power Saver	0.98
PNM Peak Saver	0.90
Overall Portfolio	**1.30**

PY2023 EVALUATION OF PNM ENERGY EFFICIENCY AND DEMAND RESPNOSE PROGRAMS

FINAL REPORT - APPENDICES

Date: April 9, 2024

Prepared for: PNM

Prepared by: EcoMetric Consulting LLC

TABLE OF CONTENTS

A. ENERGY SMART SURVEY INSTRUMENT

A.1 INTRODUCTION

Hello, my name is (YOUR NAME) from Evergreen Economics. I am calling on behalf of PNM. May I please speak with _______________?

A. (Once correct respondent is reached) Hello, my name is (YOUR NAME) from Evergreen Economics. I am calling on behalf of PNM.

I'm calling because our records show that your organization is a trade ally in the PNM Energy Smart program. I'd like to ask a short set of questions about your organization and it's and your experience with this rebate program. Your time will help us improve this program for PNM customers. Are you the best person to talk to this program?

1. Yes

2. No (Ask, Who would be the best person to talk to about the energy efficiency upgrades and energy use in your home? (RPNMAT INTRO WHEN CORRECT PERSON COMES ON LINE; ARRANGE CALLBACK IF NECESSARY)

3. Have never participated (THANK AND TERMINATE)

Talking points for starting the interview

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

A.2 INTERVIEWEE BACKGROUND

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

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

Probe to understand:

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

A.3 PROGRAM AWARENESS AND ENGAGEMENT

B1. Do you recall how your organization first learned about and got involved with the PNM Energy Smart (LI) rebate programs through PNM?

Listen (and probe as needed) for:

- • Any reservations about participating
- • Any barriers to participating
- • Whether or not they work with any other PNM rebate programs

B2. Could you describe what involvement is required from the trade ally to particpate in the PNM rebate program?

Probe as needed:

- • In what ways do you interact with PNM or their implementers about this program?
- • What information or services do you receive from PNM

B3. In what ways is the PNM program helpful to you in your business?

Probe, as needed:

- • Rebate
    - o Increases customer satisfaction with us
    - o Increases business
    - o Helps us up-sale to higher efficiency levels
- • Ability to mention the connection with the PNM program
- • PNM messaging to customers on benefits of [MEASURE(S)]

B4. What share of your projects within PNM territory would you estimate currently end up qualifying for and receiving a PNM rebate?

- • What could PNM do to involve you more in the program?

B5. Does PNM make it clear which products or services are eligible for PNM rebates?

Probe as needed:

- • Is there anything PNM should do to more clearly communicate that?

B6. Have the programs influenced what equipment you install in your homes?

B7. Do you have any suggestions for PNM contractor services and support – either overall or for the ESNH specifically?

A.4 PROGRAM PROGRESS

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

Probe to understand:

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

C2. When and how, and/or do you bring up either PNM rebates or the equipment they rebate when talking with customers?

Listen for (and probe as needed):

- • What share of customers are already aware of rebates before the contractor brings it up
- • What it is the most effective sales tool or message to get customers to upgrade to high efficiency
- • What role the PNM rebates play in motivating upgrades
- • What particular equipment is easier or harder to get customers to upgrade to high efficiency and why

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

A.5 MARKET RESPONSE

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

Probe to understand:

- • Why is that?
- • Is the program having a large or small effect on the market?

D2. Are there markets that you feel PNM energy efficiency programs are reaching well? Not well?

Probe to understand:

- • Suggested approaches that might expand the reach of the program into markets that may be underserved by the program.

D3. Overall, what issue(s), if any, would effect future program participation by customers?

A.6 PROGRAM SATISFACTION

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

- o What is your satisfaction?
- o How do you think your customers would rate the program?

[IF RATING < 5] What could PNM do to increase your satisfaction with the program?

Probe if needed:

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

E2. Have you had any feedback from your homes' occupants/customers' about their experiences with the program that you think PNM should know?

E3. Aside from anything we've already discussed, was there ever an occasion when the program didn't meet your expectations? Please explain.

A.7 CLOSING

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

[THANK AND END]

B. PNM NEW HOME CONSTRUCTION CONTRACTOR INTERVIEW INSTRUMENT

B.1 INTRODUCTION

Talking points for recruitment

- • Evergreen Economics is conducting an evaluation of PNM (High Performance) New Home Construction Program for the New Mexico Public Regulation Commission and the state's utilities.
- • We have identified selected contractors that installed equipment that received rebates from the efficiency programs in 2023 for brief telephone interviews.
- • We would need about 20 minutes for the interview.
- • Your responses will be anonymous, but will be very helpful in helping the state's utilities ensure their energy efficiency programs best serve their customers.
- • When would be a good time to talk?

Talking points for starting the interview

- • Identify self.
- • This should take about 20 minutes.
- • Your responses will be anonymous, so please feel free to speak candidly.
- • Do you have any questions before we begin?

• Would you feel comfortable if I record this call for note taking purposes? We will not share the recording with anyone outside our company and will not attribute anything you say back to you.

B.2 INTERVIEWEE BACKGROUND

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

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

Probe to understand:

- • Services offered
- • Types of customers (esp. sector – residential, commercial, or both)

- • Regions served
- • Interviewee role

B.3 PROGRAM AWARENESS AND ENGAGEMENT

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

Listen (and probe as needed) for:

- • Any reservations about participating
- • Any barriers to participating
- • Whether or not they work with any other PNM rebate programs

B2. Could you describe what involvement with PNM rebate programs as a contractor involves?

Probe as needed:

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

B3. In what ways is the PNM program helpful to you in your business?

Probe, as needed:

- Rebate
    - Increases customer satisfaction with us
    - Increases business
    - Helps us up-sale to higher efficiency levels
- Ability to mention the connection with the PNM program
- PNM messaging to customers on benefits of [MEASURE(S)]

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

- • What could PNM do to involve you more in the program?

B5. Does PNM make it clear which of your products or services are eligible for PNM rebates?

Probe as needed:

- • Is there anything PNM should do to more clearly communicate that?

B6. Have the programs influenced what equipment you suggest to a customer?

How important was endorsement or recommendation by your PNM account manager or other NMGC staff in determining how energy efficient your project would be?

How important was information from PNM marketing or informational materials in determining how energy efficient your project would be?

How important was the technical assistance received from PNM staff in determining how energy efficient your project would be?

How important was previous participation in a PNM program in determining how energy efficient your project would be?

B7. Do you have any suggestions for PNM contractor services and support – either overall or for the [PROGRAM] specifically?

B.4 PROGRAM PROCESSES

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

Probe to understand:

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

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

Listen for (and probe as needed):

- What share of customers are already aware of rebates before the contractor brings it up

- What it is the most effective sales tool or message to get customers to upgrade to high efficiency
- What role the PNM rebates play in motivating upgrades
- What particular equipment is easier or harder to get customers to upgrade to high efficiency and why

Did you learn about the rebate before or after you decided how energy efficient your equipment would be?

How important was the dollar amount of the rebate in determining how energy efficient your project would be?

If you had to divide 100% of the influence on your decision to determine how energy efficient your new equipment would be between PNM program and non-program factors, what percent would you give to the importance of the program factors?

Using a scale of 0 to 10, where 0 means not at all likely and 10 means extremely likely, please rate the likelihood that you would have installed the same equipment with the exact same level of energy efficiency if the PNM REBATE was not available.

Using a scale of 0 to 10, where 0 means not at all likely and 10 means extremely likely, please rate the likelihood that you would have installed the same equipment with the exact same level of energy efficiency if the PNM PROGRAM AND SUPPORT was not available.

[FOR RETROFITS??] If you had done the same things or something similar, when would you have made those upgrades?

Probe to categorize:

- within one year
- between 12 months and less than 2 years
- between 2 and 3 years
- greater than 3 years
- not at all

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

B.5 MARKET RESPONSE

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

Probe to understand:

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

D2. Are there markets that you feel PNM [residential/commercial] energy efficiency programs are reaching well? Not well?

Probe to understand:

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

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

B.6 PROGRAM SATISFACTION

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

- What is your satisfaction?
- How do you think your customers would rate the program?

[IF RATING < 5] What could PNM do to increase your satisfaction with the program?

Probe if needed:

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

E2. Have you had any feedback from your customers about their experiences with the program that you think PNM should know?

E3. Aside from anything we've already discussed, was there ever an occasion when the program didn't meet your expectations? Please explain.

B.7 CLOSING

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

[THANK AND END]

C. COMMERCIAL COMPREHENSIVE CONTRACTOR SURVEY INSTRUMENT

C.1 OPENER

Hello this is _____ INTERVIEWER NAME, calling from Evergreen Economics and on behalf of PNM. Is [CONTACT NAME] available? I'm calling today because I understand you are a contractor who has been involved with the installation of equipment rebated through PNM's program. Is this correct?

[IF YES]

We are currently calling select contractors who have been with the efficiency programs in 2023 to conduct brief telephone interviews to gather your insight as part of an evaluation of PNM's Commercial comprehensive program. Your responses will be anonymous, but will be very helpful in helping the state's utilities ensure their energy efficiency programs best serve their customers. Would you be available now or sometime this week for a brief 20 minute interview?

C.2 INTERVIEW BACKGROUND QUESTIONS

A1. Let's begin with a couple of background questions. To start, please tell me a bit about your company.

[Probe to understand:]

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

B1. Do you recall how you first learned about and got involved with the commercial rebate programs through PNM?

[Listen (and probe as needed) for]

- • Any reservations about participating
- • Any barriers to participating
- • Whether or not they work with any other PNM rebate programs, or other utilities programs in New Mexico

B2. Could you describe what involvement with PNM rebate programs as a contractor involves?

[Probe as needed]

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

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

[If not mentioned in interviewee's response, ask specifically about these three topics]

- • Rebate
  - Increases customer satisfaction with us
  - Increases business
  - Helps us up-sale to higher efficiency levels
- • Ability to mention the connection with the PNM program
- • PNM messaging to customers on benefits of measures offered

B4. What share of your commercial projects within PNM territory would you estimate currently end up qualifying for and receiving a PNM rebate? What could PNM do to involve you more in the program?

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

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

[Probe as needed]

- • Is there anything PNM should do to more clearly communicate that?

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

B7a. Does that differ depending on whether the customer is in PNM territory or outside of PNM territory?

B8. Do you have any suggestions for PNM contractor services and support – either overall or for the Commercial Comprehensive programs?

C.3 PROGRAM PROCESS

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

[Probe to understand]

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

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

[Listen for (and probe as needed)]

- • What share of customers do you talk about rebates with
- • What share of customers are already aware of rebates before the contractor brings it up
- • What it is the most effective sales tool or message to get customers to upgrade to high efficiency
- • What role the rebates play in motivating upgrades
- • What particular equipment is easier or harder to get customers to upgrade to high efficiency and why

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

C.4 MARKET RESPONSE

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

[Probe to understand]

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

D2. Are there markets* that you feel PNM commercial energy efficiency programs are reaching well? Not well?

[*Note to interviewer: if needed, examples of markets could be small businesses, or certain business sectors such as retail, office, grocery—just as a few examples]

[Probe to understand]

- •Suggested approaches that might expand the reach of the program into markets that may be underserved by the program.

D3. Overall, what issue(s), if any, may affect future program participation by customers? What about future program participation by contractors?

[INTERVIEWER NOTE: Example issues are changes to building codes and standards being promoted, availability of efficient equipment, and program incentive levels].

C.5 PROGRAM SATISFACTION

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

E1a) What is your satisfaction?

E1b) How do you think your customers would rate the program?

[IF RATING < 5] What could PNM do to increase your satisfaction with the program?

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

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

E1c) Has your involvement with this program changed your general opinion of PNM at all (better, worse, about the same)?

E2. Aside from anything we've already discussed, was there ever an occasion when the program didn't meet your expectations or, conversely, provided you and your customer an exceptional customer experience? Please explain.

C.6 CLOSING

F1. Is there anything else we didn't cover that you'd like to mention or discuss about your experiences with the PNM Commercial Comprehensive program?

D. COMMERCIAL COMPREHENSIVE PARTICIANT SURVEY INSTRUMENT

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

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

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

1. Yes

2. No (Ask, Who would be the best person to talk to about the [MEASURE(S)]

installed and energy use at your business? (REPEAT INTRO WHEN CORRECT

PERSON COMES ON LINE; ARRANGE CALLBACK IF NECESSARY)

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

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

SECTION A [MEASURE _1]

1. (A 1) Our records show in 2023 your business got a rebate through PNM for

installing [MEASURE_1]. Are you familiar with this project?

1. Yes

2. No (SKIP TO Q.2)

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

4. Don't know (SKIP TO Q.2)

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

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

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

____(SKIP TO Q. 3)

99. Never installed (SKIP TO Q. 5)

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

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

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

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

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

01. Yes, it was removed (SKIP TO Q.5)

02 No (CONTINUE TO Q.4b)

03. Prefer not to answer (DO NOT READ) (SKIP TO Q.7)

99. Don't know (DO NOT READ) (SKIP TO Q.7)

Other (SPECIFY) ______________________________

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

01. Yes, never installed

02. Prefer not to answer (DO NOT READ) (SKIP TO Q.7)

99. Don't know (DO NOT READ) (SKIP TO Q.7)

Other (SPECIFY) ______________________________

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

____

____

____

(SKIP TO SECTION A [MEASURE_2]

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

1. Yes

2. No

3. Prefer not to answer (DO NOT READ)

4. Don't know (DO NOT READ)

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

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

02. Internal Staff

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

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

Other (SPECIFY)____

(SKIP TO SECTION A [MEASURE_2])

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

____

____

____

98. Prefer not to answer

99. Don't know

SECTION A [MEASURE_2]

1. (A 1) Our records also show in 2023 your business got a rebate through PNM for installing a (MEASURE_2]. Do you remember this?

1. Yes
2. No (SKIP TO INTRO BEFORE Q. 10)
3. Never installed (VOLUNTEERED) (SKIP TO Q.5)
4. Don't know (SKIP TO INTRO BEFORE Q. 10)

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

1. Yes (SKIP TO Q. 3)
2. No (GO TO Q. 1b)
3. Never installed (VOLUNTEERED) (SKIP TO Q.5)
4. Don't know (SKIP TO INTRO BEFORE Q. 10)

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

____(SKIP TO Q. 3)

99. Never installed (SKIP TO Q. 5)

2. VACANT

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

1. Yes (SKIP TO Q. 6)
2. No (CONTINUE TO Q. 4a)
3. Prefer not to answer (SKIP TO Q. 6)

4. Don’t know (SKIP TO Q. 6)

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

01. Yes, it was removed (SKIP TO Q.5)

02 No (CONTINUE TO Q.4b)

03. Prefer not to answer (DO NOT READ) (SKIP TO Q.7)

99. Don't know (DO NOT READ) (SKIP TO Q.7)

Other (SPECIFY) ____

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

01. Yes, never installed

02. Prefer not to answer (DO NOT READ) (SKIP TO Q.7)

99. Don't know (DO NOT READ) (SKIP TO Q.7)

Other (SPECIFY) ____

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

____

____

____

(SKIP TO INTRO TO Q. 10)

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

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

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

01. Contractor (SKIP TO Q. 9)

02. Internal Staff

03. Prefer not to answer (SKIP TO Q. 9)

99. Don't know (SKIP TO Q. 9)

Other (SPECIFY)____(SKIP TO Q. 9)

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

____

____

____

98. Prefer not to answer

99. Don't know

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

1. Together as one project

2 Separately

3. Prefer not to answer (DO NOT READ)

4. Don’t know (DO NOT READ)

SECTION B

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

10. (B 1) How did your company FIRST learn about the program?

(DO NOT READ CATEGORIES) (TAKE ONE RESPONSE)

01. Word of mouth (business associate, co-worker)

02. Utility program staff

03. Utility website

04. Utility bill insert

05. Utility representative

06. Utility advertising

07. Email from utility

08. Contractor/distributor

09. Building audit or assessment

10. Television Advertisement – Mass Media

11. Other mass media (sign,

billboard, newspaper/magazine ad)

12. Event (conference, seminar

workshop)

13. Online search, web links

14. Participated or received rebate

before

15. Energy consultant or performance contractor

98. No way in particular

99. Don't know

Other (SPECIFY) ____

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

01. Word of mouth (business associate, co-worker)

02. Utility program staff

03. Utility website

04. Utility bill insert

05. Utility representative

06. Utility advertising

07. Email from utility

08. Contractor/distributor

09. Building audit or assessment

10. Television Advertisement – Mass Media

11. Other mass media (sign, billboard, newspaper/magazine ad)

12. Event (conference, seminar, workshop)

13. Online search, web links

14. Participated or received rebate before

98. None (SKIP TO POLLER NOTE BEFORE Q. 13a)

99. Don't know (SKIP TO POLLER NOTE BEFORE Q. 13a)

Other (SPECIFY) ____

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

____

____

____

97. None in particular

98. Prefer not to answer

99. Don't know

SECTION C

POLLER NOTE:

If Respondent’s answer to Q. 9 was:

Together as one project, prefer not to answer, or don't know then READ:

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

If Respondent's answer Q. 9 was:

Separately, READ:

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

POLLER NOTE: WAS MEASURE INSTALLED?

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

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

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

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

1. Yes (i.e. all equipment is replacing old equipment) (SKIP TO Q. 14b)

2. Some equipment is a replacement and some was a new addition (SKIP TO Q. 14b)

3. No (i.e. all equipment is an addition to existing equipment) (SKIP TO INTRO TO Q. 17)

4. Prefer not to answer (SKIP TO INTRO TO Q. 17)

5. Don't know (SKIP TO INTRO TO Q. 17)

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

1. Fully functional and not in need of repair? (SKIP TO Q. 15a)

2. Functional, but needed minor repairs? (SKIP TO Q. 15a)

3. Functional, but needed major repairs? (SKIP TO Q. 15a)

4. Not functional? (SKIP TO INTRO TO Q. 17)

5. Prefer not to answer (DO NOT READ) (SKIP TO INTRO TO Q. 17)

6. Don't know (DO NOT READ) (SKIP TO INTRO TO Q. 17)

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

1. Fully functional and not in need of repair? (SKIP TO Q. 15b)

2. Functional, but needed minor repairs? (SKIP TO Q. 15b)

3. Functional, but needed major repairs? (SKIP TO Q. 15b)

4. Not functional? (SKIP TO INTRO TO Q. 17)

5. Prefer not to answer (DO NOT READ) (SKIP TO INTRO TO Q. 17)

6. Don't know (DO NOT READ) (SKIP TO INTRO TO Q. 17)

15a. (C 3) About how old, in years, was the equipment prior to replacement?

(Probe if necessary: Best guess is fine.)

____ _____ _____ (Record Years)

499. Prefer not to answer

500. Don't know

ALL ANSWERS TO 15a GO TO Q. 16

15b. (C 3) About how old, in years, is the equipment you are replacing?

(Probe if necessary: Best guess is fine.)

_____ _____ _____ (Record Years)

499. Prefer not to answer

500. Don't know

ALL ANSWERS TO 15b. GO TO Q.16

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

1. Less than a year

2. 1 – 2 years

3. 3 – 5 years

4. 6 – 10 years

5. More than 10 years

6. Prefer not to answer

7. Don't know

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

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

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

POLLER NOTE: Was HVAC Measure installed?

1. Yes (CONTINUE TO Q. 20)

2. No (SKIP to Q. 21)

20. (C5d) Improving air quality 5 4 3 2 1 6

21. (C5e) Receiving the rebate 5 4 3 2 1 6

(Q21 NOT ASKED IF DIRECT INSTALL)

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

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

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

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

SECTION D (INTRO TO Q.24)

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

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

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

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

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

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

Extremely Not at all
DK/

(RANDOMIZE) Important Important WS
N/A

Program Factors

24. (D1A) The contractor who

performed the work 10 09 08 07 06 05 04 03 02 01
00 11 12

25. (D1B) The dollar amount of the

rebate 10 09 08 07 06 05 04 03 02 01 00 11
12

26. (D1C) Technical assistance or

project economic analysis

(e.g. rate of return or payback

analysis) received from PNM staff

10 09 08 07 06 05 04 03 02 01 00 11
12

27. (D1D) Endorsement or recommendation by your PNM account manager or other PNM staff 10 09 08 07 06 05 04 03 02 01 00
11 12

28. (D1E) Information from PNM marketing or informational materials 10 09 08 07 06 05 04 03 02 01 00
11 12

29. (D1F) Previous participation in a PNM program 10 09 08 07 06 05 04 03 02 01 00
11 12

30. (D1G) Endorsement or recommendation by a contractor 10 09 08 07 06 05 04 03
02 01 00 11 12

31. (D1H) Endorsement or recommendation by a vendor

or distributor 10 09 08 07 06 05 04 03 02 01 00 11 12

32. (D1I) Endorsement or

recommendation by CLEAR

Result, the program implementer 10 09 08 07 06 05 04 03 02 01 00 11 12

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

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

Extremely Not at all DK/

(RANDOMIZE) Important Important WS N/A

Non-program Factors

33. (D1J) The age or condition of the

old equipment 10 09 08 07 06 05 04 03 02 01 00 11 12

34. (D1K) Corporate policy or

guidelines 10 09 08 07 06 05 04 03 02 01 00 11 12

35. (D1L) Minimizing operating cost 10 09 08 07 06 05 04 03 02 01 00 11 12

36. (D1M) Scheduled time for routine

maintenance 10 09 08 07 06 05 04 03 02 01 00 11 12

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

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

____ ____ _____ % = Program Factors

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

500. Don’t know (SKIP TO Q. 39)

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

company policy, operating costs and routine maintenance.)

_____ _____ _____ %= Non Program Factors

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

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

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

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

1. Before
2. After
3 Prefer not to answer
4. Don't know

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

Extremely Likely										Not at all Likely	DK/ WS
10	09	08	07	06	05	04	03	02	01	00	11

GO TO Q. 41   SKIP TO Q. 43 GO TO Q. 42   SKIP TO

Q. 43

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

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

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

(RECORD VERBATIM)

(SKIP TO Q. 43)

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

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

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

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

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

(READ CATEGORIES)

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

45. (D11) Using a scale from 0 to 10, where 0 means not at all likely and 10 means

extremely likely, please rate the likelihood that you would have conducted this project within 12 months of when you actually completed this project if the [REBATE_PROGRAM] program was not available.

Extremely Likely									Not at all Likely	WS	DK/
10	09	08	07	06	05	04	03	02	01	00	11

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

SECTION E

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

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

47. (E1A) PNM as an energy provider

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied (SKIP TO Q. 49)
5. Very Satisfied (SKIP TO Q. 49)
6. Not applicable (SKIP TO Q. 49)

7. Prefer not to answer (SKIP TO Q. 49)

8. Don't know (SKIP TO Q. 49)

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

____

____

____

49. (E1B) The rebate program overall

1. Very Dissatisfied

2. Somewhat Dissatisfied

3. Neither Satisfied Nor Dissatisfied

4. Somewhat Satisfied (SKIP TO Q.51)

5. Very Satisfied (SKIP TO Q. 51)

6. Not applicable (SKIP TO Q. 51)

7. Prefer not to answer (SKIP TO Q. 51)

8. Don't know (SKIP TO Q. 51)

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

____

____

____

51. (E1C) The equipment installed through the program

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

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

____

____

____

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

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

53. (E1D) The contractor who installed the equipment

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

4. Somewhat Satisfied (SKIP TO Q.55)

5. Very Satisfied (SKIP TO Q. 55)

6. Not applicable (SKIP TO Q. 55)

7. Prefer not to answer (SKIP TO Q. 55)

8. Don't know (SKIP TO Q. 55)

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

____

____

____

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

1. Very Dissatisfied

2. Somewhat Dissatisfied

3. Neither Satisfied Nor Dissatisfied

4. Somewhat Satisfied (SKIP TO Q.57)

5. Very Satisfied (SKIP TO Q. 57)

6. Not applicable (SKIP TO Q. 57)

7. Prefer not to answer (SKIP TO Q. 57)

8. Don't know (SKIP TO Q. 57)

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

(Q57-60 NOT ASKED IF DIRECT INSTALL)

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

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

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

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

1. Very Dissatisfied

2. Somewhat Dissatisfied

3. Neither Satisfied Nor Dissatisfied

4. Somewhat Satisfied (SKIP TO Q.61)

5. Very Satisfied (SKIP TO Q. 61)

6. Not applicable (SKIP TO Q. 61)

7. Prefer not to answer (SKIP TO Q. 61)

8. Don’t know (SKIP TO Q. 61)

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

____

____

____

61. (E1H) Interactions with PNM

1. Very Dissatisfied

2. Somewhat Dissatisfied

3. Neither Satisfied Nor Dissatisfied

4. Somewhat Satisfied (SKIP TO Q.63)

5. Very Satisfied (SKIP TO Q. 63)

6. Not applicable (SKIP TO Q. 63)

7. Prefer not to answer (SKIP TO Q. 63)

8. Don’t know (SKIP TO Q. 63)

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

____

____

____

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

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied (SKIP TO Q.65)
5. Very Satisfied (SKIP TO Q. 65)
6. Not applicable (SKIP TO Q. 65)
7. Prefer not to answer (SKIP TO Q. 65)
8. Don't know (SKIP TO Q. 65)

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

____

____

____

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

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

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

____

____

____

(Q67 and Q68 NOT ASKED IF DIRECT INSTALL)

67. (E1K) The project application process

1. Very Dissatisfied
2. Somewhat Dissatisfied
3. Neither Satisfied Nor Dissatisfied
4. Somewhat Satisfied (SKIP TO Q. 69)
5. Very Satisfied (SKIP TO Q. 69)

6. Not applicable (SKIP TO Q. 69)

7. Prefer not to answer (SKIP TO Q. 69)

8. Don't know (SKIP TO Q. 69)

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

____

____

____

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

01. Yes (RECORD VERBATIM)

____

____

____

97. No

98 Prefer not to answer

99. Don't know

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

Extremely Likely									Not at all Likely		DK/ WS
10	09	08	07	06	05	04	03	02	01	00	11
SKIP TO Q. 72											

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

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

____

____

____

98 Prefer not to answer

99. Don't know

SECTION: CHARACTERISTICS AND DEMOGRAPIHCS

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

01. Own

02. Lease / Rent

03. Prefer not to answer (SKIP TO Q. 74)

99. Don't know (SKIP TO Q. 74)

Other (SPECIFY) ____

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

1. Pay own

2. Someone else pays

3. Prefer not to answer

4. Don’t know

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

1. Less than 1,000 square feet

2. Between 1,000 and 1,999 square feet

3. Between 2,000 and 4,999 square feet

4. Between 5,000 and 9,999 square feet

5. Between 10,000 and 49,999 square feet

6. Between 50,000 and 99,999 square feet

7. 100,000 square feet or more

8. Prefer not to answer (DO NOT READ)

9. Don’t know (DO NOT READ)

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

1. 1939 or earlier
2. 1940 to 1949
3. 1950 to 1959
4. 1960 to 1969
5. 1970 to 1979
6. 1980 to 1989
7. 1990 to 1999
8. 2000 to 2009
9. 2010 to 2019
10. 2020 or later
11. Prefer not to answer (DO NOT READ)
12. Don’t know (DO NOT READ)

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

1. Less than 5

2. 5-9

3. 10-19

4. 20 - 49

5. 50 - 99

6. 100 - 249

7. 250 - 499

8. 500 - 999

9. 1,000 - 2,500

10. More than 2,500

11. Prefer not to answer

12. Don't know

77. (Gen5) And this is my last question. How long has your company been in business?

(Poller : Please be specific, by writing in months and years.)

____

98. Prefer not to answer

99. Don't know

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

NOTE TO INTERVIEWER, WAS RESPONDENT:

1. Male

2. Female

Unique ID #:_____ _____ _____

Respondent's Phone Number:_______________________________

Interviewer's Name:______________________________________

Interviewer's Code:____

E. PEAK SAVER AND POWER SAVER SUPPLIMENTAL INFORMATION

The tables below offer a year-over-year comparison of the Peak Saver performance metrics for the years 2018 through 2023. The relevant performance metrics are:

- **10-Minute Participant Capacity Performance** – The difference between the CBL and the lowest actual electrical demand measured by a one-minute interval reading between eight and ten minutes after the start of an event.
- **Average Participant Capacity Performance** – The average difference between the CBL and the participant's actual electric demand beginning ten minutes after the initiation of the event.
- **Participant Event Capacity Performance** – Weighted average of 10-Minute Participant Capacity Performance (40% weight) and Average Participant Capacity Performance (60% weight).
- **Energy Delivered** – The difference (in kWh) between the adjusted CBL and the metered load summed across all DR event hours.

Table 1 shows average portfolio performance metrics by year as calculated by the evaluation team. Table 2 shows average portfolio performance metrics by year as calculated by the program implementer.

Table 1: Historical Evaluated Performance

Year	Participants	Events	10-Minute Capacity Performance (kW)	Average Capacity Performance (kW)	Verified Capacity Performance (kW)	Energy Performance During Event Hours (kWh)
2018	86	12	17,558	13,655	15,216	57,371
2019	92	3	17,460	15,342	16,189	60,250
2020	130	10	13,433	12,528	12,890	52,991
2021	157	2	18,975	16,532	17,509	64,662
2022	159	3	17,659	13,975	15,449	40,079
2023	160	2	17,543	14,850	15,927	58,578
Average	**131**	**5**	**17,105**	**14,480**	**15,530**	**55,655**

Table 2: Historical Reported Performance

Year	Participants	Events	10-Minute Capacity Performance (kW)	Average Capacity Performance (kW)	Verified Capacity Performance (kW)	Energy Performance During Event Hours (kWh)
2018	86	12	28,337	24,438	25,998	96,437
2019	92	3	30,419	27,645	28,754	109,958
2020	130	10	18,728	17,806	18,175	70,905
2021	157	2	42,182	41,420	42,176	165,911
2022	159	3	28,252	25,178	26,831	77,922
2023	160	2	35,124	35,740	35,740	142,790
Average	**131**	**5**	**30,507**	**28,705**	**29,612**	**110,654**

E.1 NOMINATIONS

The following sections detail comparisons between monthly site-level DR kW commitments ("nominations"), average demand, and DR impacts. The first section seeks to answer the question: How do nominations compare to average demand? The second section seeks to answer the question: How do nominations compare with verified DR performance? Throughout these two sections, note that results are presented at the participant level rather than the site level. That is, if one participant has three sites in the program, those three sites will be aggregated.

E.1.1 COMPARING DR NOMINATIONS AND AVERAGE DEMAND

How do nominations compare to average demand? In answering this question, our team investigated common event hours (4:00 PM – 8:00 PM) on non-event, non-holiday weekdays. Any hours where the temperature was below 80 were removed. Under these conditions, we calculated average hourly demand for each participant, then compared these averages to the average nomination. For the comparison, two metrics were calculated: raw differences and ratios. Raw differences are simply the difference between average demand and the average nomination. Ratios were calculated as the average nomination divided by average load (and multiplied by 100%).

Figure 1 displays the distribution of differences. A difference greater than zero indicates that the average demand exceeds the average nomination, which is what we would expect to see for all sites (though this may get muddied for sites with solar power). Most sites are to the right of zero, with less than 6 percent of sites (i.e., eight sites) having an average demand that did not exceed the average nomination.

Figure 1: Comparing Nominations and Non-Event Demand

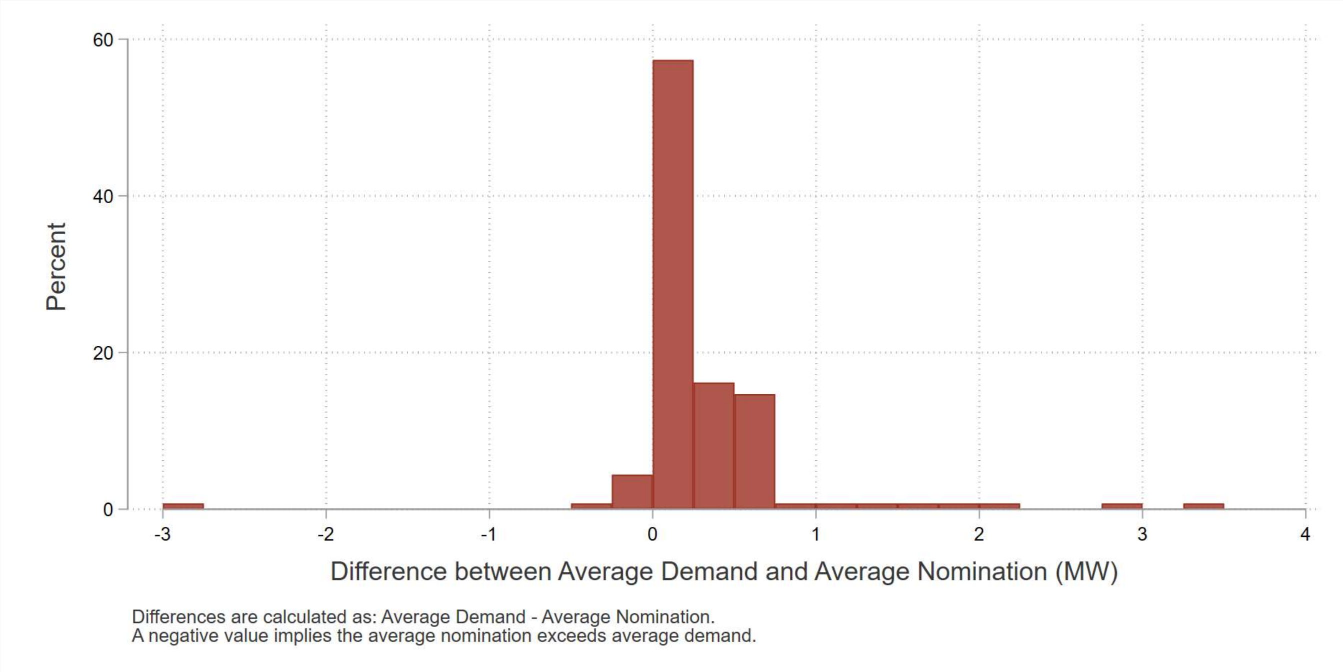


Figure 2 shows the distribution of ratios (ratio = average nomination / average demand * 100%). A value greater than 100 percent implies the average nomination exceeds average demand. For a handful of sites, the ratio was considerably greater than 100 percent. Importantly, there was one large outlier with a ratio of 462. This outlier site had a nomination of 90 kW (represented by the reference line in Figure 3), but average demand at this site between 4:00 PM and 8:00 PM on the day types considered was less than 20 kW.

Figure 2: Nominations as a Percentage of Demand

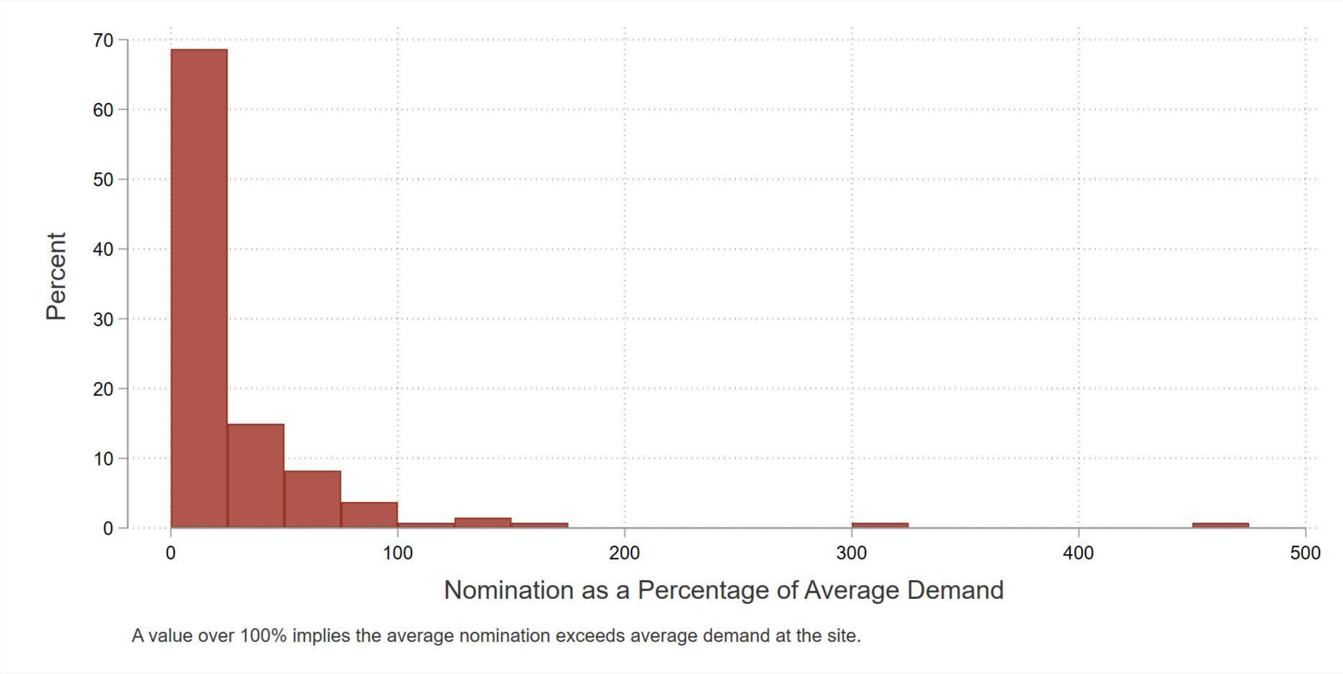
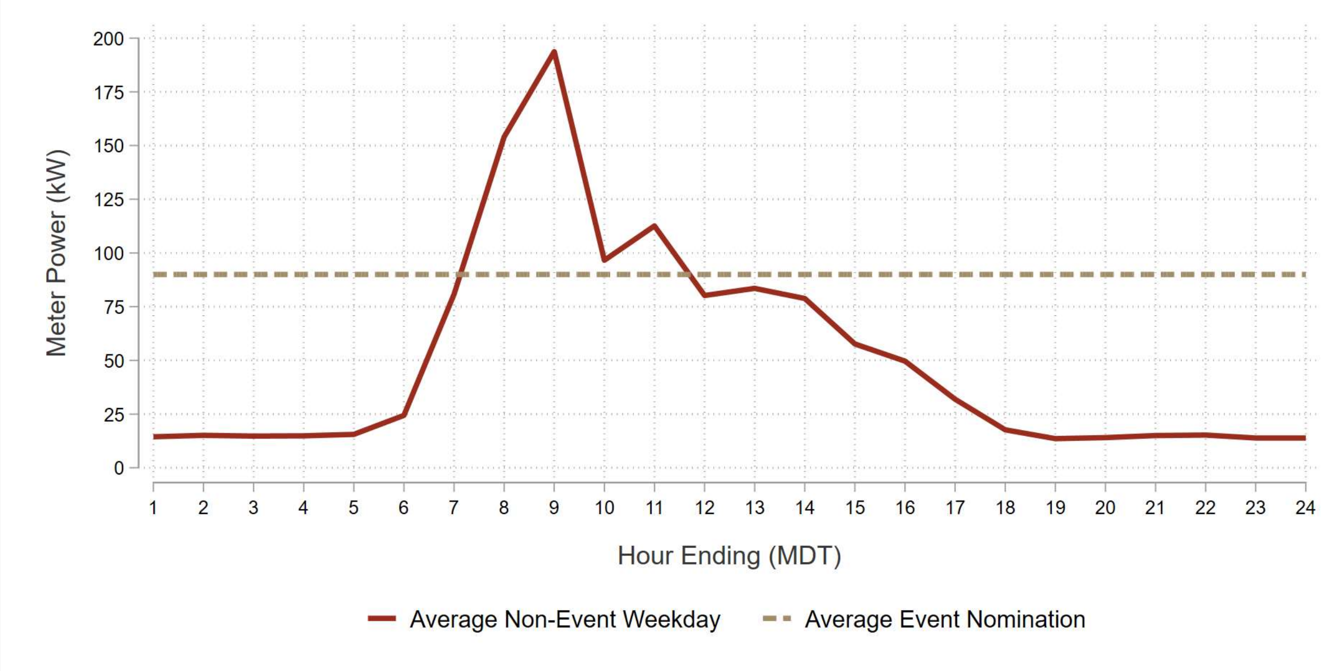


Figure 3: Investigating Nomination as a Percentage of Average Demand



For most participants, DR nominations make sense relative to their average hourly demand on non-event summer afternoons. For a handful of others, we would recommend reviewing the loads and nominations with Generac (and possibly the customer).

E.1.2 COMPARING DR NOMINATIONS AND DR PERFORMANCE

This section compares DR nominations with verified performance metrics (as calculated by the EcoMetric team). The metric our team reviewed was the percent of the nomination achieved, calculated as follows:

$$Percent\ of\ Nomination\ Achieved = 100\% * \frac{Verified\ Reduction}{Nominated\ Reduction}$$

Figure 4 shows the distribution of these percentages. For each participant, unique percentages were calculated for each event, using the nomination for the relevant month. Sites that did not participate in a certain event day are not included in this analysis. Instances where actual reductions do not exceed nominated reductions result in percentages that are less than 100 percent, and vice versa. More than half of the distribution falls below 100 percent, implying that many sites did not achieve their nominated load reduction on most event days. An achievement percentage less than zero means the DR performance for the event was negative.

Figure 4: Distribution of Percent Differences

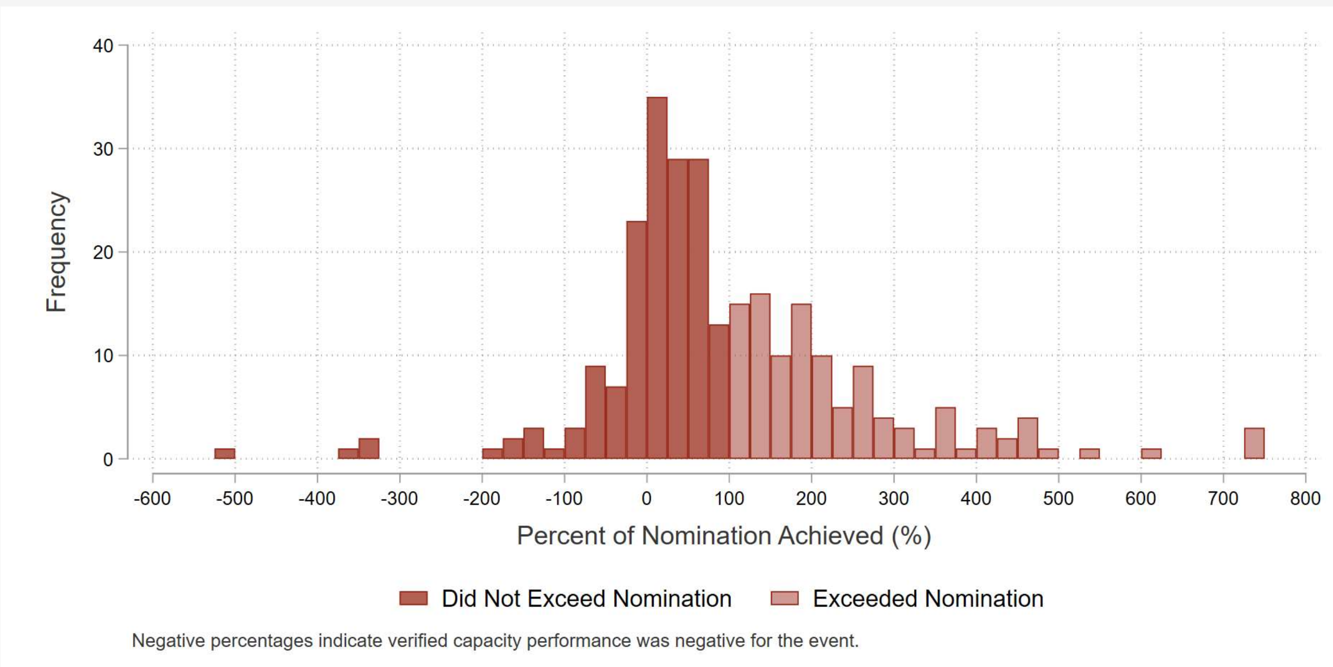


Table 3 groups participants based on how their verified reductions compared to their nominated reductions. Several participants made a bulk nomination for their multiple sites. Of the 138 participants, 49 exceeded their nomination on average.1 Another 65 participants – accounting for roughly 87 percent of the total nominations – did not exceed their nomination but did provide demand reductions. Table 3 shows, on average, what percentage of their nomination each site achieved. The 22 participants with negative verified reductions are not included in the figure. Three of these 22 sites have solar PV.

Table 3: Comparing Performance and Nominations

Result	Frequency	Aggregate Nomination (kW)[1]
Did Not Exceed Nomination	65	21,570
Exceeded Nomination	49	2,440
Negative Performance	22	910
Nomination of 0 kW	2	0
Total	**138**	**24,920**

[1] Participant-level nominations are averaged across the summer before aggregating.

1 Recall that sites are aggregated to the participant level. Some participants had multiple sites.

F. PROJECT-LEVEL DESK REVIEW RESULTS

Project ID	20035	20067	20174	20231	20241	20257
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)
Project Description	Installation of new high-efficiency exterior LEDs.	Lighting Retrofit	Interior lighting retrofit	Installation of new high-efficiency exterior LEDs.	Lighting	Installation of new high-efficiency exterior LEDs.
Measure Type	Direct Install - Lighting	Direct Install - Lighting	Direct Install - Lighting	Direct Install - Lighting	Direct Install - Lighting	Direct Install - Lighting
Building Type	Retail	Exterior	Miscellaneous	Warehouse/Industrial	Warehouse/Industrial	Exterior
Other Building Type	Exterior		Lodging-Hotel			Nonprofit Organization
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	59,361	19,682	57,513	27,628	16,968	61,851
Gross Reported kW	1.74	0	5.75	0.00	4.07	0.00
Gross Verified kWh	58,005	18,747	57,513	26,514	21,858	59,334
Gross Verified kW	0.00	0.00	5.75	0.00	3.88	0.00
kWh Realization Rate	0.98	0.95	1.00	0.96	1.29	0.96
kW Realization Rate	0.00		1.00		0.95	
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper
Other Savings Source						
Reasons for RR(s) <> 1	The ex post calculation utilized HOU associated with the Exterior building type, 4,192 hours, based on the PNM workpaper.	The ex post calculation utilized HOU associated with the Exterior building type, 4,192 hours, based on the PNM workpaper.		The ex post calculation utilized HOU associated with the Exterior building type, 4,192 hours, based on the PNM workpaper.	RR variation is due to difference in HOU.	The ex post calculation utilized HOU associated with the Exterior building type, 4,192 hours, based on the PNM workpaper.

Project ID	20368	20415	20439	20455	20473	20509
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)
Project Description	Lighting Retrofit	Retrofit - Other	Lighting Retrofit	Replacement of EC motor-walk in refrig, Anti sweat heater control and LED case lighting	Lighting Retrofit	Retrofit of case lighting and other refrigeration measure
Measure Type	Direct Install - Lighting	Direct Install - Other	Direct Install - Lighting	Direct Install - Other	Direct Install - Lighting	Direct Install - Other
Building Type	Miscellaneous	Retail	Miscellaneous	Retail	Retail	Retail
Other Building Type	Lodging - Hotel		Automotive Service/Repair	Retail - Small	Retail - Small	Retail - Small
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	129,092	22,778	18,577	27,359	44,706	29,542
Gross Reported kW	16.5	1.477	0.22	2.49	5.01	2.4
Gross Verified kWh	151,041	22,721	18,764	27,396	44,706	26,833
Gross Verified kW	15.07	1.16	0.20	2.50	5.01	1.73
kWh Realization Rate	1.17	1.00	1.01	1.00	1.00	0.91
kW Realization Rate	0.91	0.79	0.89	1.00	1.00	0.72
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper
Other Savings Source						
Reasons for RR(s) <> 1	C.F and interactive factors were selected according to building type in the ex post calculation.	The evaluation team assumed a medium temperature cooler as a picture in the project files indicates it is a cooler.	C.F and interactive factors were selected according to building type in the ex post calculation.			The implementor assumed the case lighting measure to be typical lighting retrofit. The evaluation team utilized the LED Case Lighting refrigeration methodology.

Project ID	20522	20540	20550	20380	PGNHPS1551074961	PGNHPS1552167703
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	New Homes Construction	New Homes Construction
Subprogram	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Direct Install (Quicksaver)	Prescriptive	Prescriptive
Project Description	Lighting Retrofit	Installation of LEDs and occupancy sensors	Lighting Retrofit	LED Signage	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat
Measure Type	Direct Install - Lighting	Direct Install - Lighting	Direct Install - Lighting	Direct Install - Custom	New Homes Construction	New Homes Construction
Building Type	Miscellaneous	Office	Retail	Miscellaneous	Residential	Residential
Other Building Type	Service - Other	Office - Medium	Retail - Medium	Restaurant- Sit Down		
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	5,744	51,100	11,145	4,508	568	632
Gross Reported kW	1.04	6.46	3.13	0.65	0.26	0.27
Gross Verified kWh	5,744	51,030	11,145	4,729	568	573
Gross Verified kW	1.04	6.39	3.13	0.00	0.26	0.27
kWh Realization Rate	1.00	1.00	1.00	1.05	1.00	0.91
kW Realization Rate	1.00	0.99	1.00	0.00	1.00	1.00
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	New Mexico TRM - 2020	New Mexico TRM - 2020
Other Savings Source						
Reasons for RR(s) <> 1		Pictures in project document indicate the entry canopy is an exterior fixture. The evaluation team utilized the Exterior building type accordingly for the 1st line item.		The evaluation team utilized inputs per the PNM workpaper for the Exterior building type, where HOU are 4,192, HVAC Demand Factor is 1, HVAC energy Factor is 1, and C.F. is 0.		The ex post calculation utilized the NM TRM methodology for smart thermostats with cooling savings as well as gas furnace heating savings, using capacity and SEER value from the AHRI certificate provided in the project documentation. However, the ex ante calculation methodology was not clear and could not be recreated which led to a discrepancy in kWh savings RR.

Project ID	PGNHPS1552396263	PGNHPS1552533956	PGNHPS1552533967	PGNHPS1552534002	PGNHPS1552575556	PGNHPS1552575585
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction
Subprogram	Prescriptive	Prescriptive	Prescriptive	Prescriptive	Prescriptive	Prescriptive
Project Description	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat	Installation of Energy Star LEDs, Radiant Barrier, and two Smart Thermostats	Installation of Energy Star LEDs, Radiant Barrier, and Smart Thermostat
Measure Type	Multifamily	Multifamily	Multifamily	Multifamily	New Homes Construction	New Construction HVAC and Lighting
Building Type					Residential	Other
Other Building Type						Residential
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	995	670	385	372	735	747
Gross Reported kW	0.26	0.27	0.27	0.27	0.27	0.27
Gross Verified kWh	840	605	548	510	871	882
Gross Verified kW	0.26	0.27	0.27	0.27	0.27	0.27
kWh Realization Rate	0.84	0.90	1.42	1.37	1.18	1.18
kW Realization Rate	1.00	1.00	1.00	1.00	1.00	1.00
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	New Mexico TRM - 2020	Utility Workpaper
Other Savings Source						
Reasons for RR(s) <> 1	As per the available documents, it was assumed that the Smart Thermostats only control the split system air conditioner unit in the new homes. Savings formulas from the NM TRM and the AHRI certificates were referred to for the ex post analysis. In the ex post analysis, an air conditioning (AC) unit with a cooling capacity of 39,000 BTU/h was used for a total of 1,038 hours. The SEER value of the AC unit, as per the AHRI certificate, was 15. Additionally, it was assumed that an unknown (default) to smart thermostat conversion occurred (7%), with a duct efficiency of 0.8. As a result, the energy savings achieved in the ex post analysis amounted to 540 kWh, falling behind the claimed ex ante savings of 694 kWh for the two smart thermostats.	As per the available documents, it was assumed that the Smart Thermostats only control the split system air conditioner unit in the new homes. As the site address is in County Valencia, and according to the NM TRM, the weather zone city for Valencia is Albuquerque. Therefore, savings formulas from the NM TRM and the AHRI certificates were referred to for the ex post analysis. In the ex post analysis, an air conditioning (AC) unit with a cooling capacity of 38,000 BTU/h was used for a total of 1,038 hours. The SEER value of the AC unit, as per the AHRI certificate, was 14. Additionally, it was assumed that an unknown (default) to smart thermostat conversion occurred (7%), with a duct efficiency of 0.8. As a result, the energy savings achieved in the ex post analysis amounted to 281kWh, falling behind the claimed ex ante savings of 347kWh for the smart thermostat.	As per the available documents, it was assumed that the Smart Thermostats only control the split system air conditioner unit in the new homes. As the site address is in County Valencia, and according to the NM TRM, the weather zone city for Valencia is Albuquerque. Therefore, savings formulas from the NM TRM and the AHRI certificates were referred to for the ex post analysis. In the ex post analysis, an air conditioning (AC) unit with a cooling capacity of 36,000 BTU/h was used for a total of 1,038 hours. The SEER value of the AC unit, as per the AHRI certificate, was 17. Additionally, it was assumed that an unknown (default) to smart thermostat conversion occurred (7%), with a duct efficiency of 0.8. As a result, the energy savings achieved in the ex post analysis amounted to 220kWh, surpassing the claimed ex ante savings of 57kWh for the smart thermostat.	As per the available documents, it was assumed that the Smart Thermostats only control the split system air conditioner unit in the new homes. As the site address is in County Valencia, and according to the NM TRM, the weather zone city for Valencia is Albuquerque. Therefore, savings formulas from the NM TRM and the AHRI certificates were referred to for the ex post analysis. In the ex post analysis, an air conditioning (AC) unit with a cooling capacity of 28,200 BTU/h was used for a total of 1,038 hours. The SEER value of the AC unit, as per the AHRI certificate, was 15. Additionally, it was assumed that an unknown (default) to smart thermostat conversion occurred (7%), with a duct efficiency of 0.8. As a result, the energy savings achieved in the ex post analysis amounted to 195kWh, surpassing the claimed ex ante savings of 57kWh for the smart thermostat.	For smart thermostats, ex post calculation utilized the NM TRM methodology for cooling savings for smart thermostats. Heating savings were not considered since there is no proof of the heating type in the project documents. ex post used capacity and SEER value from AHRI certificate provided in the project documentation. However ex ante calculation methodology was not clear and could not be recreated which led to a discrepancy in kWh savings RR.	As per the available documents, it was assumed that the Smart Thermostats only control the split system air conditioner unit in the new homes. Savings formulas from the NM TRM and the AHRI certificates were referred to for the ex post analysis. In the ex post analysis, an air conditioning (AC) unit with a cooling capacity of 39,000 BTU/h was used for a total of 1,038 hours. The SEER value of the AC unit, as per the AHRI certificate, was 15. Additionally, it was assumed that an unknown (default) to smart thermostat conversion occurred (7%), with a duct efficiency of 0.8. As a result, the energy savings achieved in the ex post analysis amounted to 540 kWh, surpassing the claimed ex ante savings of 404 kWh for the two smart thermostats.

Project ID	PGNHVA1550665278	PGNHVA1551076995	PGNHVA1551839374	PGNHVA1552752268	PGNHVA1553291385	PGNHVA1553737301
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction
Subprogram	Performance	Prescriptive	Performance	Performance	Prescriptive	Performance
Project Description	Installation of LED, water heater, gas furnace and air conditioner	Installation of EnergyStar LEDs and Smart Thermostat	Installation of LEDs, water heater and ASHP	Installation of LEDs, water heater, gas furnace, air conditioner and a smart thermostat	Installation of EnergyStar LED's, Efficient AC and Smart thermostats	Installation of LED, water heater, gas furnace and air conditioner
Measure Type	New Construction HVAC and Lighting	New Homes Construction	New Construction HVAC and Lighting	New Construction HVAC and Lighting	New Homes Construction	New Construction HVAC and Lighting
Building Type	Other	Residential	Other	Other	Residential	Other
Other Building Type	Residential		Residential	Residential		Residential
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	1,328	373	3,897	756	929	1,085
Gross Reported kW	0.50	0.02	0.70	0.00	0.38	0.30
Gross Verified kWh	1,329	387	3,898	756	696	1,252
Gross Verified kW	0.50	0.02	0.70	0.00	0.36	0.30
kWh Realization Rate	1.00	1.04	1.00	1.00	0.75	1.15
kW Realization Rate	1.00	1.00	1.00		0.96	1.00
Savings Source	Custom Analysis	New Mexico TRM - 2020	Custom Analysis	Custom Analysis	New Mexico TRM - 2020	Custom Analysis
Other Savings Source						
Reasons for RR(s) <> 1		For smart thermostat, ex post calculation utilized the NM TRM methodology for smart thermostats with cooling savings as well as gas furnace heating savings, using capacity and SEER values from AHRI certificate provided in the project documentation. However ex ante calculation methodology was not clear and could not be recreated which led to a discrepancy in kWh savings RR.			For smart thermostat, ex post calculation utilized the NM TRM methodology for smart thermostats with cooling savings as well as gas furnace heating savings as provided in the project documents and SEER value of 16.2 based on AHRI certificate of the packaged central AC, while ex ante calculation methodology was not clear and seemed to calculate only cooling smart thermostat savings based on a SEER value of 13, which led to a discrepancy in kWh savings RR. For packaged AC measure, ex post utilized the 2021 NM TRM High Efficiency Air Conditioner methodology, using SEEReff, EEReff, and capacity values from the AHRI certificate provided in the project documentation, while the ex ante kW savings calculation seems to utilize a savings value from an older version of the NM TRM of 2016. However, ex ante kWh savings value did not match values provided in the NM TRM of 2016 and could not be replicated, which led to a discrepancy in both kW and kWh savings RR.	The Smart Thermostats control the split system air conditioner units and the Gas furnace. Savings formulas from the NM TRM and the AHRI certificates are referred to for the ex post analysis. For cooling, the ex post had assumed a unit with 18,000 btuh and associated Cooling hours of 1,038hrs. A SEER value of 17.8 is utilized for the ex post analysis as per the AHRI certificate. For the gas-powered furnace, deemed and default values from the NM TRM were used in the ex post analysis.

Project ID	PGNHVA1553819639	PGNHVA1554124557	PGNHVA1554170495	PGNHVA1554359129	PGNHVA1554616807	PGNHVA1554649329
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction	New Homes Construction
Subprogram	Performance	Performance	Performance	Performance	Performance	Performance
Project Description	Installation of efficient lighting and HVAC measures in a New Homes Construction Project	Installation of efficient lighting and HVAC measures in a New Homes Construction Project	Installation of LED, water heater, gas furnace, air conditioner and a smart thermostat	Installation of efficient lighting, HVAC measures, and a smart thermostat in a New Homes Construction Project	Installation of efficient lighting, HVAC measures, and a smart thermostat in a New Homes Construction Project	Installation of efficient lighting and HVAC measures in a New Homes Construction Project
Measure Type	New Construction HVAC and Lighting	New Construction HVAC and Lighting	New Construction HVAC and Lighting	New Construction HVAC and Lighting	New Construction HVAC and Lighting	New Construction HVAC and Lighting
Building Type	Other	Other	Other	Other	Other	Other
Other Building Type	Residential	Residential	Residential	Residential	Residential	Residential
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	685	1,594	865	1,119	1,476	951
Gross Reported kW	0.00	0.40	0.10	0.30	0.30	0.10
Gross Verified kWh	685	1,594	880	1,133	1,489	950
Gross Verified kW	0.00	0.40	0.10	0.30	0.30	0.10
kWh Realization Rate	1.00	1.00	1.02	1.01	1.01	1.00
kW Realization Rate		1.00	1.00	1.00	1.00	1.00
Savings Source	Custom Analysis	Custom Analysis	Custom Analysis	Custom Analysis	Custom Analysis	Custom Analysis
Other Savings Source						
Reasons for RR(s) <> 1			The Smart Thermostats control the air conditioner unit and a Gas furnace. Savings formulas from the NM TRM and the AHRI certificates are referred to for the ex post analysis. For cooling, the ex post had assumed a unit with 23,200 btuh and associated Cooling hours of 1,038hrs. A SEER value of 16 is utilized for the ex post analysis as per the AHRI certificate. For the gas-powered furnace, deemed and default values from the NM TRM were used in the ex post analysis.	The ex ante calculation and ex post calculation both utilized the Fuel Summary report from a software for Base kWh savings measure. However, for smart thermostat measure, ex post calculation utilized the NM TRM methodology for smart thermostats with gas furnace heating savings as provided in the project documents, while ex ante calculation methodology was not clear and could not be replicated which led to a discrepancy in overall kWh savings RR.	The ex ante calculation and ex post calculation both utilized the Fuel Summary report from a software for Base kWh savings measure. However, for smart thermostat measure, ex post calculation utilized the NM TRM methodology for a smart thermostat with gas furnace heating savings as provided in the project documents, while ex ante calculation methodology was not clear and could not be replicated which led to a minor discrepancy in overall kWh savings RR.	RR for kWh is 99.89% due to rounding.

Project ID	PM-23-06125	PM-23-06126	PNM-20-04106	PNM-22-04649	PNM-22-04675
Utility	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Midstream	Midstream	Multifamily	Building Tune-Up	Building Tune-Up
Project Description	Installation of EnergyStar Electric Convection Oven	Installation of Energy Star Efficient Refrigerators and Freezers	New construction - installation of interior and exterior LEDs, HVAC HP and AC	Building operator certification tuition assistance	Building operator certification tuition assistance
Measure Type	Midstream	Midstream	New Construction Lighting + HVAC	Building Tune-Up	Building Tune-Up
Building Type	Other	Other	Other	Warehouse/ Industrial	Warehouse/ Industrial
Other Building Type	Retail	Restaurants and Retail	Multifamily Residential	Heavy Industry	
Site Visit Being Conducted	No	No	No	No	No
Gross Reported kWh	9,266	3,628	256,731	18,353	168,000
Gross Reported kW	0.82	0.40	68.61	1.50	14.00
Gross Verified kWh	6,086	3,357	218,917	18,353	168,000
Gross Verified kW	1.22	0.36	84.32	1.53	14.00
kWh Realization Rate	0.66	0.93	0.85	1.00	1.00
kW Realization Rate	1.49	0.90	1.23	1.02	1.00
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper
Other Savings Source					
Reasons for RR(s) <> 1	kWh discrepancy is due to fact that ex ante calculation utilized NM TRM deemed kWh savings value for a Full Size < 5 Pans Electric Convection Oven. However, ex post calculation utilized deemed kWh savings value for a Full Size >= 5 Pans Electric Convection Oven as the EnergyStar certificate states that the Full Size Pan Sheet capacity is equal to 5. ex post calculation utilized deemed peak kW savings value for a Full Size >= 5 Pans. ex ante kW savings calculation could not be replicated as ex ante calculation files have not ben provided.	Discrepancies in kW and kWh savings are due to the ex ante calculation utilizing savings per cubic foot values for glass door refrigerators and freezers. The ex post calculation utilized savings values for solid door refrigerators and freezers per Energy Star certificates, invoices, and spec. sheets.	NC Lighting - Interior: Multiple fixtures were not DLC or Energy Star Certified and were removed from the ex post analysis. Additional fixtures were not considered from the analysis because the submittals stated these fixtures were not approved. The source of LPD is an average LPD from an older IECC version and a newer one. The LPD was rounded up and the HOU utilized is not known. It was assumed that the square footage illuminated by these ineligible fixtures was proportional to the percentage of total fixtures they represented. This square footage was removed from the total floor area represented by the project as per the building type. The removal of ineligible fixtures and reduction in square footage decreased the energy savings and demand savings. NC Lighting - Exterior: One type of fixture (LED:S) was not DLC or Energy Star Certified and was removed from the ex post analysis. Additional fixtures were not considered from the analysis because the submittals stated these fixtures were not approved. The LPD considered for the ex ante are average LPD values from ASHRAE 90.1 2007 and ASHRAE 90.1 2018. The ex post analysis utilized the methodology as the ex ante analysis, resulting in a minor discrepancy in the energy savings. HVAC - HP: The ex post utilized the kWh and bonus savings for both cooling and heating, along with CF of 0.87 for the facility type: Multifamily from the 2021 work papers for the savings calculations. The SEER values along with the cooling capacities were taken from the AHRI certificates for the ex post. Since the ex ante calculation was not provided, the exact reason for the discrepancy cannot be determined. All the fixtures are AHRI-certified. HVAC - AC: The ex ante analysis utilized 13.0 as the baseline efficiency as per the 2019 work papers (IECC 2009) along with the CDF of 0.85 (source unknown) and the ELFH_C of 1,038. Since no information was present in the 2019 work papers on the CDF/ELFH_C for the building type Multifamily, the 2021 work papers were referred to for the ex post analysis with a CDF of 0.87 and the bonus savings methodology. This change affected the savings RR. The fixtures are AHRI-certified.		

Project ID	PNM-22-04771	PNM-23-04912	PNM-23-04913	PNM-23-05060	PNM-23-05044	PNM-23-05096
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Retrofit Rebate	New Construction	Retrofit Rebate	New Construction	New Construction	Retrofit Rebate
Project Description	New construction for HVAC and VSD system	Installation of HVAC horticulture Dehumidification and Indoor lighting equipment for medical cannabis cultivation.	Installation of Cyclic Control to Evaporator Fans of Freezers and Coolers	New construction exterior LED lighting	New construction project involving interior and exterior lighting and HVAC	Installation of LED fixtures
Measure Type	Retrofit Other	New Construction Lighting	Retrofit Custom	New Construction Lighting	New Construction	Retrofit Custom
Building Type	Retail	Warehouse/ Industrial	Restaurant	Education	Other	Other
Other Building Type		Light Industry			Car sales/service	
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	222,219	905,143	8,034	10,688	94,964	34,685
Gross Reported kW	35.90	134.49	1.73	0.00	5.00	3.80
Gross Verified kWh	216,732	905,143	8,034	10,688	94,972	34,685
Gross Verified kW	43.82	134.48	1.73	0.00	4.98	4.03
kWh Realization Rate	0.98	1.00	1.00	1.00	1.00	1.00
kW Realization Rate	1.22	1.00	1.00		1.00	1.06
Savings Source	Utility Workpaper	Utility Workpaper	Custom Analysis	Utility Workpaper	Other:	Other:
Other Savings Source					Combination of TRM and custom approaches	Custom Inputs
Reasons for RR(s) <> 1	RR variation in kWh savings is due to using Cooling kWh value and Bonus Cooling kWh per ton values for Retail category as per the PNM Workpaper. Also Demand savings kW variation due to using correct values as per the category of building and correcting the CF Value as per the Retail category for all Items.	The ex post analysis utilized the same ex ante approach for the Horticulture lighting and HVAC dehumidifiers measure, resulting in an RR of 100%.	The parameters match with the data provided and there is no discrepancy in the savings.	Evaluator used the same methodology and technical reference in ex post calculations as was used in ex ante.	The evaluator utilized the same methodology, sources, and inputs as were used in ex ante calculations. The resulting savings are within <0.01% for kWh and <0.7% for peak kW. The source of the very minor discrepancies is not known.	For peak kW savings, RR is affected by the use of a CF of 1.0 in the ex post calculation since the annual hours of use are 8,760.

Project ID	PNM-23-04954	PNM-23-05053	PNM-23-05018	PNM-22-04848	PNM-23-04874	PNM-22-04797
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	New Construction	Retrofit Rebate	New Construction	New Construction	Multifamily	Multifamily
Project Description	New construction interior and exterior lighting project at a workshop facility	Installation of LED grow lights, agricultural dehumidifier, and HVAC equipment	New construction interior & exterior lighting project at a retail store	Installation of exterior LEDs	Lighting retrofit in multifamily apartment type setting	Installing HVAC retrofits in multifamily space type
Measure Type	New Construction Lighting	Custom	New Construction Lighting	Retrofit Lighting	Retrofit Lighting	Retrofit HVAC
Building Type	Warehouse/ Industrial	Other	Retail	Exterior	Multifamily	Multifamily
Other Building Type		Agriculture (Commercial, General)		University /College		
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	52,946	173,737	43,032	15,437	9,619	12,401
Gross Reported kW	9.20	26.03	7.20	0.00	1.01	1.90
Gross Verified kWh	52,946	174,538	43,032	15,365	11,780	10,668
Gross Verified kW	9.23	28.04	7.19	0.00	1.23	4.78
kWh Realization Rate	1.00	1.00	1.00	1.00	1.22	0.86
kW Realization Rate	1.00	1.08	1.00		1.22	2.52
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Other:
Other Savings Source						Workpapers 2023 & 2021
Reasons for RR(s) <> 1	Evaluator used the same methodology, inputs, and technical reference in ex post calculations as was used in ex ante. Both methodologies assume WHFd = 1 for interior space types.	ASHP kWh savings were increased by using the 2023 workpaper workbook for heat pumps less than 5.4 tons. The Commercial, General building type was utilized for this Agriculture facility. Grow light kWh savings were increased due to the increase in HOU in the ex post calculation per the 2023 NM TRM. Grow light kW savings were increased in the ex post calculation because only one CF of 0.68 was applied. The ex ante calculation applied a CF of 0.68 and then another CF of 0.92.	Evaluator used the same methodology, inputs, and technical reference in ex post calculations as was used in ex ante.	A slight difference in RR can be seen for all three line items due to the difference in the LPD values utilized. Actual LPD values are rounded down to the nearest 0.01 in the ex ante calculation, which may have lead to the differences in LPD values. The RR variation in line item 1 is due to input wattage , Ex ante have considered 26W as input wattage whereas Ex post have considered input wattage as 25.5W according to DLC certificate. Ex post have referred to 2021 workpaper workbook for LPD values, as it is a project of year 2022. All the other values for Exterior building type like HOU, interactive energy factor, demand factor and CDF are referred from workpaper workbook 2021 as well for calculating total energy savings (kWh).	The reason for 22% RR variation is because of efficient fixture wattage. In Ex ante calculation, they have a pre calculated Annual energy savings (kWh) of (54.96 kWh) available in the Workpaper workbook 2023, which considers new efficient fixture value to be (16W) and baseline wattage as (65W) standardized for Multifamily dwelling building type. where as Ex post have used efficient fixture wattage values as per the energy star certificates (line item 1= 8W) ; (line item 2 = 4.5W) and used workpaper workbook 2023 for Algorithm, baseline wattage, HOU, CF, interactive energy factors and Demand factors for total energy savings (kWh) and demand savings (kW) calculations.	1.1 The evaluation team updated the savings for the Air source heat pump measure to use both heating and cooling savings methodology and referred to 2021 Workpapers based on the date on Invoice. It appears thethe ex ante savings referenced the 2023 workpapers for the calculations. 1.2 We can see a RR difference in Coin kW in HP because Ex ante have multiplied kW savings with General CF 0.34 where as Ex post have used CF as per space type that is 0.87. 2. A slight amount of RR variation is observed in low flow showerheads measure. The reason for variation could be , that Ex ante have rounded up value for deemed (kWh) savings value in range of 219-220 (kWh/unit) where as, Ex post have used deemed savings (kWh) value of 222.1 (kWh/unit) as per 2023 Workpapers for calculating total energy (kWh) savings.

Project ID	PNM-22-04801	PNM-23-04862	PNM-23-04908	PNM-23-04915	PNM-23-04918	PNM-23-04939
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	0	New Construction	Multifamily	0	Retrofit Rebate	Retrofit Rebate
Project Description	Installation of agricultural grow lights	Installation of LEDs in retail space type setting	Exterior LED lighting retrofit	0	Lighting Retrofit at Retail outlet floor.	Installation of new High Efficiency Unitary and Split Air Conditioning Systems
Measure Type	Retrofit Lighting	Retrofit Lighting	Retrofit Lighting	Retrofit Lighting	Retrofit Lighting	Retrofit HVAC
Building Type	Other	Retail	Exterior	Miscellaneous	Grocery	Retail
Other Building Type	Agriculture		Multifamily	Restaurant		Service
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	542,678	309,494	17,866	8,054	792,268	12,953
Gross Reported kW	72.84	57.70	0.00	1.38	103.10	9.48
Gross Verified kWh	511,166	323,455	16,052	8,518	848,043	12,948
Gross Verified kW	71.49	77.40	0.00	1.56	110.36	9.48
kWh Realization Rate	0.94	1.05	0.90	1.06	1.07	1.00
kW Realization Rate	0.98	1.34		1.13	1.07	1.00
Savings Source	0	Utility Workpaper	Utility Workpaper	New Mexico TRM - 2020	New Mexico TRM - 2020	Other:
Other Savings Source				New Mexico TRM - 2021	New Mexico TRM - 2021	PNM 2023 Workpaper
Reasons for RR(s) <> 1	The ex ante savings for the Agriculture lighting used an input wattage and PPF values directly from the spec sheets. And its also found that Ex Ante have considered one common input wattage (631W) and PPF value(1700) for two different lighting fixtures that are installed for energy savings(kWh) and demand savings calculations (kW). Next, In Dehumidifiers Ex ante have considered EFbase and EFee values as per the Algorithm in the Workpaper for energy savings(kWh) and demand savings(kW) calculations. Whereas in Agriculture lighting Ex Post have considered input wattages(661.3W ; 657.3W)and PPF values(1652µmol/sec ; 1702µmol/sec) for two different lighting fixtures having model no.(VYPR 2P & SPYDR 2i47) according to the DLC certificates For energy savings (kWh) and Demand savings (kW) calculations. Next for Dehumidifiers Ex post have considered EFbase value from the workpaper as per algorithm and EFee value as per the spec sheets for Dehumidifiers.	We have a overall 104.5% RR rate. The primary reason for this 4.5% variation is because of the first line Item(interior lighting). We can see there is a 5% RR variation for energy savings(kWh) in first line item which is due to Fixture input wattage. Ex ante have taken input wattage values from the fixture spec sheets where as Ex post have taken input wattage values as per DLC certificate for energy savings calculation(kWh). Next, We do get RR as 100% for Peak demand savings(kW), if we don't consider the demand factor in the calculation but that wont be a right approach. This is the reason for 34% RR variation for peak demand savings(kW) in first line item.	There is a 10% RR variation observed overall. The reason for this RR variation is because of difference in efficient fixtures input wattage. Ex ante have considered input wattage values from the spec sheets while Ex post have considered values as per the DLC certificates. Chronologically, For (model no.= CFLAFLW11SL) Ex have considered input wattage as 63W where as Ex post have considered 75W ; For (model no.= CFLAFLW5SL) Ex ante have considered input wattage as 35W whereas Ex post have considered 35.7W ; For (model no.= C-CP-B-BRQ-S3L) Ex ante have considered input wattage as 28W where as Ex post have considered 25.6W for the total energy savings calculation (kWh)	ex post savings utilizes the Baseline wattages of Fixture, CF, Hou as per PNM Workpaper and Efficient wattages as per DLC Certificates which gives the ex post Energy savings 8,518 kWh, Demand Savings : 1.558 kW which turns RR to 106 % for Energy savings and 113 % for Demand savings.	Ex post Savings utilizes the operating hours for Grocery, the interactive factors for the retrofit fixtures are based on the Interior-Grocery building type where it is applicable which turns RR to 107% for Energy savings and 113% for Peak Demand savings respectively.	A slightly difference occurred in energy savings due to correcting capacity from Btu/h to ton from 21.34 to 21.333.

Project ID	PNM-23-04943	PNM-23-04950	PNM-23-04958	PNM-23-04959	PNM-23-04960	PNM-23-04969
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Multifamily	New Construction	Retrofit Rebate	Multifamily	Multifamily	Retrofit Rebate
Project Description	Non-lighting project	installing LPD fixtures and Unitary and Split Air Conditioning Systems in office space type setting.	HVAC Retrofit of an AHU at AT&T Datacenter	Lighting replacement	Installation of Household electric appliances	Retrofit of interior linear fluorescent lampls with LED lamps
Measure Type	Multifamily	Retrofit Lighting	Retrofit Custom	Retrofit Lighting	Multifamily	Retrofit Lighting
Building Type	Miscellaneous	Office	Warehouse/ Industrial	Multifamily	Other	Retail
Other Building Type			Heavy Industry		Commercial, General	Retail/Service
Site Visit Being Conducted	No	No	No	No	No	No
Gross Reported kWh	274,477	6,019	2,500,626	98,239	59,136	165,373
Gross Reported kW	31.60	0.79	2821.59	10.80	0.20	33.03
Gross Verified kWh	276,954	5,615	2,548,540	124,288	59,775	179,305
Gross Verified kW	61.65	0.56	2821.59	15.43	2.57	43.42
kWh Realization Rate	1.01	0.93	1.02	1.27	1.01	1.08
kW Realization Rate	1.95	0.71	1.00	1.43	12.84	1.31
Savings Source	Utility Workpaper	Utility Workpaper	Custom Analysis	Utility Workpaper	Utility Workpaper	New Mexico TRM - 2020
Other Savings Source						New Mexico TRM - 2021
Reasons for RR(s) <> 1	HVAC: ex ante calculation used C.F from TRM General building type which is 0.34. But in work paper C.F for MF building is stated separately. For ex post calculation we have consider M.F C.F value. This is causing variation. Refrigerator: For ex ante calc KWh and kW savings has been used for 16.9 ft. cu. as the value is close to 17.5 ft. cu. Also volume is used as 16.9 instead of 17.5 But in ex post cal we have used volume according to spec sheet and have interpolated the savings value for 17.5 ft cu. This is causing slight variation in RR	The RR variation observed in Lighting calculation for Interior as well as exterior fixtures, with respect to Ex ante recreated we can say that Ex ante have not used LPD values according to workpapers 2023 where as Ex post have done the energy savings calculations using LPD values as per the Workpaper workbook 2023. Another reason for RR variation can also be that Ex ante have been using different energy and demand factors value for the analysis. 2. The reason for RR variation in Peak demand savings in Split AC HVAC) is because of the use of different CF. Ex post have used CF as per space type "office" as (0.67)referring workpaper workbook 2021. Ex ante had used CF for General space type (0.34)	Actual CDD, HDD, temperature data and metered data for kWh used in Regression equation to get the savings which shows the regression equation performs more stable to get the projected savings.	ex ante calculation did not considered C.F and I.F for savings calculation. For interior space C.F=1 was considered and I.F also was used as 1. Whereas for exterior space C.F=0 was used. Project application mentions: "ONLY qualified LED lighting is eligible for a rebate. No fluorescent replacement are eligible for rebates". So for our analysis we have made fluorescent fixture quantity as 0. Using workpaper for Incan light we have used baseline as 65W and efficient as 16 W. For efficient case in Screw-in CFL we are using wattage as 9W	The ex post utilized the deemed kWh savings values for the city of Albuquerque from the work papers for the water savings measure which included a low-flow faucet aerator and low-flow showerhead. This assumption increased the kWh energy savings by 1%.	Ex post Savings utilizes the operating hours for Retail-Large Story, the interactive factors for the retrofit fixtures are based on the Interior-Retail-Large building type where it is applicable which turns RR to 108% for Energy savings and 131% for Peak Demand savings respectively.

Project ID	PNM-23-04978	PNM-23-05023	PNM-23-05028	PNM-23-05031	PNM-23-05052	PNM-23-05065
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Retrofit Rebate	Multifamily	Retrofit Rebate	Retrofit Rebate	Multifamily	Retrofit Rebate
Project Description	Installation of new high-efficiency Stadium LED lights.	New Construction	Installation of air conditioning systems	Installation of a Centrifugal Chiller and VSDs on cooling water pumps	Installing retrofit in multifamily space type	Installation of interior LED lighting and interior occupancy sensor
Measure Type	Retrofit Lighting	Retrofit Lighting	Retrofit HVAC	Retrofit Other	Retrofit Lighting	Retrofit Lighting
Building Type	Exterior	Multifamily	Retail	Other	Multifamily	Miscellaneous
Other Building Type	K-12 Public school			Hospital		Assembly
Site Visit Being Conducted	No	No	Yes	No	No	Yes
Gross Reported kWh	134,836	328,514	3,011	1,272,792	452,361	183,961
Gross Reported kW	0.00	61.90	0.70	174.60	42.18	36.80
Gross Verified kWh	135,151	428,604	3,016	1,272,791	445,383	185,862
Gross Verified kW	0.00	116.83	1.77	180.47	58.11	37.40
kWh Realization Rate	1.00	1.30	1.00	1.00	0.98	1.01
kW Realization Rate		1.89	2.52	1.03	1.38	1.02
Savings Source	Utility Workpaper	Other:	Utility Workpaper	Utility Workpaper	Other:	Utility Workpaper
Other Savings Source		Workpaper 2023 & 2021			Workpaper 2021 & 2023	
Reasons for RR(s) <> 1	The ex post utilized the wattage of the baseline fixture, 1610W based on the work paper fixtures list. The interactive factors for the retrofit fixtures are based on the exterior building type. Since the HOU of the stadium lights are not fixed and not available in the work papers, 1,637 hours as per the ex ante are used. The wattage of the baseline fixture increased the kWh savings by 0.2%.	1.A RR variation in observed in MF low flow showerheads as Ex ante have used deemed savings value for Average Location type which is 219.23kWh for the analysis where as Ex post have used location as Sante fe as per customer application used Sante Fe deemed value (251.8kWh) for the analysis. 2. A RR variation in observed in MF Low faucet aerator 1 GPM as Ex ante have used deemed savings value for Average Location type which is 39.73kWh for the analysis where as Ex post have used location as Sante fe as per customer application used Sante Fe deemed value (49.44 kWh) for the analysis. 3. Ex post calculations used LPD values from workpaper 2021 Ashrae 90.1 2007. 4. The reason for RR variation for HVAC cannot be identified. Ex post have referred Workpaper 2021 for the savings calculation.	Peak demand savings increased due to the use of CF (0.8) for the Retail building type in the ex post analysis. The ex ante used the Commercial, General building type which has a lower CF (0.34). A minor variation in energy savings was noticed, which can be attributed to the rounding off of the cooling capacities of the air conditioning units.	The evaluation team adjusted the algorithm input parameters used to calculate the peak demand savings for both the chiller and cooling water VFD measures. The adjustments combine to increase the ex post peak demand savings. To calculate the peak demand savings for the chiller measure, the evaluation team multiplied the chiller capacity times the efficiency improvement and coincidence factor of 0.63, which corresponds to a Medical building type. The ex ante peak demand savings appear to have been calculated by dividing the annual kWh savings by the EFLH for a Medical building type then multiplying by a CF of 0.49, which corresponds to a Commercial, General building type. This adjustment increased the peak demand savings for the chiller measure. To calculate the ex post peak demand savings for the cooling water VFDs, the evaluation team multiplied the total HP (quantity time motor size) by the deemed peak demand savings values (kW/HP) listed in then utility workpapers. Based on the supplied documentation, it is not clear why the ex post peak demand savings are less than the reported ex ante savings.	Ex post have referred workpaper 2021 for heat pump and used both cooling and heating bonus savings methodology for the savings calculation. 1.1 We can see a RR difference in Coin kW in Heat Pump and AC because Ex ante have multiplied kW savings with General CF 0.34 where as Ex post have used CF as per space type that is 0.87. 2.In New construction lighting savings in interior as well as exterior, lighting RR variation can be seen, the reason for that variation could be because, Ex ante may have used some other HOU values. Ex post have followed 2021 Workpapers for LPD values and other factors like HOU, Interactive factors and CF for the savings calculation.	The discrepancy observed is due to the rounding of the efficient equipment wattages in the ex ante calculations. The ex post analysis referred to the DLC and Energy star certified wattages for the analysis.

Project ID	PNM-23-05066	PNM-23-05073	PNM-23-05074	PNM-23-05393	PNM-23-05098
Utility	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	New Construction	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Retrofit Rebate	0	Building Tune-Up	Retrofit Rebate	Multifamily
Project Description	Installation of LED fixtures	New construction project involving interior and exterior lighting and HVAC installations	Building operator certification tuition assistance	Installation of interior LED lighting and interior occupancy sensor	New construction
Measure Type	Retrofit Custom	New Construction	Building Tune-Up	Retrofit Lighting	New Construction Lighting
Building Type	Retail	Other	Other	Miscellaneous	0
Other Building Type	Retail - Multiple Buildings	Exercise/gym center	Heavy Industry, Multiple Buildings		
Site Visit Being Conducted	No	No	No	Yes	No
Gross Reported kWh	55,939	70,689	168,000	74,374	218,512
Gross Reported kW	7.75	16.80	0.00	14.40	60.50
Gross Verified kWh	55,939	71,064	168,000	67,593	203,378
Gross Verified kW	9.34	18.60	14.00	13.21	63.16
kWh Realization Rate	1.00	1.01	1.00	0.91	0.93
kW Realization Rate	1.21	1.11		0.92	1.04
Savings Source	Other:	Utility Workpaper	New Mexico TRM - 2023	Utility Workpaper	Other:
Other Savings Source	Custom Inputs				Workpaper 2023 & 2021
Reasons for RR(s) <> 1	The peak kW RR increased due to the application of one CF (0.80) in the ex post calculation. The ex ante calculation utilized a CF of 0.80 and then multiplied these savings by an additional CF of 0.83.	Ex ante used WHF_d of 1.0 for the fixture savings peak kW calculation. Evaluator used WHF_d of 1.247, reflecting the TRM value for 'Commercial, General'. This resulted in an increase in ex post savings. Evaluator also did not include exit signs in the lighting savings calculation, as they are not considered space lighting. This decreased ex post savings slightly. It is unclear what fixture quantities were used in ex ante calculation. There are discrepancies regarding fixture quantities between the various project files: invoice, COMCheck form, and design plans. Evaluator did not adjust fixture quantities, since there was no basis to do so.		1. In the ex post analysis, the Light Industry facility utilized a House Operating Unit (HOU) of 2,580 hours for screw-in bulbs (A23 and E8A) in the interior, as per the PNM work papers. 2. Initially, the ex ante analysis assumed an HOU of 3,276 hours for the interior fixtures based on 63 hours per week. However, the ex post analysis aligned with the work papers for the Commercial/General facility and used 3,175 hours. 3. For the exterior fixtures, the ex ante analysis considered an HOU of 4,368 hours (based on 84 hours per week), while the ex post analysis followed the work papers and utilized 4,192 hours. 4. During verification, all 19 types of fixtures were cross-referenced with invoices and their ES/DLC certificates. Notably, the fixture LBR6 were neither DLC/ES listed, so their wattages were obtained from spec sheets in the ex post analysis. 5. In the ex ante analysis, lamp wattages were used for all baseline HPS/MH/T8 fixtures where the retrofit type involved fixtures replacing fixtures as per the ex ante calculator. The ex post analysis rectified this by replacing the lamp wattages with the fixture wattages. The use of HOU and the fixture wattages for baseline as per work papers and DLC-certified wattages for retrofit equipment are major contributors to the reduction in energy and peak demand savings.	1. In HVAC (heat pump)A RR difference can be observed in every heat pump claimed because Ex ante have used 2023 workpapers where as Ex post has used 2021 workpapers for the analysis. Hence savings changes due to the change in bonus savings value. 2. In New construction lighting savings in interior as well as exterior, lighting RR variation can be seen, the reason for that variation could be because, Ex ante may have used some other HOU values. Ex post have followed 2021 Workpapers for LPD values and other factors like HOU, Interactive factors and CF for the savings calculation.

Project ID	PNM-23-05099	PNM-23-05103	PNM-23-05123	PNM-23-05125	PNM-23-05126
Utility	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	New Construction	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Retrofit Rebate	Retrofit Rebate	0	Retrofit Rebate	Multifamily
Project Description	Installation of interior LED lighting	Installation of an ASHP and EC motors in walk-in cases	New construction cannabis grow lighting measure	Installation of Transformer, AC, and an ASHP	Installing Retrofit in multifamily space type
Measure Type	Retrofit Lighting	Retrofit HVAC	New Construction Lighting	Retrofit Custom	Multifamily
Building Type	Miscellaneous	Miscellaneous	Other	Office	0
Other Building Type	Light Industry	Restaurant	Agricultural		
Site Visit Being Conducted	Yes	Yes	No	Yes	No
Gross Reported kWh	258,301	6,375	86,094	73,126	57,829
Gross Reported kW	43.50	0.90	13.36	40.50	6.80
Gross Verified kWh	313,410	6,404	89,158	70,947	57,829
Gross Verified kW	51.54	1.44	14.37	44.87	7.98
kWh Realization Rate	1.21	1.00	1.04	0.97	1.00
kW Realization Rate	1.18	1.60	1.08	1.11	1.17
Savings Source	Utility Workpaper	Utility Workpaper	Other:	Other:	Other:
Other Savings Source			NM 2023 TRM	Utility work paper for AC and ASHP, Custom spreadsheet for Transform	2021 &2023 Workpaper
Reasons for RR(s) <> 1	1. During verification, all 36 types of fixtures were cross-referenced with invoices and their ES/DLC certificates. Notably, the fixtures LBR6 and LBR8 were neither DLC/ES listed, so their wattages were obtained from spec sheets in the ex post analysis. 2. In the ex ante analysis, lamp wattages were used for all baseline HPS/CFL/Incandescent/Halogen/MH fixtures where the retrofit type involved fixtures replacing fixtures as per the ex ante calculator. The ex post analysis rectified this by replacing the lamp wattages with the fixture wattages. The use of fixture wattages for baseline as per work papers and DLC-certified wattages for retrofit equipment are major contributors to the increase in energy and peak demand savings.	ASHP: Peak demand savings increased due to the use of CF (0.76) for the Restaurant building type in the ex post analysis. The ex ante used the Commercial, General building type which has a lower CF (0.34).	Evaluator used the same methodology and most of the same inputs. Evaluator used 4,255 HOU per the NM TRM, whereas ex ante used 4,000 HOU per the IL TRM. This resulted in an increase in verified kWh savings. Ex ante peak kW calculations included a 5% reduction factor, the source of which is unknown. Ex post savings calculation did not include this 5% reduction factor, thus verified savings were increased. Evaluator also made slight adjustments to installed fixture wattage and PPF, based on the DLC listing for the fixture. These resulted in slight increases in verified savings.	ASHP:The ex post utilized the deemed kWh and bonus savings values for both cooling and heating along with the CF of 0.67 associated with the facility type 'Office'. It is observed that the ex ante used kWh and the bonus deemed savings values along with the CF of 0.34 for the facility type 'Commercial, General' analysis. Air Conditioning: The ex post utilized the cooling capacity for the 40Ton AC unit as per the AHRI certificate (37.92Ton). The CF (0.67) associated with the facility type 'Office' is considered. It is observed that the ex ante used averaged deemed kWh and kWh bonus savings values along with the CF of 0.34 for the analysis. Transformer: The ex post calculations used estimated load factors as per the "Losses Reference" worksheet in the ex ante calculator for the 75kVA transformer. The baseline and the proposed equipment power losses were evaluated based on the formula (No load loss + Loading^2 * Full load loss). The baseline and the proposed, no load and full load losses were referred from the ex ante calculator "Losses Reference" worksheet. The ex post losses were subtracted from baseline losses to estimate the transformer peak demand and energy savings. On-peak and off-peak operational hours were estimated quantities. The ex ante had assumed the loading factors for the 113kVA transformer. For peak demand savings, the ex ante calculation used the Building Type "Office" with a CDF of 0.7 for all spaces. The building type on the application is listed as "Office." According to IL TRM, "CF for distribution transformers is 1.0 by definition. By including the load factor in the demand savings calculation, the load profile is accounted for".	0

Project ID	PNM-23-05129	PNM-22-04769	PNM-23-04891	PNM-23-04916	PM-23-06127	PNM-20-04110
Utility	PNM	PNM	PNM	PNM	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive	Commercial Comprehensive
Subprogram	Retrofit Rebate	Retrofit Rebate	Retrofit Rebate	Retrofit Rebate	Midstream	Multifamily
Project Description	Installation of VSDs and Water Cooled Centrifugal chiller	Installation of New and Retrofit High efficiency lighting Fixtures	Installation of Water-Cooled Chiller - Centrifugal_Central: > 300 and <= 400 Tons	Installing Guest Room Energy Management System	Installation of new High Efficiency HVAC Equipment.	Installing Lighting and Air source heat pumps in multifamily - Exterior facility type setting.
Measure Type	Retrofit HVAC	Retrofit Lighting	Retrofit HVAC	Retrofit HVAC	Retrofit HVAC	Retrofit Lighting
Building Type	Health	Warehouse/ Industrial	Office	Miscellaneous	Miscellaneous	Exterior
Other Building Type	Medical					
Site Visit Being Conducted	Yes	No	No	No	No	No
Gross Reported kWh	382,789	1,275,442	90,780	229375	228,534	197,056
Gross Reported kW	53.80	146.90	31.04	58.50	21.95	35.39
Gross Verified kWh	432,544	1,272,237	90,781	167500	214,691	269,595
Gross Verified kW	63.38	146.45	37.38	42.7125	91.37	38.96
kWh Realization Rate	1.13	1.00	1.00	0.73	0.94	1.37
kW Realization Rate	1.18	1.00	1.20	0.73	4.16	1.10
Savings Source	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper	Utility Workpaper
Other Savings Source						
Reasons for RR(s) <> 1	Water Cooled Centrifugal chiller: The project is implemented in Otero County. As per the NM TRM, Las Cruces is the weather zone city for Otero County. The ex ante calculation utilized a CF of 0.49 (Commercial, General at Albuquerque), while the ex post calculation employed a CF of 0.62 (Medical at Las Cruces). This adjustment resulted in an increase in kW savings for the water-cooled chiller measure. Furthermore, the ex ante calculation used an HOU of 2,319 hours, which is associated with air-cooled chillers for the medical facility at Las Cruces. In contrast, the ex post calculation used an HOU of 2,946 hours, which is associated with water-cooled chillers for the same facility. This difference is due to the application of a different EFLH for the ex post calculation, which is based on the type of chiller.		RR for annual energy savings is 100%. However, RR for peak demand kW savings IS 120%. This is due to that the ex ante calculations used CF of 0.49 for commercial general building type in Albuquerque . However, ex post peak demand savings used a CF factor of 0.59 for office building type in Albuquerque. ex ante used HOU for office building type, but they used CF for commercial general, which is what caused the RR discrepancy.	RR Discrepancies are due to that the application summary used per room savings methodology based on different number of rooms than the one stated in the post-inspection of 268 rooms. This could be due substitution for different room HVAC capacities as the assumption in the workpaper and the TRM was that the typical HVAC capacity IS 1 Ton. However, No similar substitution was made for Kwh calculation.	* For Heat Pumps and VRF systems, the cooling and heating savings are calculated separate which resulted in a reduction in heating kWh Savings. ex ante calculation used the cumulative table (Both Heating and Cooling Savings) * " Commercial, General" Building type was used in most of the cases for calculating the Peak KW and kWh Savings. ex post calculation considers particular building types mentioned in the files. This resulted in an increase in ex post Peak Coincident kW savings and kWh savings. * Information about Customer address, City or Zip is unavailable, hence Albuquerque location is considered for all measures.	Ex post has been using bonus savings approach for HVAC heat pumps referring to all relative factors from 2019 workpaper. Ex post has used miscellaneous building type for "multifamily" space type. The possible reason for RR discrepancy for first two line items in HP can be identified, which is be because, Ex ante has not used efficient rating as per AHRI, whereas Ex post has used efficient rating as per AHRI certificate.

Project ID	PNM-22-04829	PNM-04956
Utility	PNM	PNM
Program	Commercial Comprehensive	Commercial Comprehensive
Subprogram	New Construction	Retrofit Rebate
Project Description	Installation of exterior lighting and HVAC equipment	Interior and Exterior lighting retrofit
Measure Type	Retrofit Lighting	Retrofit Lighting
Building Type	Warehouse/ Industrial	Miscellaneous
Other Building Type		Adult detention center
Site Visit Being Conducted	No	No
Gross Reported kWh	80,193	530,689
Gross Reported kW	7.11	53.70
Gross Verified kWh	35,378	719,755
Gross Verified kW	6.35	68.31
kWh Realization Rate	0.44	1.36
kW Realization Rate	0.89	1.27
Savings Source	Utility Workpaper	Utility Workpaper
Other Savings Source		
Reasons for RR(s) <> 1	The evaluation team used the supplied utility workpapers to calculate the ex post savings. The deviation between ex ante and ex post savings is not clear based on the supplied documentation.	The ex post utilized the wattage of the baseline fixture, based on the work paper fixtures list. The interactive factors for the retrofit fixtures are based on the exterior building type where it applicable and for interior as per Lodging-Hotel since the facility is adult detention center. Since the HOU of the Adult detention facility is not available in the work papers, same hours as per the ex ante are used due to operation. The wattage of the baseline fixture and correcting ex post wattage as per DLC increased the kWh savings gives RR 136%. In ex post, Peak demand savings is calculated for Interior lighting as per CF 0.86. which gives RR 127%.