

BEFORE THE PUBLIC UTILITIES COMMISSION OF NEVADA

Joint Application of Nevada Power Company d/b/a NV Energy and Sierra Pacific Power Company d/b/a NV Energy for approval of their 2027-2046 integrated resource plan, 2027-2029 Action Plan and 2027-2029 Energy Supply Plan.

Docket No. 26-05 ____

VOLUME 37 OF 41

TECHNICAL APPENDIX DEMAND SIDE MANAGEMENT PLAN

DESCRIPTION	PAGE NUMBER
DSM-15 2025 Direct Install M&V	2
DSM-16 2025 Residential Demand Response M&V	46
DSM-17 2025 Energy Smart Schools M&V	229

DSM-15

**Direct Install and Home Improvements Program
NV Energy
Program Year 2025**

***Measurement and Verification Report
March 2, 2026***

Prepared for:



Prepared by:

QUALUS

***100 Colonial Center Parkway
Suite 400
Lake Mary, FL 32746***

TABLE OF CONTENTS

1. Executive Summary	1
2. Program Background	4
3. M&V Methodology	5
3.1 Determining Survey Sample Size	5
3.2 Determining Annual Energy (kWh) Savings	6
3.3 Energy Savings Curves	15
3.4 First-Year Energy (kWh) Savings	15
3.5 Critical Peak Demand Savings	15
3.6 Determination of Effective Useful Life	16
4. Energy Impact Findings	20
4.1 Findings from Online Surveys	20
4.2 Energy Impacts	21
4.3 Energy Impacts by Rate Class	22
4.4 Ex-Post Critical Peak Demand (kW) Savings	23
4.5 Inputs for Cost Effectiveness Analyses	23
5. Recommendations	24
6. Appendix A: Savings per Month by Rate Class	26
6.1 NPC Savings per Month by Rate Class	26
6.2 SPPC Savings per Month by Rate Class	26
7. Appendix B: Survey Form	28

1 EXECUTIVE SUMMARY

This Measurement and Verification (“M&V”) report provides a detailed description of ex-post verified energy and demand impacts achieved by NV Energy’s 2025 Direct Install & Home Improvements Program (“DI program”). The DI program was offered to Nevada Power Company (“NPC”) and Sierra Pacific Power Company (“SPPC” and, collectively with NPC, “NV Energy” or “NVE”) customers. This M&V report is provided by the Evaluator, Qualus LLC (formerly ADM Associates Inc., which was acquired by Qualus LCC in July 2025), an independent, third-party contractor that provides evaluation and M&V services and reports for numerous electric and gas utility clients across the United States.

The DI program is a demand side management (“DSM”) program which utilizes NVE-dispatched field technicians to implement low-cost energy efficiency measures (“EEMs”)¹ while concurrently providing in-home services, such as energy assessments and smart thermostat installations. In 2025, the DI program provided EEMs to 3,980 NPC customers and 691 SPPC customers; EEMs and quantities installed are listed in Table 1-1 and Table 1-2 on the following page.

The Evaluator employed engineering analyses and verification activities to determine the ex-post verified energy kilowatt-hour (“kWh”) and demand kilowatt (“kW”) impacts. Detailed descriptions of the Evaluator’s engineering analyses and verification activities are provided in this M&V report.

Results: For the 2025 DI program, ex-post verified annual energy savings are 1,303,820 kWh for the NPC service territory and 136,685 kWh for the SPPC service territory.

First-year results for NPC and SPPC: First-year energy savings, i.e., the energy saved during the 2025 calendar year, are 766,124 kWh for NPC and 76,973 kWh for SPPC. Summer critical peak demand (kW) savings achieved by this program are 482.7 kW for NPC and 17.4 kW for SPPC.

Realization rates for NPC and SPPC: The ex-post verified annual energy savings represent a realization rate (“RR”) of 91.9 percent for the NPC service territory and 85.2 percent for the SPPC service territory.

NPC ex-post verified lifetime energy savings are 9,235,444 kWh. The quotient of lifetime savings and ex-post annual savings yields the program-level effective useful life (“EUL”), i.e., 9,235,444 kWh lifetime divided by 1,303,820 kWh per year yields a 7.1-year lifetime at the program level. SPPC ex-post lifetime savings are 1,292,484 kWh, with EUL of 9.5 years at the program level.

Statistical precision: The Evaluator’s analyses for this M&V report are required to achieve sampling precision of ± 10.0 percent at the 90 percent confidence level (also called 90/10 confidence). Sampling precision was determined across the entire population of DI program

¹ In this report, the word “measure” may be used instead of “energy efficiency measure” or “EEM.” These are synonymous terms referring to energy-efficient equipment or actions implemented through DSM programs.

participants, i.e., 4,671 customers (3,980 NPC and 691 SPPC customers). A minimum of 68 sample points were needed to achieve 90/10 confidence. Calculated across the 467 participants who completed surveys for the 2025 DI program survey, ex-post sampling precision is ± 3.2 percent at the 90 percent confidence level.

Table 1-1 and Table 1-2 depict the 2025 DI program's ex-post verified energy impacts.

Table 1-1. Summary of Energy Impacts, NPC 2025 DI Program

Measure Category	Quantity of EEMs Installed	Ex-Post First-Year (2025) Savings (kWh)	Annual Energy Savings (kWh)			Average EUL (years)	Lifetime Energy Savings (kWh)
			Ex-Ante	Ex-Post	Realization Rate		
HVAC Filter	3,970	416,901	724,494	708,248	97.8%	5.0	3,541,240
LED Bulbs	9,592	159,413	332,376	270,817	81.5%	9.4	2,545,680
LED Photocell	412	16,976	40,368	28,840	71.4%	3.4	98,056
Advanced Power Strips	1,737	166,824	308,502	283,406	91.9%	10.0	2,834,061
Home Improvements Channel	114	6,010	12,754	12,509	98.1%	17.3	216,407
Total	15,825	766,124	1,418,494	1,303,820	91.9%	7.1	9,235,444
Number of Participants (count): 3,980			Summer Critical Peak Demand Reduction (kW): 482.7				

Table 1-2. Summary of Energy Impacts, SPPC 2025 DI Program

Measure Category	Quantity of EEMs Installed	Ex-Post First-Year (2025) Savings (kWh)	Annual Energy Savings (kWh)			Average EUL (years)	Lifetime Energy Savings (kWh)
			Ex-Ante	Ex-Post	Realization Rate		
HVAC Filter	114	3,981	10,062	11,332	112.6%	5.0	56,658
LED Bulbs	1,497	52,279	51,909	42,284	81.5%	9.4	397,470
LED Photocell	92	3,213	8,374	6,311	75.4%	3.4	21,458
Advanced Power Strips	410	14,318	78,166	66,895	85.6%	10.0	668,949
Home Improvements Channel	111	3,182	11,917	9,863	82.8%	15.0	147,949
Total	2,224	76,973	160,428	136,685	85.2%	9.5	1,292,484
Number of Participants (count): 691			Summer Critical Peak Demand Reduction (kW): 17.4				

M&V recommendations: The Evaluator provides the following recommendations for the ongoing (i.e., 2026) DI program:

- For the HVAC filter measure, DI program policy is that field technicians must recommend installation² of an air handler filter whistle with each direct installed HVAC filter. The whistle is a device that one can affix to an HVAC filter – it emits an audible alert when the filter becomes saturated. However, some customers ask the field technician not to install the whistle. The Evaluator recommends that the DI program:

² To optimize customer satisfaction, HVAC filter whistles are only installed with customer approval.

- Coach its field technicians to remind every customer of the benefits of the whistle before accepting a customer's request to forgo it; and
- Require the customer to initial a brief statement that the customer declined the whistle, but the customer also commits to replace the HVAC filter every three months.³
- The Evaluator recommends that NVE program management requires a comprehensive training and implementation manual that should be updated annually and signed by all DI program implementation staff, including field technicians. A condensed version of the manual could be defined as a field manual that all field technicians could be required to carry and use for reference while performing DI program activities for NVE's customers.⁴
- The Evaluator recommends that NVE program management require the following activities for all future DI program implementation:
 - DI field technicians should direct install all EEMs, potentially increasing the in-service rate ("ISR")⁵ from the 2025 findings of 84 percent overall ISR for both NPC and SPPC. No EEMs should be left with customers to self-install, which contradicts the "direct install" program design while contributing to suboptimal ISRs.⁶
 - Technicians should only distribute energy efficiency technologies approved by the program. In 2025, some households received 11-Watt LED bulbs that were left over from prior years' programs but received no consideration in 2025.⁷
 - Technicians should ensure that the types of filters they install are correct for the size of the household and number appropriate HVAC units. The technician could be notified that filter sizes or numbers are unusual and confirm the data before submission.

³ A brief statement that requires the customer's initials could be added to the "In-Home Energy Assessment" form that every DI participant is already required to sign. NV Energy asserts that in 2025: a) it is coaching this element as part of the Home Energy Advisor/Consultant role; and b) NVE recently changed its HVAC filter offering to MERV 8 contractor-grade filters that are expected to improve customer acceptance of the HVAC filter and the accompanying filter whistle. NV Energy is engaging in internal discussion on this issue.

⁴ NV Energy should create a manual to codify DI program activities for implementation staff in the 2026 program year.

⁵ ISR is the quotient of the count of verified installed EEMs and the EEM count reported in program tracking data.

⁶ NV Energy asserts that the direct-install requirement is being strongly emphasized with all Home Energy Advisors/Consultants in all 2025 training and quality assurance processes.

⁷ NV Energy asserts that they have addressed issues with appropriate equipment installations with field technicians.

2 PROGRAM BACKGROUND

NVE's DI program was offered to NPC and SPPC customers throughout 2025. This program directly installs relatively low-cost EEMs when an NVE PowerShift Energy Advisor is dispatched to a customer's home to provide services, such as an in-home energy assessment, a smart thermostat installation, or a quality control inspection.

The 2025 DI program implemented the following EEMs, which were directly installed in participating customers' homes by field technicians.

- HVAC filter change out and filter whistle: nine filter sizes are available to NVE's residential customers (potentially replacing 80 percent of all HVAC filters); an air handler filter whistle accompanies the HVAC filter change out – the whistle attaches to the filter in the air handler and makes a sound when it is time to replace the filter.
- ENERGY STAR® light emitting diode ("LED") bulbs: 8W BR30 and 9W A19.
- LED photocell combo unit.
- Refrigerator/freezer thermometers.
- Advanced Power Strips ("APS") units.

The 2025 DI program provided direct installed EEMs to 3,955 NPC customers; through its Home Improvements channel, the DI program provided rebates to 25 additional NPC customers, totaling 3,980 NPC customers. The DI program provided direct installed EEMs to 669 SPPC customers and Home Improvements rebates to 22 additional SPPC customers, totaling 691 SPPC customers.⁸

NV Energy's program tracking data indicates the following counts of implemented EEMs, unit savings per EEM, and total ex-ante savings per EEM.

Table 2-1. EEMs Reported in Program Tracking Data

Energy Efficiency Measure	NPC Ex-Ante Summary			SPPC Ex-Ante Summary		
	Quantity Reported	Ex-Ante Unit Savings (kWh/year)	Ex-Ante Total Savings (kWh/year)	Quantity Reported	Ex-Ante Unit Savings (kWh/year)	Ex-Ante Total Savings (kWh/year)
HVAC Filter	4,094	177.0	724,494	117	86.0	10,062
LED (8W BR30)	2,384	33.0	78,672	388	33.0	12,804
LED (9W A19)	7,688	33.0	253,704	1,185	33.0	39,105
LED Photocell	464	87.0	40,368	106	79.0	8,374
Advanced Power Strip	1,773	174.0	308,502	418	187.0	78,166
Home Improvements Channel	122	104.5	12,754	115	103.6	11,917
TOTALS	16,525	85.8	1,418,494	2,329	68.9	160,428

⁸ Home Improvements rebates were provided for LED bulbs, occupancy sensors, smart plugs, smart switches, insulation, duct sealing, low flow showerheads, and water heater blankets.

3 M&V METHODOLOGY

This chapter provides a discussion of M&V methodologies for determining EEM installation, energy (kWh) savings, energy savings curves, critical peak demand (kW) savings, and EUL.

3.1 Determining Survey Sample Size

The Evaluator verified the 2025 DI program activity and implementation of the reported EEMs. NVE's program tracking data was thoroughly reviewed. Ex-ante values were thoroughly inspected for all EEMs reported in the program tracking data. The Evaluator verified that there were no duplicate entries in program tracking data. Measure installation was verified through program tracking data and customer surveys.

The Evaluator administered surveys to a sample of DI program participants to determine installation rates and assist in program evaluation. The Evaluator conducted a simple random sample of participants for surveying. Sample size was calculated to achieve statistical precision of ± 10 percent at the 90 percent confidence level (also called 90/10 confidence). Statistical precision relates to the coefficient of variation ("cv") for program participants' energy savings. The cv is defined using the following formula:

Equation 3-1

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

Where x is participants' average expected energy savings. Residential program evaluations generally utilize a 0.5 cv.⁹ Sample size (n_0) was determined using the following formula:

Equation 3-2

$$n_0 = \left[\frac{1.645 \times cv}{P} \right]^2$$

Where,

1.645 = Z score for 90 percent confidence interval in a normal distribution

cv = coefficient of variation (0.5)

P = required relative precision (10 percent)

To account for the relatively low count of participants in the DI program, a finite population correction is applied. The adjustment factor ("AF") is calculated as follows:

⁹ National Renewable Energy Laboratory's Uniform Methods Project, Chapter 11: Sample Design Cross Cutting Protocol (<https://www.nrel.gov/docs/fy17osti/68567.pdf>).

Equation 3-3

$$AF = 1 + n_o/N$$

Where,

n_o = Sample size calculated prior to application of finite population correction
 N = Population size (number of program participants)

The sample size with finite population correction (n_{fpc}) is calculated by dividing the uncorrected sample size estimate by the adjustment factor in Equation 3-4 below, given that the 2025 DI program population included 3,980 NPC participants and 691 SPPC participants – for a combined population of 4,671 – the minimum sample needed was 68.

Equation 3-4

$$n_{fpc} = n_o / AF$$

The Evaluator conducted an online survey¹⁰ that was sent to all participants to verify that they received the EEMs reported by the DI program.¹¹

3.2 Determining Annual Energy (kWh) Savings

The Evaluator employed engineering analyses to determine annual ex-post verified energy (kWh) savings for each EEM in the 2025 DI program. M&V analyses and engineering algorithms are described in the subsequent sections of this chapter.

3.2.1 LED Bulbs

The Evaluator employed engineering analyses to determine ex-post verified energy savings. Ex-post verified energy savings per LED were calculated with methods developed by the Evaluator and consistent with The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Chapter 6. The Evaluator used the following analytical steps to determine ex-post verified energy savings for LEDs.

1. Determine baseline light bulb wattage and baseline hours of use.
2. Calculate baseline annual energy consumption.
3. Calculate annual energy consumption and annual energy savings per installed LED.
4. Determine In-Service Rate (“ISR”), which is the quotient of the count of verified installed LEDs and the count of LEDs reported in the program tracking database.

¹⁰ The online survey instrument is provided in Appendix B.

¹¹ The online survey collected verification data for 467 participants – comprised of 390 NPC customers and 77 SPPC customers – thus, the Evaluator achieved ex-post sampling precision of ± 3.2 percent at the 90 percent confidence level.

Baseline light bulb wattages: The Evaluator used the following formula to determine average Watts for baseline bulbs:

Equation 3-5

$$\text{Average Watts}_{\text{baseline}} = W_{\text{INC}} \cdot \%_{\text{INC}} + W_{\text{HAL}} \cdot \%_{\text{HAL}} + W_{\text{CFL}} \cdot \%_{\text{CFL}} + W_{\text{LED}} \cdot \%_{\text{LED}}$$

Where,

- W_{INC} = average baseline wattage, incandescent bulbs replaced by LEDs = 60W¹²
- W_{HAL} = average baseline wattage, halogen bulbs replaced by LEDs = 43W
- W_{CFL} = average baseline wattage, CFL bulbs replaced by LEDs = 15W
- W_{LED} = average wattage of old LED bulbs replaced by new LEDs = 9W
- $\%_{\text{INC}}$ = 47.2 percent incandescent bulbs (percentage of old incandescent bulbs removed and replaced by LEDs, which was 47.23 percent across both service territories).¹³
- $\%_{\text{HAL}}$ = 1.6 percent halogen bulbs (percentage of old halogen bulbs removed and replaced by LEDs, which was 1.6 percent across both service territories)
- $\%_{\text{CFL}}$ = 42.3 percent CFL bulbs (percentage of old CFLs removed and replaced by LEDs, which was 42.3 percent across both service territories)
- $\%_{\text{LED}}$ = 8.9 percent LED bulbs (percentage of old LEDs removed and replaced by LEDs, which was 8.9 percent across both service territories)

The M&V calculation for average Watts for baseline bulbs that were replaced with 8W or 9W LEDs (mostly 9W LEDs) is provided below:

Equation 3-6

$$W_{\text{baseline bulb}} = 60 \cdot 47.2\% + 43 \cdot 1.6\% + 15 \cdot 42.3\% + 9 \cdot 8.9\% = 36.2 \text{ Watts (baseline)}$$

Baseline hours of use (“HOU”): The Evaluator used 1,029.3 hours per year,¹⁴ which is the same baseline HOU previously analyzed and used for the same measures since 2016.

Baseline annual energy (kWh) consumption: Baseline annual kWh consumption is the product of baseline Watts and baseline HOU divided by 1,000 to convert Watts to kilowatts.

Equation 3-7

$$\text{Annual kWh}_{\text{baseline}} = 36.2 \text{ W} \cdot 1029.3 \text{ hours/year} \div 1000 \text{ W/kW} = 37.2 \text{ kWh}$$

¹² Baseline wattages, industry standards based on lumen output of installed lamps, are found in many TRM documents, including the Arkansas Technical Reference Manual (“AR TRM”) Version 8.0, section 2.5.1.4, page 224.

¹³ During the 2025 DI program, the Evaluator inspected 1,211 old (replaced) bulbs, of which 47.2 percent were old-fashioned Edison bulbs, 1.6 percent were halogen bulbs, 42.3 percent were CFLs, and 8.9 percent were LEDs.

¹⁴ Hours per day from the Evaluator’s LED Monitoring Study filed in PY2016.

LED annual kWh consumption: Annual energy (kWh) consumption per LED is the product of LED wattage (e.g., 9 W) and HOU (i.e., 1,029.3 hours per year, same HOU as baseline bulbs) divided by 1,000 to convert Watts to kilowatts.

Equation 3-8

$$8W \text{ LED: Annual Energy (kWh) Consumption} = 8 \text{ W} \cdot 1029.3 \div 1,000 = 8.2 \text{ kW}$$

Equation 3-9

$$9W \text{ LED: Annual Energy (kWh) Consumption} = 9 \text{ W} \cdot 1029.3 \div 1,000 = 9.4 \text{ kW}$$

Ex-post verified annual kWh savings per LED bulb:

Equation 3-10

$$8W \text{ LED: Ex-post kWh savings} = kWh/yr_{baseline \text{ bulb}} - kWh/yr_{LED} = 37.2 - 8.2 = 29.0 \text{ kWh/yr.}$$

Equation 3-11

$$9W \text{ LED: Ex-post kWh savings} = kWh/yr_{baseline \text{ bulb}} - kWh/yr_{LED} = 37.2 - 9.3 = 28.0 \text{ kWh/yr.}$$

In-Service Rate: ISR was determined from the Evaluator's analysis of 1) a desk review of all DI program tracking data; 2) a desk review of 44 NPC and eight SPPC DI project documents; and 3) participant survey data from 390 NPC DI participants and 77 SPPC DI participants.

From the desk review of all tracking data plus 52 project documents, the Evaluator determined that LED bulb counts in the tracking data were 99.94 percent accurate for NPC and 99.87 percent accurate for SPPC.

With respect to the participant survey, a random sample of participants was asked to confirm the EEMs and quantity per EEM that the DI program had reported having been provided to, and direct installed for, each participant. According to survey respondents, 95.29 percent of reported LED bulbs were installed across both service territories.

The Evaluator thus determined overall ISR for LED bulbs to be 95.23 percent for NPC (the product of 99.94 percent and 95.29 percent) and 95.16 percent for SPPC (the product of 99.87 percent and 95.29 percent).

LEDs that received rebates via the Home Improvements channel: Through this channel of the DI program, four NPC customers received rebates for a total of 29 LEDs, and five SPPC customers received a rebate for 81 LEDs. For those 110 LEDs, ex-post savings were calculated the same as ex-post savings calculations for all LEDs that were provided by the 2025 DI program.

Smart plugs, smart switches, and occupancy sensors that received rebates via the Home Improvements channel: Rebates were provided for 70 smart plugs, smart switches, and occupancy sensors for NPC customers, and 48 smart switches and occupancy sensors for SPPC customers. The Evaluator determined ex-post annual savings using the deemed per-unit savings

value of 28.9 kWh per year provided by the Pennsylvania Technical Reference Manual (“PA TRM”).¹⁵

3.2.2 LED Photocell

The 2025 DI program installed LED photocell combo bulbs (i.e., a 9W LED bulb with built-in photocell) in outdoor light sockets. An LED photocell bulb automatically turns off the outdoor lighting during daylight hours and turns it on during darkness hours. The Evaluator used the following analytical steps to determine ex-post verified energy savings for LED photocells.

1. Determine baseline light bulb wattage and baseline hours of use.
2. Calculate baseline annual energy consumption.
3. Calculate annual energy consumption and annual energy savings per LED photocell.
4. Determine ISR, i.e., the quotient of the count of verified installed photocells and the count of photocells reported in the program tracking database.

Baseline light bulb wattages: The Evaluator used the following formula to determine average Watts for baseline bulbs.

Equation 3-12

$$\text{Average Watts}_{\text{baseline}} = W_{\text{INC}} \cdot \%_{\text{INC}} + W_{\text{HAL}} \cdot \%_{\text{HAL}} + W_{\text{CFL}} \cdot \%_{\text{CFL}} + W_{\text{LED}} \cdot \%_{\text{LED}}$$

Where,

W_{INC} = average baseline wattage, incandescent bulbs replaced by LEDs = 60W

W_{HAL} = average baseline wattage, halogen bulbs replaced by LEDs = 43W

W_{CFL} = average baseline wattage, CFL bulbs replaced by LEDs = 15W

W_{LED} = average wattage of old LED bulbs replaced by new LEDs = 9W

$\%_{\text{INC}}$ = percentage of incandescent bulbs removed/replaced by LEDs, i.e., 47.2 percent across both service territories (the Evaluator used the analysis of LED baseline bulbs, as described in the previous section, i.e., 1,211 baseline bulbs were inspected)¹⁶

$\%_{\text{HAL}}$ = percentage of halogen bulbs replaced by LEDs, i.e., 1.6 percent across both service territories

$\%_{\text{CFL}}$ = percentage of CFL bulbs replaced by LEDs, i.e., 42.3 percent across both service territories

$\%_{\text{LED}}$ = percentage of LED bulbs replaced by LEDs, i.e., 8.9 percent across both service territories

¹⁵ PA TRM, Volume 2: Residential Measures, section 2.1.2, <https://www.puc.pa.gov/pcdocs/1692531.docx>

¹⁶ During the 2025 DI program, the Evaluator inspected 1,211 old (replaced) bulbs, of which 47.2 percent were old-fashioned Edison bulbs, 1.6 percent were halogen bulbs, 42.3 percent were CFLs, and 8.9 percent were LEDs.

The following is the M&V calculation for average wattage for baseline bulbs for photocells and LED-photocell combo bulbs.

Equation 3-13

$$W_{\text{baseline bulb}} = 60 \cdot 47.2\% + 43 \cdot 1.6\% + 15 \cdot 42.3\% + 9 \cdot 8.9\% = 36.2 \text{ Watts (baseline)}$$

Baseline HOU: The Evaluator used 3,245 hours per year (same baseline HOU previously analyzed and used for the same measure in the 2020 Low Income program and used every subsequent year for photocells in the Low Income and Direct Install programs).

Baseline annual energy (kWh) consumption: Baseline annual kWh consumption is the product of baseline Watts and baseline HOU divided by 1,000 to convert Watts to kilowatts.

Equation 3-14

$$\text{Annual kWh}_{\text{baseline}} = 36.2 \text{ W} \cdot 3245 \text{ hours/year} \div 1000 \text{ W/kW} = 117.3 \text{ kWh}$$

LED photocell annual kWh consumption and ex-post verified annual kWh savings: Annual kWh consumption for an outdoor LED photocell is the product of LED wattage (i.e., 9 W LED) and nighttime HOU (i.e., 4,309 hours per year.¹⁷) divided by 1,000 to convert Watts to kW.

Equation 3-15

$$\text{Annual Energy (kWh) Consumption}_{\text{Photocell}} = 9 \text{ W (LED)} \cdot 4309 \div 1000 = 38.8 \text{ kW}$$

Thus, LED photocell ex-post annual kWh savings is:

Equation 3-16

$$\text{Ex-post kWh savings}_{\text{LED photocell}} = \text{kWh/yr}_{\text{baseline}} - \text{kWh/yr}_{\text{photocell}} = 117.5 - 38.8 = 78.7 \text{ kWh/yr}$$

ISR: The ISR was 88.9 percent for both NPC and SPPC, based on the Evaluator's analysis of 1) a desk review of all DI program tracking data; 2) a desk review of 44 NPC and eight SPPC DI project documents; and 3) participant survey data from 390 NPC participants and 77 SPPC participants.

From the desk review of all tracking data plus 52 project documents, the Evaluator determined that the LED photocell counts in tracking data were 100 percent accurate for NPC and 98.1 percent accurate for SPPC.

With respect to the participant survey, a random sample of participants was asked to confirm the EEMs and quantity per EEM that the DI program had reported having been provided to, and direct

¹⁷ The Evaluator determined nighttime hours using the National Oceanic Atmospheric Administration (NOAA)'s solar calculator; for Tonopah, NV, which is a centrally located reference point for program participants, the NOAA calculator indicates 4,451 daylight hours and 4,309 nighttime hours per year. See https://www.esrl.noaa.gov/gmd/grad/solcalc/NOAA_Solar_Calculations_year.xls.

installed for, each participant. According to survey respondents, 88.9 percent of the reported LED photocells were installed across both service territories.

For NPC, the Evaluator determined the overall ISR for LED photocells to be 88.9 percent, i.e., the product of 100 percent accuracy and 88.9 percent customer-reported installation rate. For SPPC, the Evaluator determined the overall ISR for LED photocells to be 87.2 percent, i.e., the product of 98.1 percent accuracy and 88.9 percent customer-reported installation rate.

3.2.3 HVAC Filter with Whistle

This EEM applies to central forced-air furnaces, central air conditioning, and heat pumps. The Evaluator utilized the following engineering calculation to determine ex-post energy savings from reduced fan motor power requirements during cooling and heating seasons. Assumptions used in this formula are based on the Evaluator's engineering judgment and are consistent with previously filed and approved M&V reports for the same NVE program. Note that the HVAC whistle does not provide additional energy savings but does extend measure life as discussed in section 3.6 below.

Equation 3-17

$$\text{Per Unit Annual kWh savings} = kW_{\text{motor}} \times \text{Tons} \times \text{HOU} \times EI$$

Where,

kW_{motor} = average motor full load electric demand (kW), 0.17 per ton;

Tons = cooling capacity of system, assumed to be 4 tons for NPC customers and 3 tons for SPPC customers; and

HOU = hours of use, sum of Effective Full Load Hours for cooling (" $EFLH_{\text{cool}}$ ") and Effective Full Load Hours for heating, (" $EFLH_{\text{heat}}$ "), per territory.

NPC: $EFLH_{\text{cool}} = 1,140$, $EFLH_{\text{heat}} = 609$, $\text{HOU} = 1,749$.¹⁸

SPPC: $EFLH_{\text{cool}} = 339$, $EFLH_{\text{heat}} = 960$, $\text{HOU} = 1,299$.¹⁹

EI = efficiency improvement, 15 percent.²⁰

ISR was determined from the Evaluator's analysis of 1) a desk review of all DI program tracking data; 2) a desk review of 44 NPC and eight SPPC DI project documents; and 3) participant survey data from 390 NPC DI participants and 77 SPPC DI participants.

¹⁸ NPC EFLH values are taken from a review of filed/approved M&V reports for NPC's residential air conditioning programs during 2006 through 2021; across the 15 years of NPC residential air conditioning programs. $EFLH_{\text{cool}}$ ranged from 1,060 hours per year in 2009 to 1,431 hours per year in 2020; average is 1,140 hr/yr. $EFLH_{\text{heat}}$ ranged from 524 hours per year in 2020-2021 to 633 hours per year in 2011-2017; average is 609 hr/yr.

¹⁹ SPPC EFLH values were determined through energy simulation using the Home Energy Saver tool developed by the US Department of Energy and Lawrence Berkeley National Labs. Inputs for the Home Energy Saver model utilized NV Energy's 2016 Residential Appliance Saturation Study and the Evaluator's engineering judgement.

²⁰ PA TRM, Vol. 2: Residential Measures, Section 2.2.10, Table 2-33, www.puc.pa.gov/pcdocs/1692531.docx.

From the desk review of all tracking data plus 52 project documents, the Evaluator determined that the HVAC filter counts in tracking data were 99.95 percent accurate for NPC and 100 percent accurate in SPPC.

With respect to the participant survey, a random sample of participants was asked to confirm the EEMs and quantity per EEM that the DI program had reported having been provided to, and direct installed for, each participant. According to survey respondents, 97.02 percent of the reported HVAC filters were installed across both service territories.

The Evaluator thus determined the overall ISR for HVAC filters was 96.98 percent for NPC and 97.02 percent for SPPC.

3.2.4 Advanced Power Strip

The Arkansas Technical Reference Manual (“AR TRM”) provides deemed savings values for advanced power strips according to the type of equipment that is plugged into the APS.²¹ For an 8-plug APS, the values are 252.2 kWh for home entertainment equipment and 82.5 kWh for home office equipment.

Across both service territories, ex-post annual savings of an average of 163.2 kWh per APS²² was calculated from survey results in which participants indicated that 53.4 percent of APS units are used for home entertainment equipment, 32.2 percent of APS units are used for home office equipment, and 10.6 percent of APS units are used for lighting. It is the Evaluator’s engineering judgement that a reasonable savings estimate for APS/lighting is 18.1 kWh, assuming two 60 Watt LEDs and per-LED savings of 30 percent, which is the same percentage that the Evaluator has previously used for M&V analyses for occupancy sensors.

ISR was determined from the Evaluator’s analysis of 1) a desk review of all DI program tracking data; 2) a desk review of 44 NPC and eight SPPC DI project documents; and 3) participant survey data from 390 NPC DI participants and 77 SPPC DI participants.

From the desk review of all tracking data plus 52 project documents, the Evaluator determined that APS counts in tracking data were 100 percent accurate for NPC and SPPC.

With respect to the participant survey, a random sample of participants was asked to confirm the EEMs and quantity per EEM that the DI program had reported having been provided to, and direct installed for, each participant. According to survey respondents, 98 percent of reported APS devices were installed across both service territories.

The Evaluator thus determined overall ISR for APS devices to be 98 percent for NPC and SPPC.

²¹ AR TRM Version 8.0, Section 2.4.4, page 190.

²² Ex-post verified savings APS device, NPC = $252.2 \cdot 53.4\% + 82.5 \cdot 32.2\% + 18.1 \cdot 10.6\% = 163.2$ kWh annual savings.

3.2.5 Refrigerator/Freezer Thermometer

The Evaluator did not attribute any savings to refrigerator or freezer thermometer installations, but the Evaluator did track the ISR.

ISR was determined from the Evaluator's analysis of 1) a desk review of all DI program tracking data; 2) a desk review of 390 NPC and 77 SPPC DI project documents; and 3) participant survey data from 44 NPC DI participants and eight SPPC DI participants.

From the desk review of all tracking data plus 52 project documents, the Evaluator determined that refrigerator and freezer thermometer counts in tracking data were 67.1 percent accurate for NPC and SPPC.

3.2.6 Attic Insulation

The Evaluator used the following formula from the PA TRM²³ to calculate ex-post energy savings for attic insulation. This formula is consistent with the Excel-based calculator that the implementer used to calculate ex-ante claimed savings.

Equation 3-18

$$\text{Savings (kWh)} = ((1 \div R_{base}) - (1 \div R_{ee})) \times A \times (1 - FF) \times ((24 \times CDD \times DUA) \div (SEER \times 1000)) \times F_{RAC} \times AHF$$

Where,

R_{base} = R value of pre-existing attic insulation;

R_{ee} = R value of post-treatment attic insulation;

A = Area (square footage of the treated attic);

FF = framing factor (PA TRM recommends zero to 12 percent; in the Evaluator's judgement, the ex-ante assumption of seven percent is an appropriate average assumption);

CDD = cooling degree days from ENERGY STAR Portfolio Manager;²⁴

DUA = discretionary use adjustment to account for uncertainty (PA TRM recommends 75 percent, which is a typical DUA value for this calculation);

$SEER$ = cooling system seasonal efficiency; in the Evaluator's judgement, the ex-ante assumption of SEER 13 is an appropriate average assumption for older homes that are likely to receive attic insulation;

1000 = conversion factor (1,000 W per kW);

F_{RAC} = adjustment factor that is to be applied if the premise has room air conditioning ("AC") instead of central AC; for central AC systems, this factor is one (i.e., moot); and

²³ PA TRM, Volume 2: Residential Measures, section 2.1.2, <https://www.puc.pa.gov/pcdocs/1692531.docx>.

²⁴ <https://portfoliomanager.energystar.gov/pm/degreeDaysCalculator>

AHF = this “attic heat factor” is an adjustment factor that represents the engineering estimate of 121 percent provided in the PA TRM for the attic insulation measure.

3.2.7 Duct Sealing

To calculate ex-post energy savings for duct sealing, the Evaluator employed a formula that is consistent with the “Methodology 3” duct sealing algorithm provided in the Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 12.0, Volume 3: Residential Measures (“IL TRM”).²⁵ This formula is also consistent with the Excel-based calculator that the implementer used to calculate ex-ante claimed savings.

Equation 3-19

$$\text{Savings (kWh)} = (\text{Tons} \times 12 \times \text{EFLH}_{\text{cool}} \times \text{EI} \div \text{SEER}) + (\text{kW}_{\text{motor}} \times \text{Tons} \times \text{EFLH}_{\text{heat}} \times \text{EI})$$

Where,

Tons = cooling capacity of system, assumed to be four tons for NPC customers and three tons for SPPC customers;

12 = Conversion factor, i.e., 12 kBtu per ton of cooling capacity;

$\text{EFLH}_{\text{cool}}$ = EFLH for cooling (same as provided in section 3.2.3 above, i.e., NPC EFLHcool is 1,140 hours per year and SPPC EFLHcool is 339 hours per year);

EI = efficiency improvement, assumed to be 10 percent (the Evaluator’s engineering judgement);

SEER = cooling system seasonal efficiency; SEER 13 is an appropriate average assumption for older homes likely to receive duct sealing (the Evaluator’s engineering judgement);

kWmotor = motor full-load demand, 0.17 kW/ton average (the Evaluator’s engineering judgement);

$\text{EFLH}_{\text{heat}}$ = EFLH for heating (same as provided in section 3.2.3 above, i.e., NPC EFLHheat is 609 hours per year; SPPC EFLHheat is 960 hours per year).

3.2.8 Other Minor EEMs

Other minor EEMs include wall and floor insulation, weatherstripping, and water heater blankets, all of which combined to account for only 364 ex-ante kWh for NPC and 1,394 ex-ante kWh for SPPC. Given that these EEMs altogether contributed significantly less than one percent of claimed kWh savings for both territories, the Evaluator opted to conserve M&V resources and accept the ex-ante values without further analysis of the precise energy savings for each of these minor EEMs.

²⁵ Note that Version 12.0 of the IL TRM became effective as of January 1, 2024. The IL TRM may be found here: www.ilsag.info/wp-content/uploads/IL-TRM_Effective_010124_v12.0_Vol_3_Res_09222023_FINAL_clean.pdf.

3.3 Energy Savings Curves

The Evaluator developed a methodology that utilizes energy savings curves to calculate the portion of annual energy savings that occurs during each month of the year. An energy savings curve describes the temporal nature of energy savings. For example, on any given day the energy savings achieved by a LED are approximately 1/365 of the verified annual energy savings for that LED. On the other hand, an efficient air-conditioner may not save any energy during the month of January but may achieve 35 percent of its annual energy savings in the month of July alone. Four energy savings curves were used for the DI program analysis. An explanation of the origin of these curves is detailed below:

- LED bulbs and occupancy sensors: The energy savings curve that has been used for M&V for many years for NVE's residential lighting measures was used for these EEMs.
- HVAC filter and other HVAC-related measures, including evaporative coolers and insulation: a) for NPC, the energy savings curve for the residential air conditioning program was used; and b) for SPPC, the Evaluator used the energy savings curve historically used for SPPC HVAC-related EEMs (which the Evaluator originally developed for the attic insulation measure in the 2011 SPPC Low Income Weatherization Program).
- APS and smart plugs: The energy savings curve that has been used for M&V for many years for NVE's consumer electronics measures (which the Evaluator originally developed for the 2011 Consumer Electronics Program) was used for these EEMs.
- LED photocell: The energy savings curve that has been used for M&V since program year 2021 for LED photocells in the Low Income and DI programs.

These energy savings curves were coupled with installation dates on a record-by-record basis to produce accurate determinations of the energy savings achieved for each month of the year.

3.4 First-Year Energy (kWh) Savings

First-year kWh savings were calculated by determining the percentage of the year remaining when each EEM was installed. For each EEM, the number of days remaining in the year was matched with the normalized energy savings curve described above to determine the share of annualized kWh savings that were achieved during the 2025 calendar year. First-year kWh savings were summed by month across the participating customer rate classes to determine first-year kWh savings per month per rate class (see Appendix A for first-year kWh savings table).

"M&V Technical Appendix 1" contains a detailed description of the Evaluator's analytical steps for determining the energy (kWh) savings per month per rate class, which also provides first-year kWh savings for the 2025 calendar year.

3.5 Critical Peak Demand Savings

Critical peak demand period per month, as shown in Table 3-1, is the hourly period per month during which NV Energy has historically experienced maximum system-level demand.

Critical peak demand (kW) savings are calculated per month and rate class using ex-post program savings determinations and appropriate measure-level 8,760-hour energy savings curves. For each participant in this program, ex-post annualized energy savings per measure were allocated to the participant's rate class, and to the specific energy savings curve for that measure. The result is a two-dimensional matrix depicting hourly savings per rate class for all 8,760 hours of a typical calendar year. The Evaluator then identified the maximum average hourly kW savings during each month's designated peak demand period. Summer critical peak kW savings is the maximum kW reduction expected in a typical year during July or August peak demand hours indicated in Table 3-1.

The complete ex-post critical peak demand savings per month and per rate class are provided in Appendix A. For a detailed discussion of the Evaluator's analytical steps for determining critical peak demand (kW) savings, please refer to "M&V Technical Appendix 1."

Table 3-1. Critical Peak Demand Periods

Month	NPC Peak Hour(s)	SPPC Peak Hour(s)
January	18, 19, or 20	18 or 19
February	19 or 20	19 or 20
March	20	20 or 21
April	20	21
May	17 or 18	21
June	17 or 18	17 or 18
July (potential summer peak and annual peak)	16, 17, or 18	17 or 18
August (potential summer peak and annual peak)	16 or 17	17 or 18
September	17	17 or 18
October	18 or 19	19 or 20
November	18 or 19	18 or 19
December	18 or 19	18 or 19

3.6 Determination of Effective Useful Life

The Evaluator utilized the following sources to determine EUL (years of effective useful life) per measure.

- HVAC filter with whistle: 5.0 years is used for this EEM, given that HVAC filters include an air handler filter whistle for which the EUL is 5.0 years.²⁶
- LED bulbs: The Evaluator used a method from the AR TRM to provide a dual baseline that is necessitated by federal and state regulations. Details are provided in Section 3.6.1 below.

²⁶ California Public Utilities Commission Database for Energy Efficient Resources ("DEER") (<https://cedars.cpuc.ca.gov/deer-resources/deemed-measure-packages/measure-package-archive/>; enter "filter" in the search window, then refer to the "Air Filter Alarm" measure) and Pennsylvania TRM (<https://www.puc.pa.gov/pdocs/1848580.pdf>).

- LED photocell: The Evaluator used the same method that is used for LED bulbs; however, LED photocells have much higher average daily HOU – i.e., dusk to dawn – thus a lower EUL.
- Refrigerator/freezer thermometer, insulation and minor EEMs: engineering judgement.
- Advanced Power Strips: AR TRM.

Measure-level EUL and weighted-average EUL per service area are listed in Table 3-2.

Table 3-2. EUL per Measure Category

Measure Category	NPC EUL (years)	SPPC EUL (years)
HVAC Filter and Whistle	5.0	5.0
LED Bulbs	9.4	9.4
LED Photocell	3.4	3.4
Advanced Power Strips	10.0	10.0
Home Improvements Channel	17.3	15.0
EUL, program-level (weighted average)	7.1	9.5

3.6.1 Dual Baseline Methodology for LED Lighting

The Evaluator used a dual-baseline methodology to calculate lifetime savings and EUL for LED lighting. The dual baseline accounts for Nevada Assembly Bill 54 (“AB 54”)²⁷ regulations that are similar to federal Energy Independence and Security Act of 2007 (“EISA”)²⁸ regulations.

The EISA statute included a two-tiered approach to code changes for general service lamps (“GSLs”). EISA ‘Tier 1’ codes, which started impacting Nevada consumers in 2013, required GSLs to not exceed the maximum wattages shown in the EISA Tier 1 column in Table 3-3 below. EISA ‘Tier 2’ nominally requires GSL efficacy of 45 lumens per Watt, i.e., the Watts shown in the EISA Tier 2 column in Table 3-3 below.

AB 54 regulations, which took effect on January 1, 2021, require EISA Tier 2 compliance for all GSLs. All LED bulbs distributed by the 2025 DI program are GSLs as defined in AB 54. The remainder of this section provides a detailed description of the dual-baseline methodology for calculating lifetime savings for GSLs.

Table 3-3 shows applicable baseline wattages for GSLs, as required by EISA and AB 54.

²⁷ See regulations promulgated by Nevada Governor’s Office of Energy:
<https://www.leg.state.nv.us/Register/2019Register/R100-19AP.pdf>.

²⁸ See <https://www.govinfo.gov/content/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>.

Table 3-3. EISA Tier 1 and Tier 2 Baseline Wattages for General Service Lamps

Minimum Lumens	Maximum Lumens	Watts, traditional pre-EISA Edison incandescent bulbs	Tier 1 max Watts (Tier 1 started impacting consumers in 2013)	Tier 2 maximum Watts
310	749	40	29	12
750	1,049	60	43	20
1,050	1,489	75	53	28
1,490	2,600	100	72	45

The M&V community generally agrees that the LED dual baseline may use Tier 1 savings for two to three years after replacing out-of-code GSLs with EISA Tier 2-compliant GSLs.²⁹ The Evaluator calls this LED dual baseline approach the “AR TRM rationale,”³⁰ which can be summarized as follows:

Given that EISA Tier 1-compliant halogen GSLs typically have lifetimes exceeding three years and given that out-of-code GSLs (including halogen GSLs) remained available to consumers when Tier 2 standards took effect, then the verified available out-of-code GSLs are the appropriate baseline GSL technology for calculating LED energy savings for the first two to three years of LED measure life.

The Evaluator used two years of Tier 1 savings, consistent with the Evaluator’s M&V methodology and calculations for LED bulbs since the 2020 program year. The Evaluator continued to employ the AR TRM rationale because this 2025 program continued to provide LED GSLs that replaced verified out-of-code GSLs³¹ that could reasonably be expected to have two years of remaining useful life.

During 2025, the Evaluator inspected a large sampling of old bulbs that the DI program replaced, collected, and saved for periodic M&V inspections. Of the total of 1,211 baseline bulbs that the Evaluator inspected, 47.2 percent were old-fashioned Edison incandescent bulbs, 1.6 percent were EISA-compliant halogen bulbs, 42.3 percent were CFLs, and 8.9 percent were LEDs.

The 2025 DI program distributed multiple models and wattages of LEDs, all of which have a nominal EUL of 20 years. The highest volume LED bulb distributed in the 2025 DI program was SimplyConserve model ‘L09A1927KENC60’ LED, a 9W GSL with nominal EUL of 20 years.

The 9W LEDs distributed by the 2025 DI program will achieve the following lifetime savings:

- Tier 1 savings per year: $(36.2 - 9) \text{ W} \cdot 1029.3 \text{ hours/year} \div 1000 \text{ W/kW} = 28.0 \text{ kWh}$ ³²
- Tier 1 savings: $2.0 \text{ years} \cdot 28.0 \text{ kWh} = 56.0 \text{ kWh}$

²⁹ In Nevada, an “EISA Tier 2-compliant GSL” is the same as an “AB 54-compliant GSL.”

³⁰ See the original rationale articulated in the AR TRM, Version 8.0 (i.e., the “AR TRM rationale”) at https://apps.apsc.arkansas.gov/pdf/10/10-100-R_169_3.pdf; see Chapter 2.5 Lighting.

³¹ The Evaluator verified the out-of-code GSLs that were replaced by LED bulbs.

³² 36.2 Watts is the weighted average Tier 1 baseline wattage for 9W A19 LEDs. It is the same baseline calculation that is provided in section 3.2.3 above, i.e.,

$Average\ Watts_{baseline} = W_{INC} \cdot \%_{INC} + W_{HAL} \cdot \%_{HAL} + W_{CFL} \cdot \%_{CFL}$, and

$W_{baseline\ bulb} = 60 \cdot 47.2\% + 43 \cdot 1.6\% + 15 \cdot 42.3\% + 9 \cdot 8.9\% = 36.2 \text{ Watts (baseline)}.$

- Tier 2 savings: 18 years • (20 - 9) W • 1029.3 hours/year ÷ 1000 W/kW = 203.8 kWh³³
- Lifetime energy savings: 56.0 kWh + 203.8 kWh = 259.8 kWh

A lifetime savings stream derived from a dual baseline does not provide the normal inputs for NVE's planning models and forecasting tools such as cost effectiveness models. Thus, to ensure accurate planning and cost-effectiveness modeling without requiring extra steps in the use of those NVE tools, it is essential to translate the dual baseline into an appropriate single, shortened EUL for planning and cost-effectiveness modeling purposes.

For LED GSLs, the shortened EUL is simply the quotient of its lifetime kWh savings and Tier 1 annual kWh savings. This calculation method is identical to M&V calculations for determining program-level EUL, which is a weighted average of all measure-level EUL across all measures in a program. Using our example of a 9W LED GSL installed in 2025, the shortened EUL is simply the quotient of 259.8 kWh lifetime savings and 28.0 kWh (Tier 1) annual savings, or 9.4 years.

³³ Tier 2 baseline wattage for 9W LED GSLs is 20W (see Table 3-3).

4 ENERGY IMPACT FINDINGS

This chapter provides the 2025 DI program's ex-post verified energy impacts.

4.1 Findings from Online Surveys

The Evaluator conducted an online survey to verify that customers received direct installed measures and to evaluate customer satisfaction with direct install processes. The survey collected verification data for 390 NPC customers and 77 SPPC customers. The Evaluator's survey of 2025 DI program participants achieved statistical precision at the 90 percent confidence level of ± 3.2 percent relative precision when calculated across the 467 participants who completed surveys.

Table 4-1 provides the count of EEMs verified through the online survey. As participants can receive more than one measure, the total quantity represented below is greater than the respective sample sizes for the service territories.

Table 4-1. Online Survey Results – Verified Installations

EEM	NPC	SPPC
HVAC Filter	153	10
HVAC Filter Whistle	23	9
LED Lighting	148	30
LED Photocell	20	10
Refrigerator Thermometer	54	15
Freezer Thermometer	6	16
Advanced Power Strip	103	38
Home Improvements (HI) Channel (this is a count of engineering desk reviews, i.e., HI was not included in 2025 DI online survey)	25	22
Total	532	150

Using online survey data and NVE program tracking data and project documentation, the Evaluator determined measure-installation rates as shown in Table 4-2.

Table 4-2. Energy Efficiency Measures Verified, 2025 DI Program

EEM	Quantity Reported		Quantity of Verified Measures Installed		Verified Installed Measures	
	NPC	SPPC	NPC	SPPC	NPC	SPPC
HVAC Filter	4,094	117	3,970	114	97.0%	97.4%
LED Bulbs	10,072	1,573	9,592	1,497	95.2%	95.2%
LED Photocell	464	106	412	92	88.8%	86.8%
Advanced Power Strip	1,773	418	1,737	410	98.0%	98.1%
Home Improvements Channel	122	115	114	111	93.4%	96.5%
Total	16,525	2,329	15,825	2,224	95.8%	95.5%

4.2 Energy Impacts

As described in the previous chapter of this M&V report, the Evaluator employed engineering analyses to determine annual ex-post verified energy (kWh) savings for each EEM in the 2025 DI program. Table 4-3 provides a summary of ex-post verified annual kWh savings per unit for each EEM.

Table 4-3. Ex-Post Savings per Energy Efficiency Measure

EEM	Weather-Sensitive EEM?	Annual Energy Savings (kWh)		Effective Useful Life (“EUL”)	
		NPC	SPPC	NPC	SPPC
HVAC Filter	Yes	178.4	99.4	5.0	5.0
LED Bulbs	No	28.2	28.2	9.4	9.4
LED Photocell	No	70.0	68.6	3.4	3.4
Advanced Power Strips	No	163.2	163.2	10.0	10.0
Home Improvements Channel	Yes	109.7	88.9	17.3	15.0

Table 4-4 shows ex-ante estimated energy savings, ex-post verified energy savings, and realization rate (“RR”) per EEM. RR is the quotient of ex-post kWh and ex-ante kWh. Program-level RR is 91.9 percent for NPC and 85.2 percent for SPPC.

Table 4-4. Realization Rate (“RR”) per EEM

EEM	NPC – Calculation of RR per EEM			SPPC – Calculation of RR per EEM		
	Ex-Ante Energy Savings (kWh)	Ex-Post Energy Savings (kWh)	RR	Ex-Ante Energy Savings (kWh)	Ex-Post Energy Savings (kWh)	RR
HVAC Filter	724,494	708,248	97.8%	10,062	11,332	112.6%
LED Bulbs	332,376	270,817	81.5%	51,909	42,284	81.5%
LED Photocell	40,368	28,840	71.4%	8,374	6,311	75.4%
Advanced Power Strips	308,502	283,406	91.9%	78,166	66,895	85.6%
Home Improvements Channel	12,754	12,509	98.1%	11,917	9,863	82.8%
Total	1,418,494	1,303,820	91.9%	160,428	136,685	85.2%

Following are notable M&V findings related to RR:

- The APS measure has different RR for the two territories because the ex-ante claimed savings per APS unit was higher for SPPC than for NPC, causing a lower RR for SPPC.
- LED photocells have different RR for the two territories because the ex-ante claimed savings per LED photocell was higher for SPPC than for NPC, causing a lower RR for SPPC.
- RR was low for Home Improvements in the SPPC territory due to the presence of two duplicate records being listed in the DSMC file, one household being unlocatable, and one household having credit for electric heating but was actually an oil heating home.

Table 4-5 and Table 4-6 provide summaries of the Evaluator’s determinations for ex-post verified energy impacts for the 2025 DI program.

Table 4-5. Summary of Energy Impacts, NPC 2025 DI Program

Measure Category	Quantity of EEMs Installed	Ex-Post First-Year (2025) Savings (kWh)	Annual Energy Savings (kWh)			Average EUL (years)	Lifetime Energy Savings (kWh)
			Ex-Ante	Ex-Post	Realization Rate		
HVAC Filter	3,970	416,901	724,494	708,248	97.8%	5.0	3,541,240
LED Bulbs	9,592	159,413	332,376	270,817	81.5%	9.4	2,545,680
LED Photocell	412	16,976	40,368	28,840	71.4%	3.4	98,056
Advanced Power Strips	1,737	166,824	308,502	283,406	91.9%	10.0	2,834,061
Home Improvements Channel	114	6,010	12,754	12,509	98.1%	17.3	216,407
Total	15,825	766,124	1,418,494	1,303,820	91.9%	7.1	9,235,444
Number of Participants (count): 3,980			Summer Critical Peak Demand Reduction (kW): 482.7				

Table 4-6. Summary of Energy Impacts, SPPC 2025 DI Program

Measure Category	Quantity of EEMs Installed	Ex-Post First-Year (2025) Savings (kWh)	Annual Energy Savings (kWh)			Average EUL (years)	Lifetime Energy Savings (kWh)
			Ex-Ante	Ex-Post	Realization Rate		
HVAC Filter	114	3,981	10,062	11,332	112.6%	5.0	56,658
LED Bulbs	1,497	52,279	51,909	42,284	81.5%	9.4	397,470
LED Photocell	92	3,213	8,374	6,311	75.4%	3.4	21,458
Advanced Power Strips	410	14,318	78,166	66,895	85.6%	10.0	668,949
Home Improvements Channel	111	3,182	11,917	9,863	82.8%	15.0	147,949
Total	2,224	76,973	160,428	136,685	85.2%	9.5	1,292,484
Number of Participants (count): 691			Summer Critical Peak Demand Reduction (kW): 17.4				

4.3 Energy Impacts by Rate Class

According to NVE’s program tracking data, the EEMs installed through the 2025 DI program provided savings in multiple NPC and SPPC rate classes. Table 4-7 and Table 4-8 provide a listing of ex-post verified energy savings per rate class.

Table 4-7. Energy Impacts by Rate Class, NPC

Rate Class	First-year (2025) Savings (kWh)	Annual Energy Savings (kWh)
RS (single-family)	619,498	1,054,286
RM (multi-family)	146,132	248,694
LRS (large residential service)	494	841
Total	766,124	1,303,820

Table 4-8. Energy Impacts by Rate Class, SPPC

Rate Class	First-year (2025) Savings (kWh)	Annual Energy Savings (kWh)
D1 (single-family)	65,372	116,084
DM1 (multi-family)	11,601	20,601
Total	76,973	136,685

Appendix A provides monthly savings results for the calendar years of 2025 and 2026.

4.4 Ex-Post Critical Peak Demand (kW) Savings

The ex-post verified summer critical peak demand reduction for the DI program is 482.7 kW for NPC and 17.4 kW for SPPC.

Ex-post critical peak demand (kW) savings per month and rate class are provided in Appendix A. Further information on the Evaluator’s methodology for calculating critical peak demand savings can be found in “M&V Technical Appendix 1.”

4.5 Inputs for Cost Effectiveness Analyses

Table 4-9 and Table 4-10 provide M&V results needed to support cost-effectiveness modeling for the 2025 DI program:

Table 4-9. M&V Inputs for Cost Effectiveness Analyses, NPC

EEM	Number of Installed Units	Ex-Post Annual Savings (kWh/year)	Ex-Post Savings per Installed unit (kWh)	EUL (years)
HVAC Filter	3,970	708,248	178.4	5.0
LED Bulbs	9,592	270,817	28.2	9.4
LED Photocell	412	28,840	70.0	3.4
Advanced Power Strips	1,737	283,406	163.2	10.0
Home Improvements Channel	114	12,509	109.7	17.3
Total	15,825	1,303,820	82.4 (Weighted Average)	7.1 (Weighted Average)

Table 4-10. M&V Inputs for Cost Effectiveness Analyses, SPPC

EEM	Number of Installed Units	Ex-Post Annual Savings (kWh/year)	Ex-Post Savings per Installed unit (kWh)	EUL (years)
HVAC Filter	114	11,332	99.4	5.0
LED Bulbs	1,497	42,284	28.2	9.4
LED Photocell	92	6,311	68.6	3.4
Advanced Power Strips	410	66,895	163.2	10.0
Home Improvements Channel	111	9,863	88.9	15.0
Total	2,224	136,685	61.5 (Weighted Average)	9.5 (Weighted Average)

5 RECOMMENDATIONS

The Evaluator provides the following recommendations for the ongoing (i.e., 2026) DI program:

- For the HVAC filter measure, DI program policy is that field technicians must recommend installation³⁴ of an air handler filter whistle with each direct installed HVAC filter. The whistle is a device that one can affix to an HVAC filter – it emits an audible alert when the filter becomes saturated. However, some customers ask the field technician not to install the whistle. The Evaluator recommends that the DI program:
 - Coach its field technicians to remind every customer of the benefits of the whistle before accepting a customer’s request to forgo it; and
 - Require the customer to initial a brief statement that the customer declined the whistle, but the customer also commits to replace the HVAC filter every three months.³⁵
- The Evaluator recommends that NVE program management requires a comprehensive training and implementation manual that should be updated annually and signed by all DI program implementation staff, including field technicians. A condensed version of the manual could be defined as a field manual that all field technicians could be required to carry and use for reference while performing DI program activities for NVE’s customers.³⁶
- The Evaluator recommends that NVE program management require the following activities for all future DI program implementation:
 - DI field technicians should direct install all EEMs, potentially increasing the in-service rate (“ISR”)³⁷ from the 2025 findings of 84 percent overall ISR for both NPC and SPPC. No EEMs should be left with customers to self-install, which contradicts the “direct install” program design while contributing to suboptimal ISRs.³⁸
 - Technicians should only distribute energy efficiency technologies approved by the program. In 2025, some households received 11-Watt LED bulbs that were left over from prior years’ programs but received no consideration in 2025.³⁹

³⁴ To optimize customer satisfaction, HVAC filter whistles are only installed with customer approval.

³⁵ A brief statement that requires the customer’s initials could be added to the “In-Home Energy Assessment” form that every DI participant is already required to sign. NV Energy asserts that in 2025: a) it is coaching this element as part of the Home Energy Advisor/Consultant role; and b) NVE recently changed its HVAC filter offering to MERV 8 contractor-grade filters that are expected to improve customer acceptance of the HVAC filter and the accompanying filter whistle. NV Energy is engaging in internal discussion on this issue.

³⁶ NV Energy should create a manual to codify DI program activities for implementation staff in the 2026 program year.

³⁷ ISR is the quotient of the count of verified installed EEMs and the EEM count reported in program tracking data.

³⁸ NV Energy asserts that the direct-install requirement is being strongly emphasized with all Home Energy Advisors/Consultants in all 2025 training and quality assurance processes.

³⁹ NV Energy asserts that they have addressed issues with appropriate equipment installations with field technicians.

- Technicians should ensure that the types of filters they install are correct for the size of the household and number appropriate HVAC units. The technician could be notified that filter sizes or numbers are unusual and confirm the data before submission.

6 APPENDIX A: SAVINGS PER MONTH BY RATE CLASS

This appendix provides monthly energy (kWh) savings by rate class for calendar years 2025 and 2026, and critical peak demand (kW) savings by rate class for calendar year 2026.

6.1 NPC Savings per Month by Rate Class

Table 6-1. 2025 (First Year): Energy Savings (kWh) per Month by Rate Class, NPC

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
RS	1,832	5,419	9,537	15,577	43,957	74,319	103,295	111,671	97,299	65,777	38,421	52,548	619,652
RM	432	1,278	2,250	3,674	10,369	17,531	24,366	26,342	22,952	15,516	9,063	12,395	146,169
LRS	1	4	8	12	35	59	82	89	78	52	31	42	494
Total	2,266	6,701	11,794	19,264	54,361	91,909	127,743	138,102	120,329	81,346	47,515	64,985	766,315

Table 6-2. Calendar Year 2026 (Full Year) kWh Savings per Month and Rate Class, NPC

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
RS	54,232	48,546	43,251	44,970	97,782	139,040	168,342	160,544	126,596	76,987	40,669	53,326	1,054,286
RM	12,793	11,452	10,203	10,608	23,066	32,798	39,710	37,870	29,863	18,160	9,593	12,579	248,694
LRS	43	39	34	36	78	111	134	128	101	61	32	43	841
Total	67,068	60,037	53,488	55,613	120,926	171,949	208,186	198,542	156,560	95,209	50,294	65,947	1,303,820

Table 6-3. Critical Peak Demand Savings (kW) per Month by Rate Class, NPC (2026)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RS	147.4	149.2	124.5	174.5	301.6	376.5	390.3	376.6	329.1	232.3	81.3	111.3
RM	34.8	35.2	29.4	41.2	71.1	88.8	92.1	88.8	77.6	54.8	19.2	26.3
LRS	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.1
Total	182.2	184.5	154.0	215.8	372.9	465.6	482.7	465.8	407.0	287.3	100.5	137.7

6.2 SPPC Savings per Month by Rate Class

Table 6-4: 2025 (First Year): Energy Savings (kWh) per Month by Rate Class, SPPC

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
D1	341	1,163	2,570	3,477	4,339	4,793	6,243	7,020	7,436	8,241	8,989	10,759	65,372
DM1	61	206	456	617	770	851	1,108	1,246	1,320	1,463	1,595	1,909	11,601
Total	402	1,370	3,026	4,094	5,109	5,643	7,351	8,266	8,756	9,704	10,585	12,668	76,973

Table 6-5. Calendar Year 2026 (Full Year) kWh Savings per Month and Rate Class, SPPC

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
D1	10,986	9,528	9,665	8,728	8,786	8,496	9,951	9,824	9,454	9,643	9,904	11,120	116,084
DM1	1,950	1,691	1,715	1,549	1,559	1,508	1,766	1,743	1,678	1,711	1,758	1,973	20,601
Total	12,936	11,219	11,380	10,277	10,345	10,004	11,717	11,567	11,131	11,354	11,661	13,094	136,685

Table 6-6: Critical Peak Demand Savings (kW) per Month by Rate Class, SPPC (2026)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
D1	21.5	27.2	29.7	29.2	27.5	14.1	14.7	14.8	14.6	26.5	20.1	21.9
DM1	3.8	4.8	5.3	5.2	4.9	2.5	2.6	2.6	2.6	4.7	3.6	3.9
Total	25.4	32	34.9	34.3	32.4	16.6	17.3	17.4	17.2	31.2	23.7	25.8

7 APPENDIX B: SURVEY FORM

This appendix provides a copy of the survey form used in the online surveys.

NV Energy

In-Home Energy Assessment/Direct Install

2025 Participant Survey

Survey Group: **Program Participants**

Survey Mode: **ONLINE**

Variable	Definition
FirstName & LastName	Name of customer
TERRITORY	A = NPC; B = SPPC
ADDRESS	Street address
ZIP	Zip code
EMAIL	Email address
PHONE	10 digit phone number
DATE	Audit date - mm/dd/yyyy
PROGRAM	1 = IHEA; 2 = DI + IHEA; 3 = DI only
APS_QTY	Quantity of advanced power strips installed, per program data
FILT_QTY	Quantity of air filters installed/left behind, per program data
WHIST_QTY	Quantity of furnace whistles installed, per program data
LED_QTY	Quantity of LEDs installed, per program data
PHTCL_QTY	Quantity of LED/photocell combos installed, per program data
REFTHERM_QTY	Quantity of refrigerator thermometers installed, per program data
FRZTHERM_QTY	Quantity of freezer thermometers installed, per program data
FirstName & LastName	Name of customer

7.1 Introduction

1. Please use the drop-down menu to choose your language preference before you start the survey.

Por favor utilice el menú desplegable para elegir el idioma de su preferencia antes de iniciar la encuesta.

7.2 In-Home Visit

2. Our records show that your household received a free PowerShift In-Home Energy Assessment that may have been part of a Bundled Appointment from NV Energy at [ADDRESS] on [DATE]. The Energy Advisor might have provided several free services, such as an appliance evaluation, air filter replacement, energy-savings report, heating and cooling inspection, insulation assessment, or the installation of energy efficient light bulbs. Do you remember this appointment?

1. Yes, I recall this appointment
2. No, I do not recall this appointment [THANK AND TERMINATE]
3. Someone else in my household handled this appointment [THANK AND TERMINATE]

3. Please indicate your level of agreement with the following statements:

[SCALE: 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Neither agree nor disagree, 4 = Somewhat agree, 5 = Strongly agree, 98 = Don't know]

- a. The PowerShift Energy Advisor arrived on time for the appointment.
- b. The PowerShift Energy Advisor demonstrated knowledge and expertise.
- c. The PowerShift Energy Advisor was professional and courteous.
- d. The PowerShift Energy Advisor maintained a clean and presentable appearance.

[DISPLAY IF COUNT OF Q2 < 3 IS >0]

4. You indicated some disagreement, please explain:

[OPEN END]

5. During your appointment, did the PowerShift Energy Advisor do any of the following?

[SCALE: 1 = Yes, 2 = No, 97 = Not Applicable, 98 = Don't know]

- a. Inspected your HVAC system (heating, ventilation, AC).
- b. Inspected your home's insulation.
- c. Inspected your appliances (water heater, refrigerator, etc.).
- d. Discuss potential energy savings based on recommended improvements.
- e. Email an energy assessment report with energy efficiency recommendations.

7.3 Energy Efficient Measures Verification

[DISPLAY SECTION IF PROGRAM>1]

6. According to our records, you received the following energy saving item(s), either installed by the PowerShift Energy Advisor or provided for later installation. Is that correct?

[RADIO BUTTON OPTIONS WHERE 1 = “Correct”, 2 = “Incorrect”, 98 = “Don’t know”]

- a. [DISPLAY IF APS_QTY > 0] [APS_QTY] Advanced power strip(s)
- b. [DISPLAY IF FILT_QTY > 0] [FILT_QTY] Air filter(s)
- c. [DISPLAY IF WHIST_QTY > 0] [WHIST_QTY] Air filter whistle(s)
- d. [DISPLAY IF REF THERM_QTY > 0] [REF THERM_QTY] Refrigerator thermometer(s)
- e. [DISPLAY IF FRZ THERM_QTY > 0] [FRZ THERM_QTY] Freezer thermometer(s)
- f. [DISPLAY IF LED_QTY > 0] [LED_QTY] LED light bulb(s)
- g. [DISPLAY IF PHTCL_QTY > 0] [PHTCL_QTY] LED bulbs-with-integrated-photocell
- h. [DISPLAY IF THERMOSTAT_QTY>0] [THERMOSTAT_QTY] Smart thermostat(s)

[DISPLAY Q7 AND Q8 IF Q6a =2]

7. How many **advanced power strips** did you receive?

[TEXT BOX]/[NUMERIC VALUE]

[DISPLAY IF APS_QTY > 0 OR Q7 >0]

8. How many **advanced power strips** are installed/plugged in?

[TEXT BOX]/[NUMERIC VALUE]

[DISPLAY Q9 THRU Q11 IF Q6b = 2]

9. How many **air filters** did you receive?

[TEXT BOX]/[NUMERIC VALUE]

[DISPLAY IF FILT_QTY > 0 OR Q9 > 0]

10. How many **air filters** are installed/in use?

[TEXT BOX]/[NUMERIC VALUE]

11. Did the PowerShift Energy Advisor leave any additional air filters behind for you to install in the future?
1. Yes (Please specify how many were left)
 2. No
 98. Don't know

[DISPLAY Q12 THRU Q14 IF Q6c = 2]

12. How many **air filter whistles** did you receive?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY IF WHIST_QTY > 0 OR Q12 >0]

13. How many **air filter whistles** are installed/in use?

[TEXT BOX] / [NUMERIC VALUE]

14. Did the PowerShift Energy Advisor show you how to reuse the air filter whistle when you replace the air filter in the future?

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

[DISPLAY Q15 IF Q6d = 2]

15. How many **refrigerator thermometers** did you receive?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY IF REFTHERM_QTY > 0 OR Q15 >0]

16. How many **refrigerator thermometers** are installed/in use?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY Q17 IF Q6e = 2]

17. How many **freezer thermometers** did you receive?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY IF FRZTHERM_QTY > 0 OR Q18 >0]

18. How many **freezer thermometers** are installed/in use?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY Q19 IF Q6f = 2]

19. How many **LED light bulbs** did you receive?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY IF LED_QTY > 0 OR Q19 >0]

20. How many **LED light bulbs** are installed/in use?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY Q21 IF Q6g =2]

21. How many **LED bulbs-with-integrated-photocells** did you receive?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY IF PHTCL_QTY > 0 OR Q21 >0]

22. How many **LED bulbs-with-integrated-photocells** are installed/in use?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY IF Q6f =1 OR Q20 > 0]

23. What happened to the old light bulbs that the PowerShift Energy Advisor replaced with new LED light bulbs?

1. The PowerShift Energy Advisor left them at my house
2. The PowerShift Energy Advisor took the old light bulbs with them
3. Other (Please Specify) [TEXT BOX]
98. Don't know

[DISPLAY IF Q6 = 1 OR Q7 > 0 OR Q12 > 0]

24. Did your PowerShift Energy Advisor provide instructions for the proper installation and use of the following? [SCALE: 1 = Yes, 2 = No, 98 = Don't know]

- a) [DISPLAY IF APS_QTY>0] Advanced power strip(s)
- b) [DISPLAY IF WHIST_QTY>0] Air filter whistle(s)

[DISPLAY IF Q6a = 1 OR Q8 > 0]

25. What is plugged into your advanced power strip(s)?

(Please select all that apply.)

1. TV
2. Game console
3. Computer
4. Monitor
5. Stereo
6. Media Player (DVD, VCR)
7. Lighting
96. Other (Please specify) [OPEN END]

[DISPLAY IF FILT_QTY>0]

26. How often did you change your home's air filter(s) before your In-Home Energy Assessment?

1. Every month
2. Every 1 – 3 months
3. Every 3 – 6 months
4. Once every 6 months
96. Other (Please specify) [OPEN END]
98. Don't know

[DISPLAY Q27 IF Q6i =2]

27. How many **smart thermostat(s)** did you receive?

[TEXT BOX] / [NUMERIC VALUE]

[DISPLAY Q28 THRU Q33 IF THERMOSTAT_QTY > 0 OR Q27 >0]

28. How many **smart thermostats** are installed/in use?

[TEXT BOX] / [NUMERIC VALUE]

29. What type of thermostat did you have before replacing it with the new smart thermostat?

1. A programmable thermostat that allows you to schedule settings for different times of the day
2. A standard thermostat that lets you set on/off temperatures
3. A different Wi-Fi smart thermostat
98. Don't know

30. Does the smart thermostat control a central cooling system, a central heating system, or both?

- 1. Central cooling system
- 2. Central heating system
- 3. Both cooling and heating systems
- 98. Don't know

[DISPLAY IF Q30 = 1 OR 3]

31. Is your central air conditioning system a heat pump?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY IF Q30 = 2 OR 3]

32. What type of central heating system do you have?

- 1. Central furnace
- 2. Heating pump
- 3. Both cooling and heating systems
- 98. Don't know

[DISPLAY IF Q30 = 2 OR 3]

33. What is the main fuel used by the central heating system?

- 1. Electricity
- 2. Natural gas
- 3. Oil
- 4. Something else
- 98. Don't know

[DISPLAY Q34 IF ANY Q6 = 1]

34. Did The PowerShift Energy Advisor install the energy savings items that you received or leave them with you to install yourself?

[RADIO BUTTON OPTIONS WHERE 1 = “Installed”, 2 = “Left them for me to install”]

- a. **[DISPLAY IF Q6a = 1] [APS_QTY]** Advanced power strip(s)
- b. **[DISPLAY IF Q6b = 1] [FILT_QTY]** Air filter(s)
- c. **[DISPLAY IF Q6c = 1] [WHIST_QTY]** Air filter whistle(s)
- d. **[DISPLAY IF Q6d = 1] [REFTHERM_QTY]** Refrigerator thermometer(s)
- e. **[DISPLAY IF Q6f = 1] [FRZTHERM_QTY]** Freezer thermometer(s)
- f. **[DISPLAY IF Q6g = 1] [LED_QTY]** LED light bulb(s)
- g. **[DISPLAY IF Q6h = 1] [PHTCL_QTY]** LED bulbs-with-integrated-photocell
- h. **[DISPLAY IF Q6i = 1] [THERMSTAT_QTY]** smart thermostat(s)

7.4 Behavioral Savings

35. How informative was your In-Home Energy Assessment with the PowerShift Energy Advisor?

- 1. Not at all informative
- 2. Somewhat informative
- 3. Moderately informative
- 4. Very informative
- 5. Extremely informative
- 98. Don't know

36. During the In-Home Energy Assessment with the PowerShift Energy Advisor, did you learn any tips about how to reduce energy use in your home?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY IF Q36=1]

37. How clear were the tips and suggested next steps provided by your PowerShift Energy Advisor?

- 1. Not at all clear
- 2. Somewhat clear
- 3. Moderately clear
- 4. Very clear
- 5. Extremely clear
- 98. Don't know

[DISPLAY IF Q36=1]

38. Have you implemented any of the energy saving tips you learned since receiving the In-Home Energy Assessment?
1. Yes
 2. No
 98. Don't know
39. How have you taken any of the following energy saving actions as a result of the information from your In-Home Energy Assessment? **[INSERT SCALE AS 1 = YES; 2 = NO; 98 = DON'T KNOW]**
- Home Maintenance & Efficiency:**
1. Replaced air filters
 2. Checked heating/cooling ducts for leaks
 3. Vacuumed refrigerator coils
 4. Tuned-up air conditioning and/or heating system
 5. Cleaned clothes dryer vent
 6. Lowered water heater temperature
 7. Adjusted freezer/refrigerator temperature settings
 8. Unplugged second refrigerator or freezer
 9. Installed energy efficient appliance(s) (clothes washer, clothes dryer, dishwasher, refrigerator, freezer)
- Daily Energy Saving Habits:**
10. Reduced thermostat temperature in winter / Increased in summer
 11. Used dishwasher or laundry machines only with full loads
 12. Turned off lights or ceiling fans when not in room
 13. Washed clothes in cold water
 14. Used a portable fan instead of air conditioning
 15. Let dishes air dry
 16. Reduced shower time
 17. Other (Please specify) **[TEXT BOX]**
40. Have you received a PowerShift rebate from NV Energy when you purchased any of the following appliances from a participating store or through the PowerShift Smart Shop in YEAR?
1. ENERGY STAR certified clothes dryer
 2. ENERGY STAR certified clothes washer
 3. **[DISPLAY IF TERRITORY = A]** ENERGY STAR certified heat pump clothes dryer
 4. ENERGY STAR certified refrigerator
 5. ENERGY STAR certified room air conditioner
 6. ENERGY STAR certified air purifier
 7. Advanced power strip
 8. No, I have not

41. What is the main reason for you deciding to participate in the PowerShift In-Home Energy Assessment?
1. To save money on energy bill(s)
 2. To reduce my environmental impact
 3. NV Energy provided it for free
 4. A recommendation from an NV Energy Representative
 5. To improve my home's energy efficiency
 6. To identify potential energy saving upgrades
 96. Other (Specify) **[OPEN END]**
 98. Don't know
42. How did you request your PowerShift In-Home Energy Assessment or Bundled Appointment?
1. Signed up on NV Energy's website
 2. Emailed NV Energy
 3. Signed up in-person at a local community event
 4. Called NV Energy
 96. Other (Specify) **[OPEN END]**
 98. Don't know

7.5 Satisfaction

43. How could the In-Home Energy Assessment be improved? Select all that apply.
1. Provide more personalized recommendations
 2. Offer a more thorough inspection of my home
 3. Provide clearer explanation of the energy saving tips
 4. Offer a more detailed report with actionable steps
 5. Follow up with additional support or resources
 6. Install more energy saving items during the visit
 7. Offer more flexible appointment times
 8. No improvements needed
 9. Other (please specify)

44. How did you learn about the free In-Home Energy Assessment or the Bundled Appointment?

(Please select all that apply.) **[RANDOMIZE]**

1. Digital display advertisement
2. Social media
3. Google or another internet search
4. NV Energy email
5. Television commercial
6. Radio advertisement
7. Video display at DMV location
8. Outdoor advertisement (billboards, transit ad)
9. Newspaper advertisement
10. PowerShift Smart Shop online marketplace
- 11 **[DISPLAY IF TERRITORY = A]** Video display at Mariana's supermarket
12. Previous experience with an NV Energy's energy efficiency program(s)
13. Information my child brought home from an NV Energy school event
96. Other (Please Specify) **[OPEN END]**
98. Don't know

45. How would you rate your experience with the sign-up process for a visit from the PowerShift Energy Advisor?

[SCALE: 1 = Very difficult, 2 = Somewhat difficult, 3 = Neither difficult nor easy, 4 = Somewhat easy, 5 = Very easy, 98 = Don't know]

[DISPLAY IF Q45 = 1 OR 2]

46. How could the process be improved?

[OPEN END]

47. How satisfied are you with each of the following:

[SCALE: 1 = Very dissatisfied, 2 = Somewhat dissatisfied, 3 = Neither satisfied nor dissatisfied, 4 = Somewhat satisfied, 5 = Very satisfied, 98 = Don't know]

- a) The information you received from your PowerShift Energy Advisor
- b) **[DISPLAY IF PROGRAM =2]** The performance of the items installed
- c) The In-Home Energy Assessment overall
- d) NV Energy's PowerShift products and services
- e) NV Energy as your service provider

[DISPLAY IF ANY IN Q47 = 1 OR 2]

48. Why are you dissatisfied with those aspects you mentioned?

[OPEN END]

7.6 Demographics

49. The next few questions are about your household. This information will only be reported in total, and you may select “Prefer not to answer” for any questions in this section.

Which of the following best describes your home?

1. Manufactured or mobile home
2. Single-family home
3. Duplex or townhouse
4. Apartment or condominium
96. Other (Please specify) **[OPEN END]**
98. Don’t know
99. Prefer not to answer

50. How long have you lived at your current address?

1. Less than 1 year
2. 1 to 5 years
3. More than 5 years
98. Don’t know
99. Prefer not to answer

51. Do you own or rent your home?

1. Own
2. Rent
3. Own and rent to someone else
99. Prefer not to answer

52. When was your home built?

1. Before 1960
2. 1960-1979
3. 1980-1999
4. 2000-2009
5. 2010 to 2019
6. 2020 to 2024
7. Newly built (2025)
98. Don't know
99. Prefer not to answer

53. How many square feet is your home?

(Please provide your best estimate.)

1. Less than 1,000 square feet
2. 1,000-1,999 square feet
3. 2,000-2,999 square feet
4. 3,000-3,999 square feet
5. Greater than 4,000 square feet
98. Don't know
99. Prefer not to answer

54. What is the main fuel used to heat your home?

1. Electricity
2. Natural gas
3. Propane
4. Oil
96. Other (Please specify) **[OPEN END]**
97. Don't heat home
98. Don't know
99. Prefer not to answer

55. What fuel does your main water heater use?

1. Electricity
2. Natural Gas
3. Propane
96. Other (Please specify) **[OPEN END]**
98. Don't know
99. Prefer not to answer

56. Including yourself, how many people live in your household year-round?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8 or more
98. Don't know
99. Prefer not to answer

[SKIP TO END OF BLOCK IF Q56>8]

57. Is your annual household income over or under [CUTOFF]?

[SCALE: 1 = At or below this value, 2 = Above this value, 98 = Don't know, 99 = Prefer not to answer]

- a) \$57,150 [DISPLAY IF Q56=1 & TERRITORY = A]
- b) \$65,300 [DISPLAY IF Q56= 2 & TERRITORY = A]
- c) \$73,450 [DISPLAY IF Q56= 3 & TERRITORY = A]
- d) \$81,600 [DISPLAY IF Q56= 4 & TERRITORY = A]
- e) \$88,150 [DISPLAY IF Q56= 5 & TERRITORY = A]
- f) \$94,700 [DISPLAY IF Q56= 6 & TERRITORY = A]
- g) \$101,200 [DISPLAY IF Q56= 7 & TERRITORY = A]
- h) \$107,750 [DISPLAY IF Q56= 8 & TERRITORY = A]
- i) \$61,054 [DISPLAY IF Q56= 1 & TERRITORY = B]
- j) \$69,781 [DISPLAY IF Q56= 2 & TERRITORY = B]
- k) \$78,509 [DISPLAY IF Q56= 3 & TERRITORY = B]
- l) \$87,192 [DISPLAY IF Q56= 4 & TERRITORY = B]
- m) \$94,196 [DISPLAY IF Q56= 5 & TERRITORY = B]
- n) \$101,152 [DISPLAY IF Q56= 6 & TERRITORY = B]
- o) \$108,151 [DISPLAY IF Q56= 7 & TERRITORY = B]
- p) \$115,107 [DISPLAY IF Q56= 8 & TERRITORY = B]

End of Survey Thank You Message

On behalf of PowerShift by NV Energy, thank you for your valuable feedback!

De parte de PowerShift de NV Energy, gracias por sus valiosos comentarios.

DSM-16

***Residential Demand Response
NV Energy
Program Year 2025***

***Measurement and Verification
Report March 27, 2026***

Prepared for:



Prepared by:

QUALUS

***100 Colonial Center Parkway
Suite 400
Lake Mary, FL 327463***

TABLE OF CONTENTS

1	Executive Summary	3
1.1	Objectives of the Impact Evaluation Study	3
1.2	History of the Demand Response Program	3
1.3	Organization of the Study	5
1.4	Program Results: NPC Service Territory	5
1.5	Program Results: SPPC Service Territory	8
1.6	Program Year 2025 Data Review	9
1.7	Findings and Recommendations	10
1.8	Organization of the Report	11
2	Program Overview	12
2.1	NV Energy’s Demand Response Program	12
2.2	NPC Service Territory Events	14
2.3	SPPC Service Territory Events	16
2.4	Abbreviations for Device Subgroups	18
2.5	Demand Response System Size	20
3	M&V Methodology	22
3.1	Thermostat Data Acquisition and Sampling	22
3.2	Non-Thermostat Data Acquisition and Sampling	23
3.3	Residential Non-Responding Devices (NRDs)	24
3.4	Calculating Per-Device Demand Reduction and Energy Savings	27
4	M&V Results	34
4.1	Residential Event Schedules	34
4.2	Interpreting Event Performance Tables	36
4.3	NPC Cool Share Results	37
4.4	NPC PowerShift Results	45
4.5	NPC Service Territory Bring Your Own Thermostat Results	69
4.6	NPC Service Territory Non-Thermostat Demand Response Results	87
4.7	Combined NPC Service Territory Results	93
4.8	SPPC Service Territory PowerShift Results	94

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

4.9	SPPC Service Territory Bring Your Own Thermostat Results	110
4.10	SPPC Service Territory Non-Thermostat Demand Response Results	123
4.11	Combined SPPC Service Territory Results	125
4.12	M&V Inputs for Cost-Effectiveness Modeling	126
5	Energy Savings Curves	128
6	Conclusions and Recommendations	129
6.1	NPC Service Territory	132
6.2	SPPC Service Territory	132
6.3	Recommendations	132
7	Appendix A: Annual Energy Savings Deemed Value Summary and Background	133
7.1	Annual Energy Savings Deemed Value Summary and Background Overview	133
7.2	Smart Thermostat Energy Optimization Matching	138
8	Appendix B: 2025 Hourly Thermostat Impacts	140
9	Appendix C: Non-Event Day Control Group Fits	157
10	Appendix D: Potential Program Savings	179

1 EXECUTIVE SUMMARY

This Measurement and Verification (“M&V”) report is provided by the Evaluator, Qualus LLC (formally ADM Associates Inc.), an independent, third-party contractor that provided the evaluation of the NV Energy 2025 Residential Demand Response (“DR”) program. Results are presented for both of NV Energy’s service territories: Nevada Power Company (“NPC”) and Sierra Pacific Power Company (“SPPC”). The Residential DR program is intended, through the remote control of a participating customer’s Heating, Ventilation, and Air Conditioning (“HVAC”) system thermostats, water heaters, batteries, and pool pumps. These demand reductions support grid reliability during periods of high system load, both for economic optimization and system emergency conditions.

1.1 Objectives of the Impact Evaluation Study

The objective of the M&V report study is to provide answers to each of the following questions:

- To what extent did the DR program in each service territory reduce peak electric demand during the summer of 2025?
- To what extent did the DR programs reduce energy consumption during 2025?
- For the purposes of forecasting, what factors influenced the amount of demand reduction achieved during DR events?
- What was the customer response to DR events? Specifically, at what rates did participants opt out of events or the program entirely?
- How reliable was the DR system? Specifically, at what rates did individual devices fail to curtail the usage of the equipment they controlled?

To provide answers to these questions, the Evaluator provided NV Energy with a research plan outlining a rigorous analytical approach, which relied on the Evaluator’s experience in impact evaluation and NV Energy’s operational expertise in administering residential demand response programs.

1.2 History of the Demand Response Program

NV Energy has been deploying DR technologies in the NPC service territory since 2001, beginning with small-scale technology demonstrations and gradually scaling the system to approximately 138,000 controlled devices in more than 100,000 homes by the end of 2025. DR technologies were first introduced in NV Energy’s SPPC service territory in 2011, beginning with a pilot program serving 64 residences. By the end of 2025, the SPPC program had expanded to approximately 21,000 devices across about 18,000 homes.

The Air Conditioning Load Management (“ACLM”) program was deployed in the 2001-2006 timeframe. The ACLM program deployed load control switches and early communicating thermostat technology. This was accompanied by rate schedule Optional Residential Service Load Management (“ORS-LM”), which provided fixed summer month incentives for program

participants. Schedule ORS-LM was replaced by rate schedule OLM which supported the “Cool Share” program deployed in the 2007-2010 timeframe. Cool Share primarily installed Carrier Comfort Choice two-way communicating programmable thermostats (“Carrier 2-way PCTs”). Schedule OLM added variable performance-based incentives leveraging the two-way data from the programmable thermostats, which provided information such as customer override data and equipment runtime data. The Company launched the mPowered Home Energy Management Program in 2012 supported by rate schedule OLM-AS. The mPowered Program introduced the EcoFactor smart thermostat, starting first with Broadband to Zigbee Gateway and a Zigbee thermostat, and then later migrating to a WiFi thermostat. The mPowered Program was rebranded as “PowerShift” in 2015. Then in 2019, the program started deploying ecobee thermostats.

In 2021, the program expanded to include a “Bring Your Own Thermostat” (“BYOT”) component, which allowed NV Energy customers to enroll existing ecobee thermostats or receive a credit toward the purchase, installation, and enrollment of new ecobee devices. By December 31, 2021, there were more than 1,500 BYOT devices in single family homes, and more than 50 BYOT devices in multifamily homes in the NPC service territory. In the SPPC service territory, there were more than 400 BYOT devices in single family homes and 15 BYOT devices in multifamily homes.

In 2023, the BYOT component was expanded to include devices controlled by Resideo Grid Service in addition to ecobee devices. The same year, the DR program expanded to include non-thermostat measures, enrolling 34 water heaters, 25 batteries, and 17 pool pumps in the NPC service territory, along with 14 water heaters and 12 batteries in the SPPC service territory. Collectively, these measures make up the non-thermostat Residential DR program component (“Non-Thermostat DR”).

The 2025 Residential DR portfolio consisted of the Cool Share, PowerShift, BYOT, and Non-Thermostat DR program components in the NPC service territory and both PowerShift and BYOT in the SPPC service territory. These customer offerings fall into specific budget categories outlined in the DR Program Data Sheet, which distinguishes budget categories between “Manage” and “Build” budgets. Support for all customers enrolled prior to 2025 falls into the Manage budget categories, while all customers newly enrolled during program year 2025 or who received replacement devices during 2025 fall into the Build budget categories.

Table 1-1: 2025 DR Program Offerings by Service Territory

Service Territory	Program	Residential Manage (Pre-2025)	Residential Build (2025)
NPC	Cool Share	☑	
	PowerShift	☑	☑
	BYOT	☑	☑
	Non-Thermostat DR	☑	☑
SPPC	PowerShift	☑	☑
	BYOT	☑	☑
	Non-Thermostat DR	☑	☑

1.3 Organization of the Study

The purpose of this M&V study was to determine the achieved peak demand reduction and energy savings associated with the Residential Cool Share, PowerShift, BYOT, and Non-Thermostat DR components in the NPC and SPPC service territories, collectively referred to as the DR programs. Table 1-2 provides the formal organization of the DR program in each service territory.

The study is organized according to the different groups of control devices, or Device Populations (“DPs”), as defined in Table 1-2. The residential populations are further subdivided by rate class; for example, DP12 consists of DP12.DM1 (multifamily) and DP12.D1 (single family).¹ At this lowest level of organization, these subsets of DR devices are called “subgroups.” Each device subgroup is listed in Table 1-3 for the NPC service territory and Table 1-6 for the SPPC service territory. NV Energy sorts these subgroups into two more categories for budgeting reasons, “Build” and “Manage”. All new participating devices in a program year are in the build category and legacy devices from previous years are in the manage category.

Table 1-2: Device Population Definitions

Service Territory	Program	Device Population	Device Description
NPC	Cool Share	DP1	Carrier Residential Two-Way PCTs
	PowerShift	DP11	EcoFactor Smart Thermostats
		DP23	ecobee Wi-Fi Thermostats
		DP47	EcoFactor s100 Wi-Fi Thermostats
	BYOT	DP49	Customer-installed ecobee Wi-Fi Thermostats
		DP51	Customer-installed Resideo Wi-Fi Thermostats
	Non-Thermostat DR	N/A	Non-Thermostat Measures
SPPC	PowerShift	DP12	EcoFactor Smart Thermostats
		DP24	ecobee Wi-Fi Thermostats
		DP46	EcoFactor s100 Wi-Fi Thermostats
	BYOT	DP48	Customer-installed ecobee Wi-Fi Thermostats
		DP50	Customer-installed Resideo Wi-Fi Thermostats
	Non-Thermostat DR	N/A	Non-Thermostat Measures

1.4 Program Results: NPC Service Territory

For NV Energy’s DR program in the NPC service territory, 2025 DR Events provided the ex-post peak verified demand reduction (“VDR”) presented in Table 1-3 and the ex-post verified energy savings (“EE”) for each device type are presented in Table 1-4.

¹ The suffixes “.DM1” and “.D1” apply to devices in the SPPC service territory. In the NPC service territory, the equivalent multi-family and single-family home suffixes are “.RM” and “.RS” respectively.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 1-3: NPC Demand Response Events Ex-Post Verified Demand Reduction

Program Component	Device Population	%NRD ²	Available Devices ³	kW ⁴ Factor	Max VDR (kW)
Cool Share (Manage)	DP1.RM	16.49	4,195	0.37	1,296.20
	DP1.RS	7.45	19,865	0.62	11,398.74
PowerShift (Manage)	DP11M.RM	8.29	225	0.71	146.51
	DP11M.RS	4.80	9,388	0.43	3,843.07
	DP23M.RM	8.12	5,217	1.07	5,128.92
	DP23M.RS	3.78	57,424	1.15	63,541.38
	DP47M.RM	11.11	304	0.53	143.22
	DP47M.RS	4.09	5,226	0.44	2,205.39
BYOT (Manage)	DP49M.RM	11.98	722	0.68	432.14
	DP49M.RS	8.62	8,040	0.91	6,685.73
	DP51M.RM	14.68	2,205	1.12	2,107.06
	DP51M.RS	7.88	14,544	1.74	23,312.40
PowerShift (Build)	DP23B.RM	8.44	964	1.07	944.42
	DP23B.RS	3.78	4,414	1.15	4,884.22
BYOT (Build)	DP49B.RM	12.14	167	0.68	99.77
	DP49B.RS	8.79	1,224	0.91	1,015.93
	DP51B.RM	14.90	778	1.12	741.53
	DP51B.RS	7.96	3,159	1.74	5,059.13
Non-Thermostat DR (Manage)	Battery Storage	12.12	27	8.96	212.60
	Pool Pumps	7.39	44	0.82	33.41
	Water Heaters	1.33	34	2.40	80.52
Non-Thermostat DR (Build)	Battery Storage	12.12	3	8.96	23.62
	Pool Pumps	7.39	8	0.82	6.08
	Water Heaters	1.33	124	2.40	293.65
			138,301		133,635.63

² Non-Responding Device ("NRD")³ Device counts for the program level VDR are from the end of the program year.⁴ Kilowatt ("kW")

Table 1-4: NPC Demand Response Verified 2025 Energy Savings

Program Component	Device Population	2025 DR Energy Savings (Events, kWh)	2025 EE Energy Savings (Optimization, kWh)	2025 Total Energy Savings (kWh)
CoolShare (Manage)	DP1	156,351	-	156,351
PowerShift (Manage)	DP11	-57,030	493,038	436,008
	DP23	-124,604	18,414,984	18,290,380
	DP47	-53,428	1,625,820	1,572,392
BYOT (Manage)	DP49	-188,106	2,576,028	2,387,922
	DP51	-12,230	4,924,206	4,911,976
PowerShift (Build)	DP23	-2,686	1,581,132	1,578,446
BYOT (Build)	DP49	-38,982	408,954	369,972
BYOT (Build)	DP51	-1,750	1,157,478	1,155,728
Non-Thermostat DR (Manage and Build)	Battery Storage	4,108	-	4,108
	Pool Pumps	174	-	174
	Water Heaters	6,808	-	6,808
Total		--311,375	31,181,640	30,870,265

Table 1-5 compares these ex-post verified savings to the reported ex-ante energy savings for each device population. The overall program-level realization rate for the 2025 NPC service territory Residential DR program was 85 percent.

Table 1-5: NPC 2025 Realization Rate

Program Component	Device Population	Ex-ante Energy Savings, kWh	Ex-post Energy Savings, kWh	Realization Rate
CoolShare (Manage)	DP1	42,792	156,351	365%
PowerShift (Manage)	DP11	4,058,743	436,008	11%
	DP23	17,915,638	18,290,380	102%
	DP47	2,749,385	1,572,392	57%
BYOT (Manage)	DP49	2,655,432	2,387,922	90%
	DP51	5,326,586	4,911,976	92%
PowerShift (Build)	DP11	1,323	0	0%
	DP23	1,585,664	1,578,446	100%
BYOT (Build)	DP49	638,748	369,972	58%
	DP51	1,298,144	1,155,728	89%
Non-Thermostat DR (Manage and Build)	Battery Storage	0	4,108	--
	Pool Pumps	14,871	174	1%
	Water Heaters	34,684	6,808	20%
Total		36,322,009	30,870,265	85%

1.5 Program Results: SPPC Service Territory

For NV Energy's DR program in the SPPC service territory, 2025 DR Events provided the ex-post peak VDR presented in Table 1-6.

Table 1-6: SPPC Demand Response Events Ex-Post Verified Demand Reduction

Program Component	Device Population	%NRD	Available Devices	kW Factor	Max VDR (kW)
PowerShift (Manage)	DP12M.D1	14.47	1,481	0.77	975.36
	DP12M.DM1	20.37	30	1.64	39.18
	DP24M.D1	9.04	7,959	1.25	9,049.38
	DP24M.DM1	16.96	547	1.00	454.23
	DP46M.D1	13.55	1,313	0.89	1,010.23
	DP46M.DM1	26.48	60	0.76	33.53
BYOT (Manage)	DP48M.D1	10.81	2,776	1.53	3,788.15
	DP48M.DM1	17.76	123	1.13	114.31
	DP50M.D1	17.38	3,665	1.72	5,208.20
	DP50M.DM1	26.12	333	1.12	275.54
PowerShift (Build)	DP24B.D1	9.03	537	1.25	610.64
	DP24B.DM1	17.08	107	1.00	88.72
BYOT (Build)	DP48B.D1	10.95	378	1.53	515.01
	DP48B.DM1	18.07	25	1.13	23.15
	DP50B.D1	17.60	1,075	1.72	1,523.58
	DP50B.DM1	26.55	126	1.12	103.65
Non-Thermostat DR (Manage)	Battery Storage	0.74	16	8.94	141.98
	Water Heaters	14.29	17	2.24	32.64
Non-Thermostat DR (Build)	Battery Storage	0.74	2	8.94	17.75
Total			20,570		24,005.23

Ex-post verified energy (kWh) savings for NV Energy's DR program in the SPPC service territory are presented in Table 1-7.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 1-7: SPPC Demand Response Verified 2025 Energy Savings*

Program	Device Population	2025 DR Energy Savings (Events, kWh)	2025 EE Energy Savings (Optimization, kWh)	2025 Total Energy Savings (kWh)
PowerShift (Manage)	DP12	15,629	259,584	275,213
	DP24	51,283	1,440,192	1,491,475
	DP46	9,061	237,328	246,389
BYOT (Manage)	DP48	6,814	593,632	600,446
	DP50	35,117	819,104	854,221
PowerShift (Build)	DP24	2,575	110,656	113,231
BYOT (Build)	DP48	1,252	83,824	85,076
	DP50	11,807	249,600	261,407
Non-Thermostat DR (Manage and Build)	Battery Storage	1,663	-	1,663
	Water Heaters	-80	-	-80
Total		135,121	3,793,920	3,929,041

Table 1-8 compares these ex-post verified savings to the reported ex-ante energy savings for each device population. The overall program-level realization rate for the 2025 SPPC service territory Residential DR program was 66 percent.

Table 1-8: SPPC 2025 Realization Rate

Program	Device Population	Ex-ante Energy Savings, kWh	Ex-post Energy Savings, kWh	Realization Rate
PowerShift (Manage)	DP12	567,657	275,213	48%
	DP24	2,208,372	1,491,475	68%
	DP46	575,133	246,389	43%
BYOT (Manage)	DP48	798,030	600,446	75%
	DP50	1,225,174	854,221	70%
PowerShift (Build)	DP12	573	0	
	DP24	227,831	113,231	50%
	DP46	374	0	0%
BYOT (Build)	DP48	266,856	85,076	32%
	DP50	96,490	261,407	271%
Non-Thermostat DR (Manage and Build)	Battery Storage	0	1,663	--
	Water Heaters	6,921	-80	-1%
Total		5,973,412	3,929,041	66%

1.6 Program Year 2025 Data Review

The Evaluator had no issues obtaining accurate data for the 2025 Residential DR program M&V activities. Overall, data sharing was reliable and facilitated by open and regular communication between NV Energy and the Evaluator.

1.7 Findings and Recommendations

1.7.1 NPC Service Territory Findings

Accounting for non-responding devices (“NRDs”) and participant overrides, a single DR Event in the NPC service territory could achieve a demand reduction of 133,636kW if all devices were to operate simultaneously and achieve their maximum demand reduction during the first hour. By the end of the 2025 program year the number of available devices in the NPC service territory was 138,301, representing an increase of 3,623 devices compared to 2024.

A deemed value of 294 kWh was used for annual smart thermostat energy efficiency savings. The Evaluator derived the deemed value through a weighted average of annual kWh savings evaluated annually during program years 2019 and 2021-2025. Additional detail on the deemed value methodology are provided in Appendix A: Annual Energy Savings Deemed Value Summary and Background

1.7.2 SPPC Service Territory Findings

Accounting for non-responding devices (“NRDs”) and participant overrides, a single DR Event in the SPPC service territory could achieve a demand reduction of 24,005kW, if all devices were to operate simultaneously and achieve their maximum demand reduction during the first hour. By the end of the 2025 program year there were 20,570 available devices in the SPPC territory, an increase of 1,184 devices since 2024.

A deemed value of 208 kWh was used for annual smart thermostat energy efficiency savings. The Evaluator derived the deemed value through a weighted average of annual kWh savings evaluated annually during program years 2019 and 2021-2025. Additional detail on the deemed value methodology are provided in Appendix A: Annual Energy Savings Deemed Value Summary and Background .

1.7.3 Program Recommendations

Table 1-9 provides a summary of recommendations that will further improve the performance of the Residential DR program.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 1-9: Recommendation Summary*

Recommendation Title	Impacted Population(s)	Summary
Increase participant engagement and training for later DR event times.	NPC Thermostat DPs	It is recommended that NV Energy increase customer engagement and develop training materials (one sheets, online short course, etc.) to teach participants about the importance of full participation in DR events even when they fall at later hours of the day. This can increase event performance and customer satisfaction with the program.
Consider the effects of different start time on DR event performance.	NPC Thermostat DPs	NV Energy should consider using the information about event performance (kW factors, NRDs, kWh factors) during specific time-of-day DR event calls from previous years M&V Reports when developing the options for types of DR event schedules. Including more specific expectations for event performance by event start time would provide the NV Energy team with the information needed to deploy the Residential DR program resources strategically and with more flexibility.
Increase the water heater DP in the SPPC service territory	SPPC Water Heaters	In the NPC service territory, NV Energy enrolled 124 water heaters in PY2025, quintupling the size of the program. However, in the SPPC service territory, no water heaters were enrolled. It is recommended that NV Energy increase the water heater DP in the SPPC service territory.

1.8 Organization of the Report

This report presents the results of the Evaluator’s measurement and verification study of NV Energy’s Residential DR program for 2025. Chapters 2 through 6 of this report are outlined in Table 1-10.

Several technical appendices are included at the end of this report and are referenced, as needed, throughout the main body of this document.

Table 1-10: Report Outline

Chapter Number	Chapter Title	Description
2	Program Overview	Description of the residential DR program, the DR events called during the 2025 season, and information about the subgroups and their sizes.
3	M&V Methodology	Description of the methodology used to estimate residential demand reductions and energy savings.
4	M&V Results	Estimates of ΔkW_g and ΔkWh_g for residential subgroups.
5	Energy Savings Curves	Describes energy savings curves used for the 2025 DR analysis.
6	Conclusions and Recommendations	Recommendations for future program years considering this year’s evaluation.

2 PROGRAM OVERVIEW

This chapter provides a high-level overview and summary description of the DR program.

2.1 NV Energy's Demand Response Program

DR encompasses a range of interventions and techniques that utilities can use to manage and control electricity demand, either for economic reasons or in the event of an emergency. The types of interventions used in DR programs include both tariff-based and technology-based measures.

NV Energy deployed residential load control switches originally in the 1980's and reintroduced DR technologies at a limited scale beginning in 2001. From 2001 through 2006, NV Energy conducted a technology evaluation of a variety of manufacturers' switches, thermostats, gateways, and dispatch control systems, and built a load control capacity of 19 to 23 megawatts ("MW"). In 2007, the program transitioned from a technology assessment pilot program to a full-scale DR resource with the launch of the Cool Share component in the NPC service territory, which utilized two-way PCT technology. NV Energy expanded the overall system to over 140 MW of residential load control by the end of 2010.

In 2011 and 2012, NV Energy upgraded its DR infrastructure with the installation of a demand response management system ("DRMS") and enhanced customer technologies designed to leverage smart meter capabilities. The balancing authority and market resource optimization groups incorporated DR in their operations and energy portfolio as a reliable and flexible peaking resource. At the same time, a residential pilot component was approved and tested in the SPPC service territory. The trial utilized a smart thermostat system supported by cloud-based optimization software from technology vendor EcoFactor.

In October of 2012, NV Energy launched its next generation residential DR offering, referred to as the mPowered program (the component was rebranded as PowerShift in 2015).

In 2015, the residential DR program added a small residential pilot of ecobee two-way PCTs. During 2017, the "PowerShift Pilot" was implemented to investigate the efficacy of two new Wi-Fi smart thermostats from ecobee and EcoFactor. Based on the results from the "PowerShift Pilot," NV Energy deployed the new EcoFactor s100 thermostats to all retrofit and new program participants in 2018. In 2019, NV Energy discontinued the use of several legacy devices, including the CSE and Cannon LCR5000-5200 DCUs as well as the Honeywell Residential UtilityPro and ExpressStat One-Way PCTs. Despite these deactivations, the program continued to enroll new customers in 2019 as the ecobee device became the principal device installed, nearly doubling the ecobee population. ecobee devices remained the primary device installed throughout the 2020 program year; however, due to the COVID-19 pandemic, it was not possible to enter customers' homes and install as many new devices as anticipated.

Currently, the Residential DR program consists of the following primary customer offerings:

- Cool Share includes customers in the NPC service territory who enrolled in NV Energy's DR effort prior to 2012 with two-way paging-based non-smart devices such as Carrier

programmable thermostats.

- PowerShift includes two groups of customers:
 - Customers in NPC service territory joined the DR program between 2012 and 2025 with smart thermostat systems leveraging cloud-based software from EcoFactor and ecobee; and
 - All DR program customers within NV Energy's SPPC service territory, which are not enrolled in the BYOT component.
- BYOT includes customers in both NPC and SPPC service territories who installed their own ecobee or Resideo-hosted smart thermostats and opted into the Residential DR program.
- Non-Thermostat DR includes customers with batteries, water heaters, or pool pumps participating in the DR program.

2.1.1 About Cool Share

The Cool Share component utilizes an assortment of PCTs and DCUs to control participants' HVAC systems during a demand response event. Cool Share PCTs communicate over commercial paging systems, and DR events increase their cooling set point by four degrees. Cool Share DCU's received a remote signal to reduce cooling duty cycles, thereby reducing compressor run times by half. In 2019, NV Energy discontinued the use of DCU and one-way communicating thermostats in the Cool Share component due to the age of the devices and their relatively low-cost effectiveness compared to other DR technologies.

For participation in Cool Share, customers with PCTs installed before 2012 received a \$5 bill credit per device per month during the June through September DR season. In addition to this fixed incentive, customers could also receive a tariff-based rebate, the amount of which depended on savings achieved during DR events relative to a customer-specific baseline.⁵

2.1.2 About PowerShift

The PowerShift component was marketed not only as a DR program but also as a smart thermostat program utilizing an internet-connected system that communicates with cloud-based software from EcoFactor and ecobee. Smart thermostat technology provides an automates HVAC controls based on household energy consumption patterns, with the goal of reducing overall HVAC energy usage.

⁵ <https://www.nvenergy.com/home/saveenergy/rebates/coolshare.cfm>

For participation in the PowerShift component, customers received the thermostat, installation, and automation service subscription free of charge.⁶ PowerShift customers also received a tariff-based rebate that varied depending on the amount of energy savings achieved during DR event hours.

2.1.3 About Bring Your Own Thermostat

The BYOT component, introduced in 2021, allows customers with already existing ecobee and Resideo hosted devices⁷ to enroll in the DR program. Customers can also receive a one-time credit to purchase, install, and enroll new ecobee and Resideo devices into the DR program as well as monthly participation credits during the summer months.

2.1.4 About Non-Thermostat Demand Response

In 2023, NV Energy added non-thermostat devices to the DR Program. To save energy, customers in both the NPC and SPPC service territories can enroll batteries and water heaters to this program, while pool pumps are eligible for enrollment only the NPC service territory. NV Energy provided and installed all water heaters and pool pump DR controllers, whereas customers participating in the battery sub-component used existing equipment. In future program years, customers may be able to enroll existing water heater and pool pump controllers.

2.2 NPC Service Territory Events

2.2.1 Thermostat Demand Response Events

Between June and August 2025, 25 residential DR events were scheduled, of which 24 were called successfully. Figure 2-1 shows the days on which an event was called. Of those 25 events, two had thermostat DR beginning at 18:00 and 22 had thermostat DR beginning at 19:00.

The 2025 DR season was cooler than average in the NPC service territory. The average July temperature in Las Vegas was 92.5°F; the coldest in the past 10 years and below the 1991-2020 average.⁸ August 2025 was the sixth warmest August on record in Las Vegas, with both the average high temperature (104.1°F)⁹ and the record high temperature (112°F)¹⁰ exceeding those observed in July 2025, which is unusual for the region.

⁶ <https://www.nvenergy.com/save-with-powershift/smart-thermostat>.

⁷ Resideo is the host technology that allows other smart thermostats to be part of the BYOT program. Currently, it includes thermostats such as Honeywell Home, Google Nest, Amazon, and Sensi thermostats.

⁸ <https://www.ktnv.com/news/july-2025-on-track-to-be-coolest-in-las-vegas-in-a-decade-bucking-recent-heat-trends>. Last Accessed: December 17, 2025.

⁹ <https://www.extremeweatherwatch.com/cities/las-vegas/average-temperature-by-year/month-august>. Last Accessed: December 17, 2025.

¹⁰ <https://www.extremeweatherwatch.com/cities/las-vegas/year-2025>. Last Accessed: December 17, 2025.

2.2.2 Non-Thermostat Demand Response Events

2.2.2.1 Battery Storage

Between June and August 2025, 25 residential battery storage demand response events were scheduled. Figure 2-1 shows the days on which an event was called. Each event lasted for two hours. All battery events were called at 19:00. During each event, available battery capacity was discharged. Exceptions included customer sites that requested to limit participation of the battery to a maximum of a certain percentage discharge and sites with multiple batteries that were limited to discharge a maximum of 10 kWh.

2.2.2.2 Pool Pumps

Between June and August 2025, 25 residential pool pump demand response events were scheduled. Figure 2-1 shows the days on which an event was called. Each event lasted two hours. All pool pump events were called at 13:00.

2.2.2.3 Water Heaters

Between June and August 2025, 25 residential water heater demand response events were scheduled, of which 24 were successfully called. Figure 2-1 shows the days on which an event was called. Each event lasted two hours. All water heater events were called at 19:00.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

June								July						
S	M	T	W	Th	F	Sa		S	M	T	W	Th	F	Sa
1	2	3	4	5	6	7				1	2	3	4	5
8	9	10	11	12	13	14		6	7	8	9	10	11	12
15	16	17	18	19	20	21		13	14	15	16	17	18	19
22	23	24	25	26	27	28		20	21	22	23	24	25	26
29	30							27	28	29	30	31		
August								September						
S	M	T	W	Th	F	Sa		S	M	T	W	Th	F	Sa
					1	2		1	1	2	3	4	5	6
3	4	5	6	7	8	9		7	8	9	10	11	12	13
10	11	12	13	14	15	16		14	15	16	17	18	19	20
17	18	19	20	21	22	23		21	22	23	24	25	26	27
24	25	26	27	28	29	30		28	29	30				
31														
		DR Event — All Devices												
		DR Event — Thermostat, Pool Pump, and Water Heater Devices												
		DR Event — Battery Storage and Pool Pump Devices												

Figure 2-1: 2025 NPC Service Territory DR Events

2.3 SPPC Service Territory Events

2.3.1 Thermostat Demand Response Events

In 2025, 11 residential demand response events were scheduled between June and August. In Figure 2-2, calendars of the summer months are shown. In the SPPC service territory, residential events in June and August began at 18:00. Residential events in July began at 19:00. All events lasted for two hours.

The average temperature in the SPPC service territory during July 2025 was 92.7°F, which was cooler than the record-breaking average July temperature in 2024, along with the average July temperatures in 2020-2023.¹¹ The record high for 2025 in the territory was 104°F on July 13¹² Average temperatures in June and August 2025 were similar to previous years.^{13,14}

2.3.2 Non-Thermostat Demand Response Events

2.3.2.1 Battery Storage

Between June and August 2025, 11 residential battery storage demand response events were scheduled. Figure 2-2 shows the days on which events were scheduled. Each event began at 16:00 and lasted two hours. During the event, available battery capacity was discharged. Some exceptions to this were customer sites that requested to limit participation of the battery to a maximum of a certain percentage discharge and sites with multiple batteries that were limited to discharge a maximum of 10 kWh.

2.3.2.2 Water Heaters

Between June and August 2025, 11 residential water heater demand response events were scheduled. Figure 2-2 shows the days on which events were scheduled. These events occurred at 17:00 and each event lasted two hours.

¹¹ <https://www.extremeweatherwatch.com/cities/reno/average-temperature-by-year/month-july>. Last Accessed: February 11, 2026.

¹² https://www.extremeweatherwatch.com/cities/reno/year-2025#highest_temperatures. Last Accessed: February 11, 2026.

¹³ <https://www.extremeweatherwatch.com/cities/reno/average-temperature-by-year/month-june>. Last Accessed: December 29, 2025.

¹⁴ <https://www.extremeweatherwatch.com/cities/reno/average-temperature-by-year/month-august>. Last Accessed: December 29, 2025.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

June								July						
S	M	T	W	Th	F	Sa		S	M	T	W	Th	F	Sa
1	2	3	4	5	6	7				1	2	3	4	5
8	9	10	11	12	13	14		6	7	8	9	10	11	12
15	16	17	18	19	20	21		13	14	15	16	17	18	19
22	23	24	25	26	27	28		20	21	22	23	24	25	26
29	30							27	28	29	30	31		
August								September						
S	M	T	W	Th	F	Sa		S	M	T	W	Th	F	Sa
					1	2			1	2	3	4	5	6
3	4	5	6	7	8	9		7	8	9	10	11	12	13
10	11	12	13	14	15	16		14	15	16	17	18	19	20
17	18	19	20	21	22	23		21	22	23	24	25	26	27
24	25	26	27	28	29	30		28	29	30				
31														
		DR Event – Thermostat and Water Heater Devices												
		DR Event — All Devices												

Figure 2-2: 2025 SPPC Service Territory DR Events

2.4 Abbreviations for Device Subgroups

Throughout this report, thermostat device subgroups will be referred to using the abbreviated forms in Table 2-1.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 2-1: Abbreviated Names, All Residential Thermostat Device Subgroups*

Abbreviated Name(s)	Device Description
DP1.RS	Carrier two-way PCTs in single family homes
DP1.RM	Carrier two-way PCTs in multifamily homes
DP11.RS Manage, DP12.D1 Manage	EcoFactor two-way PCTs installed in single family homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP11.RM Manage, DP12.DM1 Manage	EcoFactor two-way PCTs in multifamily homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP12.D1 Build	EcoFactor two-way PCTs in single family homes, i.e., new program participants with this device installed during 2025.
DP23.RS Manage, DP24.D1 Manage	ecobee two-way Wi-Fi PCTs in single family homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP23.RM Manage, DP24.DM1 Manage	ecobee two-way Wi-Fi PCTs in multifamily homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP23.RS Build, DP24.D1 Build	ecobee two-way Wi-Fi PCTs in single family homes, i.e., new program participants with this device installed during 2025.
DP23.RM Build, DP24.DM1 Build	ecobee two-way Wi-Fi PCTs in multifamily homes, i.e., new program participants with this device installed during 2025.
DP47.RS Manage, DP46.D1 Manage	EcoFactor two-way Wi-Fi PCTs in single family homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP47.RM Manage, DP46.DM1 Manage	EcoFactor two-way Wi-Fi PCTs in multifamily homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP49.RS Manage, DP48.D1 Manage	ecobee two-way Wi-Fi PCTs in single family homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP49.RM Manage, DP48.DM1 Manage	ecobee two-way Wi-Fi PCTs in multifamily homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP49.RS Build, DP48.D1 Build	ecobee two-way Wi-Fi PCTs in single family homes, i.e., new program participants in 2025 who installed this device on their own.
DP49.RM Build, DP48.DM1 Build	ecobee two-way Wi-Fi PCTs in multifamily homes, i.e., new program participants in 2025 who installed this device on their own.
DP51.RS Manage, DP50.D1 Manage	Resideo two-way Wi-Fi PCTs in single family homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP51.RM Manage, DP50.DM1 Manage	Resideo two-way Wi-Fi PCTs in multifamily homes prior to 2025 as well as devices installed in 2025 to replace older technology installed prior to 2025.
DP51.RS Build, DP50.D1 Build	Resideo two-way Wi-Fi PCTs in single family homes, i.e., new program participants in 2025 who installed this device on their own.
DP51.RM Build, DP50.DM1 Build	Resideo two-way Wi-Fi PCTs in multifamily homes, i.e., new program participants in 2025 who installed this device on their own.

2.5 Demand Response System Size

In the following section, tracking data for the different DR devices used to quantify the size of the system at different times during the summer are described. The counts provided below represent available devices, defined as devices registered with NV Energy as DR assets. An available device becomes unavailable if and only if the customer in possession of said device decides to permanently opts out of the DR program.

Available devices are to be distinct from active or responding devices, which are available devices that are, at a given moment, controllable by NV Energy. The potential for various technical failures on the part of devices means that, in theory and in practice, responding devices are a proper subset of available devices. The proportion of NRDs is estimated for each subgroup and each event and is used to adjust the number of available devices down to the number of responding devices that contribute to actual demand reduction (see Section 3.2).

All device subgroups were tracked using NV Energy's DRMS, which serves as a centralized hub for controlling and monitoring the entire DR system.

The DRMS tracks when new customers join a DR program and when they opt out and includes identifier information such as meter number and device serial number. Rate class information was determined by cross-referencing the DRMS with NV Energy's Banner customer database.

Based on the enrollment and opt-out dates recoded in the DRMS, the number of available devices in device subgroup g at a given date d is calculated as follow:

$$N_g(d) = [\text{\# of devices enrolled prior to } d] - [\text{\# of devices opting out prior to } d]$$

Equation 1

The number of available devices can change day-to-day, so $N_g(d)$ is calculated for each event e . Therefore, to provide a prospective value for system size, the system size as of December 31, 2025, was used, as shown in Table 2-2.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 2-2: Comparison of Device Counts, December 2025, Versus Summer 2025

Service Territory	Subgroup	Summer 2025 Average Quantity	Size at 12/31/2025 (N g (d))
NPC	DP1M.RM	4,174	4,195
	DP1M.RS	20,032	19,865
	DP11M.RM	354	225
	DP11M.RS	13,226	9,388
	DP23B.RM	630	964
	DP23B.RS	2,932	4,414
	DP23M.RM	5,172	5,217
	DP23M.RS	52,986	57,424
	DP47M.RM	576	304
	DP47M.RS	8,707	5,226
	DP49B.RM	136	167
	DP49B.RS	1,483	1,224
	DP49M.RM	663	729
	DP49M.RS	7,514	8,033
	DP51B.RM	733	778
	DP51B.RS	3,525	3,159
	DP51M.RM	1,950	2,205
	DP51M.RS	13,391	14,544
	Battery Storage	24	30
	Pool Pumps	45	52
	Water Heaters	150	158
NPC Program Total		138,405	138,301
SPPC	DP12M.D1	2,091	1,481
	DP12M.DM1	43	30
	DP24B.D1	287	537
	DP24B.DM1	51	107
	DP24M.D1	7,105	7,959
	DP24M.DM1	522	547
	DP46M.D1	2,072	1,313
	DP46M.DM1	104	60
	DP48B.D1	506	378
	DP48B.DM1	31	25
	DP48M.D1	2,481	2,776
	DP48M.DM1	112	123
	DP50B.D1	1,127	1,075
	DP50B.DM1	131	126
	DP50M.D1	3,326	3,665
	DP50M.DM1	290	333
	Battery Storage	15	18
	Water Heaters	14	17
SPPC Program Total		20,308	20,570

3 M&V METHODOLOGY

This chapter describes the methodology that the Evaluator used for the M&V effort for the 2025 Residential DR program.

3.1 Thermostat Data Acquisition and Sampling

Smart meter data was obtained for participants via the DRMS, with approximately 91 percent of the enrolled premises included in the delivered dataset. Because the units of the smart meter data are in “kWh delivered” per 15-minute interval, the Evaluator converted these values to average hourly demand (kW) by multiplying by four and averaging across the hour.

The sampling units were individual homes and multi-family units, each identified by a unique meter number. A unit was included in the sample, and the overall DR population, if and only if the following four criteria were met:

- The home did not disenroll any devices from the program in 2025. That is, every device in the sample should have participated in every event. The only exceptions were PowerShift, BYOT, and Non-Thermostat Build homes, which were installed or enrolled throughout 2025.¹⁵
- The home did not participate in any other energy efficiency programs offered by NV Energy during the program year. The only exception is non-thermostat DR, as some DR participants had both thermostat and non-thermostat devices enrolled.
- The home service class could be verified as either single family or multifamily in NV Energy’s records.
- The home contained only one type of thermostat technology. For example, if a home had both a Carrier PCT and an ecobee device, then it was excluded from the sample. On the other hand, if, say, the home had two PCTs, then it was included in the sample.

Table 3-1 shows the average number of premises used to evaluate DR thermostat program savings for each DP in both service territories.

¹⁵ BYOT devices are only evaluated for savings for events after the device was enrolled.

Table 3-1: Average Count of Premises Used for Thermostat DR Event Analyses

Service Territory	Device Population	Average Number of Premises Used for DR Event Analyses
NPC	DP1.RM	3,961
	DP1.RS	13,769
	DP11.RM	312
	DP11.RS	7,698
	DP23.RM	5,077
	DP23.RS	32,894
	DP47.RM	498
	DP47.RS	5,096
	DP49.RM	589
	DP49.RS	7,395
	DP51.RM	2,074
	DP51.RS	14,275
	NPC Total	93,638
SPPC	DP12.D1	1,575
	DP12.DM1	41
	DP24.D1	5,906
	DP24.DM1	549
	DP46.D1	1,542
	DP46.DM1	93
	DP48.D1	2,675
	DP48.DM1	116
	DP50.D1	4,015
	DP50.DM1	346
	SPPC Total	16,858

3.2 Non-Thermostat Data Acquisition and Sampling

Non-thermostat data was collected by the third party Ennovara and delivered to the Evaluator electronically. This data was sampled at the premise level. Collection methods varied by device type and were as follows:

3.2.1 Battery Storage

Battery consumption was measured at the device level as the difference between the energy imported by the battery and the energy exported by the battery. Both data streams were measured in 15-minute intervals as Wh, then converted to kWh by taking the average across each hour, quadrupling it, and dividing it by 1,000.

3.2.2 Pool Pumps

Whole-home 15-minute AMI data for each premise in the pool pump DR subcomponent was used to calculate the DR reductions. This data came from the DRMS, and the same methods were used to convert these data to hourly kWh as with the thermostat DR program subcomponents.

3.2.3 Water Heaters

Water heater data was measured as ON or OFF on 5-minute intervals. Hourly water heater heating element demand was assumed to be 4,500 W, which means that, when the element was ON, the 5-minute demand was assumed to be 375 W. To convert these data to hourly kWh, they were averaged across the hour, multiplied by 12, and then divided by 1,000.

3.3 Residential Non-Responding Devices (NRDs)

A device was considered “non-responding” if it did not respond to the curtailment signal sent by NV Energy for reasons other than manual override by the customer. (For information related to overrides, see Section 3.3.3). Common causes of non-response are system outages, internet accessibility issues or other physical barriers that may block the signal.

Prior to the calculation of kW factors, NRDs were identified and removed from the sample using a combination of two algorithms: a cumulative sum (“CSUM”) change-in-slope analysis and a straight 10 percent decrease in load detection. Given that overrides and partial overrides cannot be considered NRDs, the Evaluator utilized override data to identify and exclude overrides and partial overrides from the NRD identification process. A DR event qualifies as a non-routine event (“NRE”) when looking at the energy consumption data for residential homes. The Evaluator developed the CSUM and percent reduction approaches for NRD detection following the “IPMVP Application Guide on Non-Routine Events & Adjustments” document which was last updated in October 2020 (EVO 10400-1:2020). The CSUM methodology follows NRE detection described in Section 3.5 of the “IPMVP Application Guide on Non-Routine Events & Adjustments” document and the 10 percent reduction follows the methodology described in Section 3.4 of that document.

The reason that the Evaluator employs both algorithms for the thermostat DR analysis is that at the premise level, meter data is quite erratic as air conditioning (“A/C”) units rarely run continuously. The 10 percent drop method works great at identifying DR participants whose A/C were running when the event started, while the CSUM method will identify DR participants even if their A/C wasn’t running at the moment the event was called. Taking the intersection of both methods is a conservative approach to identifying NRDs when we want to limit Type I errors (identifying a home as a NRD when in fact it just has erratic meter data).

For the non-thermostat DR analysis, only the cumulative sum algorithm was used to classify devices as NRDs.

3.3.1 CSUM Algorithm

When an event was called, each device was sent curtailment instructions that resulted in a significant load drop over the event period. This drop is illustrated in Figure 3-1, where an example DR event is presented with an example “normal” usage curve.

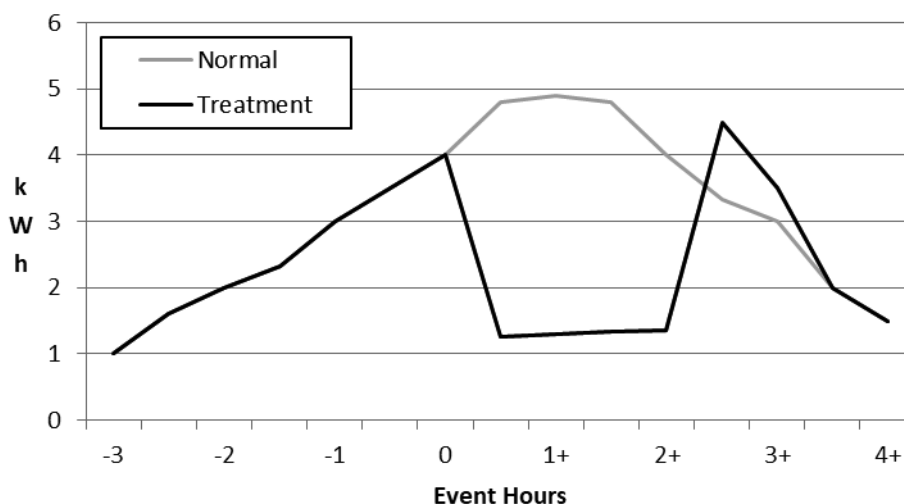


Figure 3-1: Example of Site-level Load Shapes during Event Hours

Homes had different energy usage patterns and load magnitudes. Accordingly, when identifying which homes participated in an event, it was important to look at load shapes in a way that reduced the variability in load shapes to a simple pattern. The Evaluator applied a CSUM to each load shape to create a simple cumulative time series:

$$x = (i_1, i_2, i_3, \dots, i_{96}) \quad CSUM(x) = (i_1, i_1 + i_2, i_1 + i_2 + i_3, \dots, i_1 + \dots + i_{96})$$

Equation 2

where x is a vector of kWh measurements taken at 15-minute intervals, the interval $i_1 : i_{96}$ is the 24-hour interval from 7:00 am to 7:00 am the following day. The result of Equation 2 for each treatment site was a smoothed, increasing curve, as depicted in Figure 3-2.

If a device responded to the curtailment signal, then there was a significant change in slope during the event period compared to the period before the event started. To test for significance in the slope change, the Evaluator applied two tests. Test 1 took the ratio of the event period (1-2 hours) slope divided by the pre-period (3 hours) slope (Figure 3-2). A responding device was detected by a decrease in the line slope, so the ratio was less than unity.

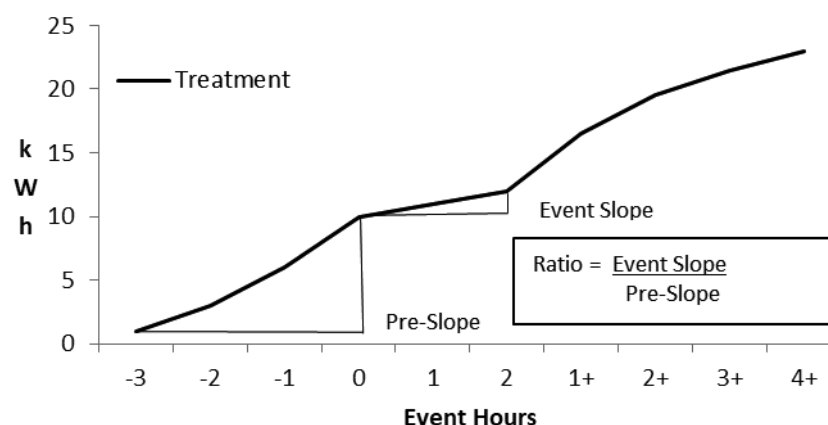


Figure 3-2: Example of Site-level Cumulative Sum Slope Changes during Event Hours

Some sites had unique meter profiles that could confuse Test 1. Test 2 took the average load shape of each site based on the previous 7 non-event, non-weekend days to create a “site-normal” cumulative curve to compare with the event curve (Figure 3-3). The Evaluator calculated the slope ratios for the site-normal cumulative curve and compared them to the event ratio for those sites that failed Test 1.

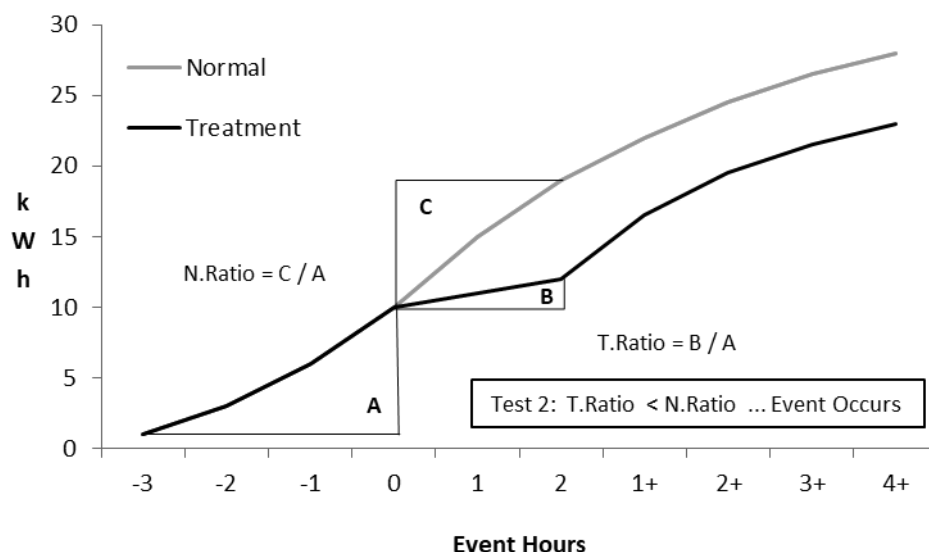


Figure 3-3: Example of the CSUM Change-in-Slope Analysis used to Identify NRDs

If the ratio for the site-normal curve was greater than the ratio for the event curve, then the device was classified as responding. Any devices that did not meet the criteria under either test were classified as non-responding.

3.3.2 Percent Reduction Algorithm

It is possible that a single NRD classification algorithm misidentify some NRDs. To reduce Type 1 errors, the Evaluator employed two algorithms and took the intersection of the resulting NRD groups. The percent reduction algorithm was a straight test for a 10 percent reduction in kWh during the first hour of an event. The same meter data evaluated using the CSUM algorithm were also analyzed using this approach. For each unique device, the kWh for 1-hour pre-event and kWh for the first hour of the event (Figure 3-1) were compared to determine whether the reduction exceeded 10 percent, as shown below:

$$T1_{kWh} = PreHr_{kWh} - EventHr_{kWh} \quad \text{and} \quad T2_{kWh} = PreHr_{kWh} * 10\%$$

$$NRD = T1_{kWh} \leq T2_{kWh}$$

Where,

$PreHr_{kWh}$ = kWh usage during the hour before the event started

$EventHr_{kWh}$ = kWh usage during the first hour of the event

$T1_{kWh}$ = $PreHr_{kWh} - EventHr_{kWh}$

$T2_{kWh}$ = $PreHr_{kWh} * 0.10$

Equation 3

If T1 was less than or equal to T2 that device was classified as an NRD. A drop of 10 percent represented an average selected by the Evaluator and NV Energy following an extensive review of drop percentages for the different device types in the program.

3.3.3 Manual Overrides

All DR thermostat components provide customers with ability to override DR curtailments. A customer who does not wish to participate in an event may override the curtailment either over the internet or manually doing so on the device (with all devices). Manual overrides were measured using various event tracking data sets provided by NV Energy and its implementers. These override events were recorded in a log that differs by device types in terms of the information available for analysis. The percentage of participants who overrode during each event is presented in the results sections.

3.4 Calculating Per-Device Demand Reduction and Energy Savings

The following subsections discuss how demand reduction and energy savings are determined for all responding devices for each DR event.

3.4.1 Calculation of Demand Reductions

The Evaluator calculated the following metrics to assess DR program's demand reduction capabilities in each service territory.

The first metric was the subgroup kW factor $\Delta kW_g^{[OBJ]}$, which represents $g^{[OBJ]}$'s per-device load reduction capability. For DPs that were $\Delta kW_g^{[OBJ]}$ was taken to be the $^{[OBJ]}$.

The second metric was the season verified demand reduction, VDR, which was equal to:

$$VDR = \sum_g \Delta kW_g \cdot N_g \cdot (1 - p_{NRD,g})$$

Equation 4

Where $N_g \cdot (1 - p_{NRD,g})$ represent the number of responding devices in subgroup g ($p_{NRD,g}$ is the average proportion of NRD). In this report, only the end-of-line demand reductions are reported, and line losses are not included in the computation of the demand reduction achieved.

3.4.2 Calculation of Demand Response Event Energy Savings

Although intended primarily as a peak management resource, the DR program also can achieve energy savings because the cooling loads shifted by the DR events do not always end up being as large as they would have been in the absence of an event. Often, even when cooling-demand is shifted to later in the day by a DR event (the so-called “snapback”), the home still ends up using less energy overall because of the event.

The net per-device difference in energy consumption (relative to a control group baseline) for a subgroup g during event e is referred to as the subgroup-event kWh factor ($\Delta kWh_g(e)$). The program-level DR event energy savings (ΔkWh) were calculated as the sum of the subgroup-event kWh factors across all subgroups, and all events, multiplied by the number of responding devices, using Equation 5.

$$\Delta kWh = \sum_g \sum_e [\Delta kWh_g(e) \cdot N_g \cdot (1 - p_{NRD,g})]$$

Equation 5

As with demand reductions, line losses are not factored into this calculation.

3.4.3 Aggregating Subgroup Loads

The individual time series of household demand were aggregated by subgroup, after removing premises with suspected NRDs according to the method described in Section 3.2. The aggregated subgroup time series by $\overline{L}_g(t)$ was denoted where t is the time index (where time is discretized

into 15-minute intervals, per the smart meter's default time resolution).

Aggregation is useful because it smooths out the temporal noise that is present in individual time series. Moreover, even though household demand tends to vary widely from home to home, due to the large size of the samples, $\overline{L}_g(t)$, as an estimate of subgroup average household demand, is virtually error-free by the central limit theorem,¹⁶ especially since the sample sizes approach the population sizes. These aggregated subgroup load shapes are depicted graphically in Chapter 4.

3.4.4 Estimating Baseline Loads

3.4.4.1 Thermostat Demand Response

For each thermostat device subgroup, a control group was created to serve as a point of comparison, or a baseline, during DR event days.

Meter data for over 79,000 randomly chosen single family control homes and over 12,000 randomly chosen multifamily control homes was obtained through NV Energy's DRMS system. For each treatment premise p , the total WL_p was matched to the WL 's from at least five control premises using an increasing pseudo-clustering¹⁷ circle that expands until several control premises are matched. This control subgroup was then matched one-to-one to each treatment premise using random sampling. The matched control premise was then removed from the base group, and the process was repeated for each treatment premise.

The control matching process was designed to select, for each treatment premise, the handful of homes in the non-DR control groups that match its consumption patterns as closely as possible. The resulting matched control group was a significantly better fit to the treatment group than a random sample of control premises.

As with the subgroup loads, once the control groups were selected, they were aggregated to form the subgroup control time series, which is denoted by $\overline{L}_g^c(t)$.

Throughout Chapter 4, example load shapes of the control group are plotted alongside the load shape from each subgroup to provide a visual comparison. Additionally, in Appendix C: Non-

¹⁶ Which states that the imprecision in the point estimate of a mean, based off a sample, goes to zero on the order of $O(1/\sqrt{n})$, where n is the sample size.

¹⁷ A pseudo-clustering circle is a term we use to describe the custom process developed to perform this matching step. It is a combination of Euclidean distance calculations, hierarchical clustering, and a binary search technique using ordered data. Wikipedia actually provides useful descriptions of these techniques.

https://en.wikipedia.org/wiki/Euclidean_distance

https://en.wikipedia.org/wiki/Cluster_analysis

https://en.wikipedia.org/wiki/Binary_search_algorithm

Traditional clustering algorithms are designed to group all data in one big step but because we were seeking to match each premise in the treatment group to a single control group home out of over 91,000 homes, for each DR event, this process took days to complete. This custom algorithm takes seconds versus days to perform the matching step, saving NV Energy significant M&V costs.

Event Day Control Group Fits, a series of illustrations depicting the load shapes of the treatment and matched control groups during DR season non-event days are presented.

3.4.4.2 Non-Thermostat Demand Response

The baseline load for non-thermostat DPs was calculated by comparing the event day consumption with the average consumption over the previous 7 non-holiday weekdays—for weekday events, or the previous 7 weekends and holidays in the case of a weekend or holiday event (Equation 6).

$$WL_p(d1, d7) = \text{total usage at premise } p \text{ from day } d1 \text{ to } d7,$$

Equation 6

where d = Monday, ..., Friday with event days excluded for both groups of homes.

3.4.5 Event-Day Adjustment of the Control Group Load

Even with the matched control groups, there may be a consistent difference between $\overline{L}_g(t)$ and $\overline{L}_g^c(t)$, which would bias the DR load impacts if one were to simply take the difference of the two. To account for these differences, an event-day adjustment was made to the control group load:¹⁸

$$\overline{L}_g^c(t) \rightarrow \overline{L}_g^c(t) \cdot \alpha_g(t),$$

Equation 7

where t lies within the event period. For all device groups, $\alpha_g(t) = \frac{\overline{L}_g(t_{pre})}{\overline{L}_g^c(t_{pre})}$ was calculated as the ratio of the average treatment group load and the average control group load during the hour prior to the event. In previous program years, pre-cooling was employed for DP11, DP12, DP46, and DP47. However, no DPs experienced pre-cooling in 2025.

The event-day adjusted load shapes are plotted in figures throughout Chapter 4 alongside the aggregated subgroup loads and the estimated baseline loads from the control group to provide a visual comparison.

3.4.6 Calculation of Demand and Energy Factors

Let t denote a time interval during an event e . At the most basic level, the difference of $\overline{L}_g(t)$ and $\overline{L}_g^c(t) \cdot \alpha_g(t)$ was taken to produce the load difference:

¹⁸ Event day control load adjustments were not made to the water heater DP or the battery storage DP.

$$\Delta_g(t) = \overline{L}_g^c(t) \cdot \alpha_g(t) - \overline{L}_g(t).$$

Equation 8

Subgroups were curtailed for roughly one to two hours in both the NPC and SPPC service territories. For thermostat devices, it took approximately another two hours to restore the pre-event indoor temperatures. This post-event period is called the “snapback” period because usage within the treatment group will rapidly shoot up and past the control group after the end of an event, implying negative savings for that period.

For each event e , and subgroup g , the average $\Delta_g(t)$ for each of these three to four^{19,20} event periods was calculated. These averaged load difference denoted by $\overline{\Delta}_g(e, h)$, where h refers the event period (which usually includes one to two curtailment periods and two snapback hours).

For each thermostat subgroup g and event e , the subgroup-event kW and kWh factors were calculated. The subgroup-event kW factor was defined as:

$$\Delta kW_g(e) = \frac{1}{\rho_g} \cdot \left(\max_h \{ \overline{\Delta}_g(e, h) \} \right),$$

Equation 9

that is, the larger of the first or second average load reductions in the curtailment period was normalized by the sample device-to-premise ratio ρ_g :

$$\rho_g = \frac{\# \text{ of } g \text{ devices represented in sample}}{\# \text{ of } g \text{ premises in sample}}$$

Equation 10

which normalized the load differences to a per-device value. Non-thermostat DPs were evaluated at the premise level and therefore did not need to be normalized. Table 3-2 lists the thermostat device-to-premise ratios based on the device counts at the end of the program year.

²⁰ Pool pump and battery storage DPs did not have a two hour “snapback” period as neither DP regulates temperature. For these DPs, only the 2-hour event window was used for the analysis.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 3-2: Thermostat Device-to-Premise Ratios December 31, 2025*

Service Territory	Subgroup	Devices	Premises	Ratio
NPC	DP1.RM	4,195	4,156	1.009
	DP1.RS	19,865	13,997	1.419
	DP11.RM	225	211	1.066
	DP11.RS	9,388	5,960	1.575
	DP23.RM	6,181	5,717	1.081
	DP23.RS	61,838	38,491	1.607
	DP47.RM	304	290	1.048
	DP47.RS	5,226	3,321	1.574
	DP49.RM	889	879	1.011
	DP49.RS	9,264	9,110	1.017
	DP51.RM	2,983	2,941	1.014
	DP51.RS	17,703	17,489	1.012
SPPC	DP12.D1	1,481	1,219	1.215
	DP12.DM1	30	30	1.000
	DP24.D1	8,496	6,835	1.243
	DP24.DM1	654	626	1.045
	DP46.D1	1,313	1,085	1.210
	DP46.DM1	60	58	1.034
	DP48.D1	3,154	3,112	1.013
	DP48.DM1	148	146	1.014
	DP50.D1	4,740	4,687	1.011
	DP50.DM1	459	451	1.018

The subgroup-event kWh factor was defined as:

$$\Delta kWh_g(e) = \frac{1}{\rho_g} \cdot \left(\sum_h \overline{\Delta}_g(e, h) \right),$$

Equation 11

where the sum was over all event periods h (including snapback).

3.4.7 Calculation of Energy Optimization Impacts

In addition to its role as a DR asset for NV Energy, the PowerShift and BYOT components include an energy-optimization service that provides users year-round energy savings through fine-tuned control of the HVAC system that also learns residents' preferences and behaviors.

The Evaluator determined the electricity savings resulting from the energy optimization service by using a deemed value derived from a regression based analysis of the energy optimization savings from the 2019 and 2021-2025 program participants in the NPC and SPPC service territories.

Please see Appendix A, Section 7.1: Annual Energy Savings Deemed Value Summary and Background Overview for a more detailed explanation of the methodology used to derive the deemed values.

4 M&V RESULTS

This chapter reports demand reduction and energy savings results for both the NPC and SPPC service territories. Results are reported for each component (Cool Share, PowerShift, BYOT, and Non-Thermostat DR) for both the Manage and Build program participants. The Evaluator also provides the kW factors ($\Delta kW_g(e)$) and kWh factors ($\Delta kWh_g(e)$) for each device type as well as the subgroup-event VDR and net energy savings for each event broken out into the Manage and Build program participants.

4.1 Residential Event Schedules

The following tables present the scheduling of the residential event phases in each service territory. To display this information in a compact format, the start time of the first phase is shown, followed by the offset, in minutes, of the following phases. For example, on June 9, 2025, Phase 1 began at 13:00, the second phase began at 19:00 (13:00 plus 360 minutes), the third phase began at 19:20 (19:00 plus 20 minutes), and so on.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-1: 2025 NPC Service Territory Residential Event Schedules*

Date	First Phase	Phase Offsets in Minutes²¹
9-Jun	13:00	360+20+20+20
10-Jun	13:00	360+20+20+20
18-Jun	13:00	300+20+20+20
19-Jun	13:00	300+20+20+20
30-Jun	13:00	360+20+20+20
1-Jul	13:00	360 (Non-Thermostats only)
9-Jul	13:00	360+20+20+20
10-Jul	13:00	360+20+20+20
11-Jul	13:00	360+20+20+20
13-Jul	13:00	360+20+20+20
14-Jul	13:00	360+20+20+20
15-Jul	13:00	360+20+20+20
28-Jul	13:00	360+20+20+20
29-Jul	13:00	360+20+20+20
31-Jul	13:00	360+20+20+20
1-Aug	13:00	360+20+20+20
4-Aug	13:00	360+20+20+20
6-Aug	13:00	360+20+20+20
7-Aug	13:00	360+20+20+20
8-Aug	13:00	360+20+20+20
11-Aug	13:00	360+20+20+20
12-Aug	13:00	360+20+20+20
13-Aug	13:00	360+20+20+20
21-Aug	13:00	360+20+20+20
22-Aug	13:00	360+20+20+20

²¹ The non-thermostat devices DR time often started well before the thermostat phases which is why the first phase offset is so large.

Table 4-2: 2025 SPPC Service Territory Residential Event Schedules.

Date	First Phase	Phase Offsets in Minutes
9-Jun	16:00	60+60
10-Jun	16:00	60+60
18-Jun	16:00	60+60
13-Jul	16:00	60+120
14-Jul	16:00	60+120
15-Jul	16:00	60+120
11-Aug	16:00	60+60
12-Aug	16:00	60+60
13-Aug	16:00	60+60
21-Aug	16:00	60+60
22-Aug	16:00	60+60

4.2 Interpreting Event Performance Tables

The following sections contain tables that detailing the performance of each residential DP during the 2025 DR event. The following columns are included in the event performance tables:

- *Date* – The date of each DR event.
- *Event1* – The aggregated (weighted by the device counts in each phase) kW reduction during the first event period.²²
- *Event2* – The aggregated (weighted by the device counts in each phase) kW reduction during the second event period.
- *Snap1* – The aggregated (weighted by the device counts in each phase) kW reduction during the first snapback hour. These values are commonly negative (i.e., no reduction) because HVAC systems are cooling spaces that warmed during the DR event and therefore kW consumption is increased during this period.
- *Snap2* – The aggregated (weighted by the device counts in each phase) kW reduction during the second snapback hour. These values are commonly negative (i.e., no reduction) because HVAC systems are cooling spaces that warmed during the DR event and therefore kW consumption is increased during this period.
- *kW Factor* – ΔkW_g i.e., the maximal load reduction among all disaggregated phases.
- *kWh Factor* – The subgroup-event kWh factor ($\Delta kWh_g(e)$), i.e., net per-device difference in energy consumption (relative to a control group baseline) for a subgroup g during event e for event and snapback hours. These values can be negative if snapback energy consumption is too high to be offset by event energy savings.

²² The first event period was always 1 hour long.

- *kW Factor Phase* – The number of the phase from which the kW Factor (ΔkW_g) was derived.
- *Available Devices* – The number of devices that were installed at the time of each DR event.
- *Percent NRD* – The percentage of devices in the analysis sample that were classified as non-responding.
- *Responding Devices* – The number of devices considered to be responding during the event ($\text{Available Devices} * (1 - \text{Percent NRD})$). Because the Percent NRD is calculated from the analysis sample and then extrapolated to Available Devices (the actual number of devices installed is typically slightly greater than the number of devices in the analysis sample because meter data for all devices is not always available), it is possible for the Responding device count to be a non-integer. Non-integer values are rounded accordingly.
- *VDR (kW)* – The Verified Demand Reduction (Equation 9) for each event. This value is calculated with rounded variables.
- *Energy Savings (kWh)* – The Energy Savings (Equation 11) for each event. Negative energy savings can result in accordance with a negative kWh Factor if snapback energy consumption is too high to be offset by event energy savings.

4.3 NPC Cool Share Results

DP1.RS and DP1.RM are comprised of Carrier two-way PCTs. DP1 is controlled with the DRMS, which interfaces with Carrier's own Comfort Choice Manager ("CCM") server, which in turn sends the control signals to the individual PCTs (via local cellular paging towers), and records data emitted from the PCTs (such as timestamps for manual overrides).

The curtailment strategy for DP1 devices was to initiate an immediate four-degree increase of the thermostat's set point. For example, if the PCT is normally scheduled to maintain indoor temperature at 75 degrees, it will increase to 79 degrees during a DR event. The four-degree offset was maintained for the given schedule for the entire duration of the event.²³

Because of its large size, DP1 was divided into 16 "DRMS zones" of around 1,000-4,000 devices each. DRMS zones are based on geography. During multi-phased events, not all DRMS zones are curtailed at the same time, thus the results reported in this section were weighted averages of the individual phases' results, weighted per their respective sizes.

²³ For example, at a normal schedule of 75° F, Carrier will apply a set point of 79° F. If the schedule then changes to 72° F, perhaps if the user returns home from work, then Carrier will apply 76° F.

4.3.1 NPC Carrier Residential Thermostats (DP1.RS)

4.3.1.1 NPC DP1.RS Event Load Shape

Figure 4-1 shows the typical curtailment pattern for DP1.RS, as illustrated by the event day load on June 19, 2025. In addition to the Treatment and Baseline curves, the figure also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 19:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is the area above the Normalized Baseline curve and below the Treatment curve, starting just after 20:00.

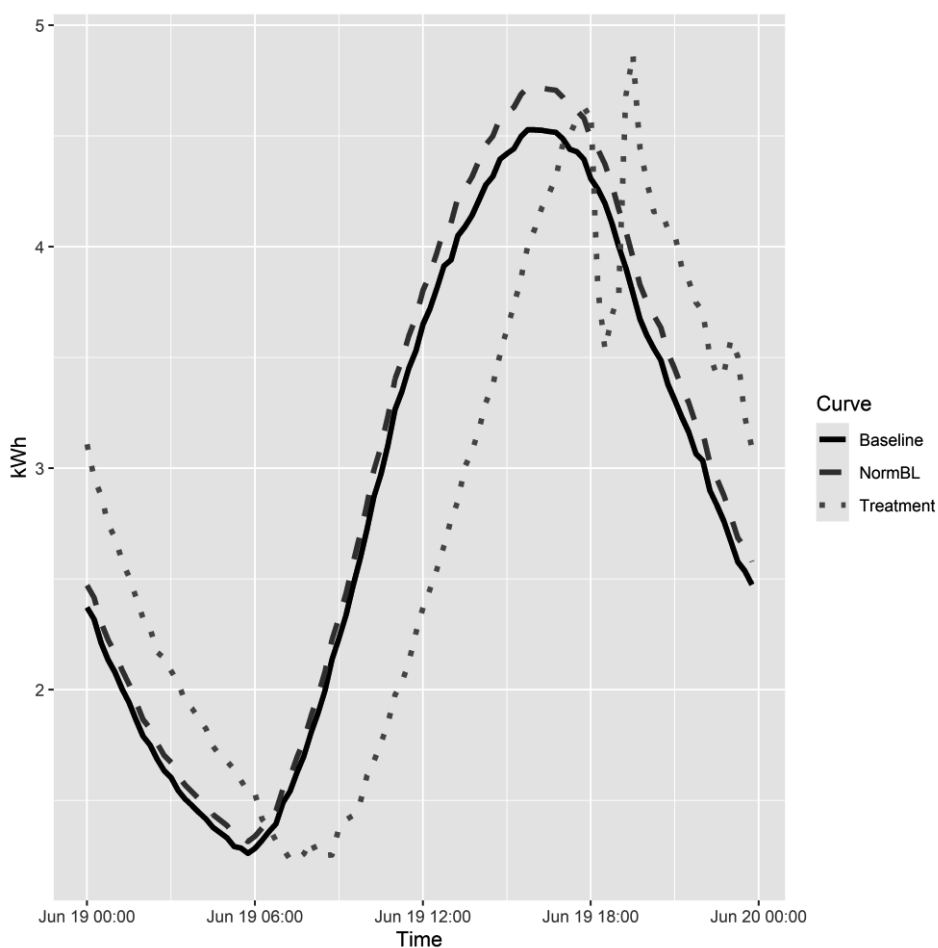


Figure 4-1: NPC DP1.RS Phase 4 Load Shape June 19, 2025

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**4.3.1.2 NPC DP1.RS Demand Reduction Results**Table 4-3: NPC DP1.RS Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.54	0.00	-0.15	-0.06	0.34	0.54	4
6/10/2025	0.56	0.00	-0.16	-0.08	0.31	0.56	4
6/18/2025	0.62	0.00	-0.18	-0.12	0.32	0.62	4
6/19/2025	0.58	0.00	-0.19	-0.12	0.27	0.58	4
6/30/2025	0.56	0.00	-0.18	-0.10	0.29	0.56	4
7/9/2025	0.61	0.00	-0.16	-0.09	0.36	0.61	4
7/10/2025	0.54	0.00	-0.17	-0.09	0.28	0.54	4
7/11/2025	0.55	0.00	-0.18	-0.11	0.26	0.55	4
7/13/2025	0.58	0.00	-0.15	-0.08	0.35	0.58	4
7/14/2025	0.58	0.00	-0.16	-0.11	0.33	0.58	4
7/15/2025	0.57	0.00	-0.16	-0.10	0.31	0.57	4
7/28/2025	0.50	0.00	-0.15	-0.06	0.30	0.50	4
7/29/2025	0.51	0.00	-0.16	-0.07	0.28	0.51	4
7/31/2025	0.49	0.00	-0.15	-0.06	0.28	0.49	4
8/1/2025	0.49	0.00	-0.17	-0.08	0.24	0.49	4
8/4/2025	0.48	0.00	-0.15	-0.06	0.27	0.48	4
8/6/2025	0.53	0.00	-0.16	-0.07	0.31	0.53	4
8/7/2025	0.54	0.00	-0.16	-0.07	0.31	0.54	4
8/8/2025	0.57	0.00	-0.13	-0.07	0.37	0.57	4
8/11/2025	0.54	0.00	-0.15	-0.08	0.30	0.54	4
8/12/2025	0.56	0.00	-0.15	-0.11	0.30	0.56	4
8/13/2025	0.54	0.00	-0.15	-0.09	0.30	0.54	4
8/21/2025	0.56	0.00	-0.15	-0.10	0.32	0.56	4
8/22/2025	0.53	0.00	-0.14	-0.05	0.34	0.53	4

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***4.3.1.3 NPC DPI.RS VDR and Energy Savings***Table 4-4: NPC DPI.RS VDR and Energy Savings*

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	20,106	8	18,516	10,090	6,258
6/10/2025	20,102	8	18,519	10,280	5,685
6/18/2025	20,090	7	18,615	11,506	6,018
6/19/2025	20,083	9	18,287	10,590	4,861
6/30/2025	20,072	7	18,635	10,559	5,463
7/9/2025	20,068	7	18,747	11,408	6,784
7/10/2025	20,067	7	18,740	10,226	5,320
7/11/2025	20,062	6	18,767	10,272	4,957
7/13/2025	20,058	6	18,853	10,864	6,553
7/14/2025	20,058	6	18,785	11,033	6,137
7/15/2025	20,056	7	18,573	10,568	5,736
7/28/2025	20,045	8	18,451	9,296	5,551
7/29/2025	20,044	8	18,354	9,339	5,175
7/31/2025	20,042	9	18,326	9,040	5,177
8/1/2025	20,038	8	18,336	8,883	4,351
8/4/2025	20,020	10	18,031	8,589	4,860
8/6/2025	20,020	7	18,534	9,843	5,715
8/7/2025	20,014	7	18,525	9,888	5,658
8/8/2025	20,010	7	18,602	10,661	6,847
8/11/2025	20,015	6	18,859	10,074	5,644
8/12/2025	20,009	6	18,721	10,417	5,559
8/13/2025	20,013	7	18,665	10,129	5,664
8/21/2025	19,995	7	18,646	10,574	5,971
8/22/2025	19,994	9	18,152	9,574	6,108

4.3.2 NPC Carrier Residential Thermostats (DP1.RM)

4.3.2.1 NPC DP1.RM Event Load Shape

Figure 4-2 shows the typical curtailment pattern for DP1.RM, as illustrated by the event day load on July 29, 2025. In addition to the Treatment and Baseline curves, the figure also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 20:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is the area above the Normalized Baseline curve and below the Treatment curve, starting just after 21:00.

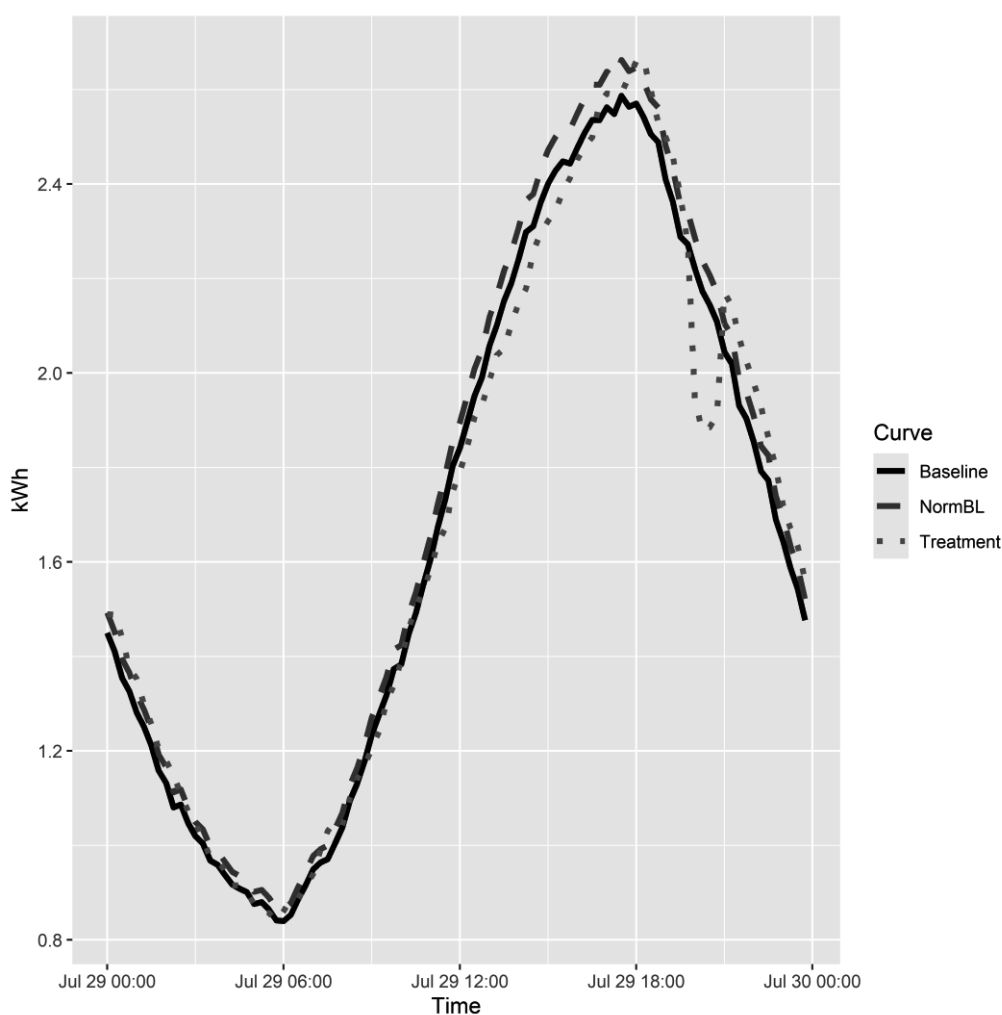


Figure 4-2: NPC DP1.RM Phase 4 Load Shape July 29, 2025

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**4.3.2.2 NPC DPI.RM Demand Reduction Results**Table 4-5: NPC DPI.RM Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.34	0.00	-0.02	-0.03	0.28	0.34	4
6/10/2025	0.33	0.00	0.00	-0.02	0.31	0.33	4
6/18/2025	0.36	0.00	-0.02	-0.06	0.28	0.36	4
6/19/2025	0.37	0.00	0.00	-0.04	0.33	0.37	4
6/30/2025	0.32	0.00	-0.01	-0.03	0.28	0.32	4
7/9/2025	0.34	0.00	-0.04	-0.06	0.24	0.34	4
7/10/2025	0.32	0.00	-0.02	-0.06	0.23	0.32	4
7/11/2025	0.32	0.00	-0.08	-0.09	0.16	0.32	4
7/13/2025	0.36	0.00	0.02	0.00	0.38	0.36	4
7/14/2025	0.32	0.00	0.00	-0.01	0.32	0.32	4
7/15/2025	0.34	0.00	-0.02	-0.03	0.29	0.34	4
7/28/2025	0.32	0.00	-0.03	0.00	0.29	0.32	4
7/29/2025	0.33	0.00	-0.07	-0.07	0.18	0.33	4
7/31/2025	0.33	0.00	0.00	-0.02	0.31	0.33	4
8/1/2025	0.30	0.00	0.00	0.01	0.31	0.30	4
8/4/2025	0.35	0.00	0.05	0.04	0.44	0.35	4
8/6/2025	0.33	0.00	0.00	-0.01	0.32	0.33	4
8/7/2025	0.29	0.00	0.01	-0.01	0.29	0.29	4
8/8/2025	0.31	0.00	0.02	-0.02	0.31	0.31	4
8/11/2025	0.34	0.00	0.00	0.01	0.35	0.34	4
8/12/2025	0.34	0.00	-0.01	-0.01	0.31	0.34	4
8/13/2025	0.31	0.00	0.00	-0.01	0.30	0.31	4
8/21/2025	0.31	0.00	0.00	-0.02	0.28	0.31	4
8/22/2025	0.35	0.00	0.03	-0.02	0.36	0.35	4

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

4.3.2.3 NPC DP1.RM VDR and Energy Savings

Table 4-6: NPC DP1.RM VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	5,199	9	4,724	4,356	2,322
6/10/2025	5,192	9	4,717	4,510	2,851
6/18/2025	5,208	9	4,753	5,071	2,664
6/19/2025	5,208	8	4,774	5,028	3,538
6/30/2025	5,207	9	4,763	4,877	2,982
7/9/2025	5,169	8	4,744	4,958	3,311
7/10/2025	5,170	8	4,761	4,894	3,056
7/11/2025	5,171	8	4,777	4,743	2,716
7/13/2025	5,178	7	4,833	4,697	2,345
7/14/2025	5,176	7	4,823	4,837	2,933
7/15/2025	5,176	8	4,776	4,474	1,903
7/28/2025	5,177	9	4,727	4,341	1,877
7/29/2025	5,183	8	4,755	4,284	1,978
7/31/2025	5,183	9	4,724	4,120	2,043
8/1/2025	5,182	8	4,761	4,219	2,025
8/4/2025	5,173	9	4,687	4,016	2,097
8/6/2025	5,165	8	4,768	4,415	2,086
8/7/2025	5,163	8	4,743	4,558	2,419
8/8/2025	5,168	8	4,757	4,418	1,860
8/11/2025	5,159	7	4,776	4,480	1,978
8/12/2025	5,161	7	4,783	4,641	2,257
8/13/2025	5,159	8	4,749	4,415	2,071
8/21/2025	5,156	8	4,766	4,521	1,839
8/22/2025	5,160	9	4,714	3,842	1,295

4.3.3 NPC Cool Share Overrides

In the following section, the Evaluator provides statistics on Cool Share customer overrides during the 2025 DR season.

4.3.3.1 NPC Carrier Thermostat Overrides (DP1)

Cool Share customers with Carrier thermostats have the option of overriding the DR event set-point during events. This can be done with the physical thermostat or over the internet. When a customer override the DR event, the time of override is recorded and sent to the Carrier CCM server. Table 4-7 provides the override rates for DP1, by event, with the median time to override. On average, 0.25 percent of DP1.RS thermostats and 0.14 percent of DP1.RM thermostats were manually overridden during the 2025 DR events. As in program years 2021-2024, the percentage

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

of reported overrides continued to be low due to changes in override data collection on the part of the manufacturer. The average event median time-to-override was 34 minutes for DP1.RS thermostats and 33 minutes for DP1.RM thermostats. These values are both lower than the average event median times-to-override in 2024, which were 54 and 41 minutes respectively.

Table 4-7: NPC Override Rates for DP1

Date	Event High Temperature (° F)	DP1.RS Participants Overriding	DP1.RS Median Time before Override (in Minutes)	DP1.RM Participants Overriding	DP1.RM Median Time before Override (in Minutes)
6/9/2025	106	0.26%	29	0.15%	39
6/10/2025	108	0.30%	34	0.13%	39
6/18/2025	108	0.31%	38	0.13%	34
6/19/2025	107	0.23%	39	0.12%	35
6/30/2025	108	0.26%	25	0.07%	37
7/9/2025	110	0.26%	36	0.16%	30
7/10/2025	108	0.27%	31	0.17%	33
7/11/2025	108	0.26%	31	0.19%	25
7/13/2025	110	0.24%	37	0.10%	50
7/14/2025	111	0.25%	40	0.18%	38
7/15/2025	109	0.30%	40	0.17%	20
7/28/2025	105	0.24%	35	0.19%	25
7/29/2025	105	0.24%	35	0.12%	28
7/31/2025	104	0.23%	32	0.16%	38
8/1/2025	105	0.19%	40	0.12%	25
8/4/2025	102	0.20%	32	0.08%	38
8/6/2025	107	0.23%	39	0.21%	33
8/7/2025	107	0.27%	29	0.13%	38
8/8/2025	108	0.22%	30	0.16%	14
8/11/2025	108	0.27%	39	0.10%	53
8/13/2025	110	0.30%	30	0.06%	28
8/21/2025	110	0.27%	31	0.19%	29
8/22/2025	104	0.22%	30	0.08%	38
Average	107	0.25%	34	0.14%	33

4.3.4 Component-Level Summaries for NPC Cool Share

This section summarizes results from the previous sections to provide component-level VDR and energy savings for all Cool Share devices.

Program-Event VDR is the sum of the VDRs across all Cool Share DPs on the given event day. Similarly, Component-Event Energy Savings was the sum of the Energy Savings across all Cool Share DPs on the given event day.

Table 4-8: Component-Level Energy Impacts for NPC Cool Share

Date	Program-Event VDR (kW)	Program-Event Energy Savings (kWh)
6/9/2025	14,446	8,580
6/10/2025	14,790	8,536
6/18/2025	16,577	8,682
6/19/2025	15,617	8,398
6/30/2025	15,435	8,445
7/9/2025	16,366	10,095
7/10/2025	15,120	8,376
7/11/2025	15,015	7,673
7/13/2025	15,562	8,899
7/14/2025	15,871	9,070
7/15/2025	15,042	7,638
7/28/2025	13,638	7,428
7/29/2025	13,624	7,154
7/31/2025	13,160	7,220
8/1/2025	13,103	6,377
8/4/2025	12,605	6,958
8/6/2025	14,258	7,801
8/7/2025	14,446	8,077
8/8/2025	15,079	8,707
8/11/2025	14,554	7,622
8/12/2025	15,058	7,815
8/13/2025	14,544	7,735
8/21/2025	15,094	7,810
8/22/2025	13,416	7,403

4.4 NPC PowerShift Results

This section presents demand reduction and energy savings results for the PowerShift Build and Manage components in the NPC service territory. The device populations evaluated included EcoFactor smart PCTs (DP11), ecobee Wi-Fi thermostats (DP23), and EcoFactor s100 Wi-Fi thermostats (DP47). The kW factors ($\Delta kW_g(e)$) and kWh factors ($\Delta kWh_g(e)$) are also reported for each device type. The subgroup-event VDR and net energy savings for each event are broken out into the Manage and Build program participants.

4.4.1 NPC PowerShift Results for Single-Family Homes

4.4.1.1 NPC EcoFactor Smart Thermostats (DP11.RS)

NPC DP11.RS Event Load Shapes

Figure 4-3 shows the typical curtailment pattern for DP11.RS, as illustrated by the event day load on June 30, 2025. In addition to the Treatment and Baseline curves, Figure 4-3 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 19:20, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:20.

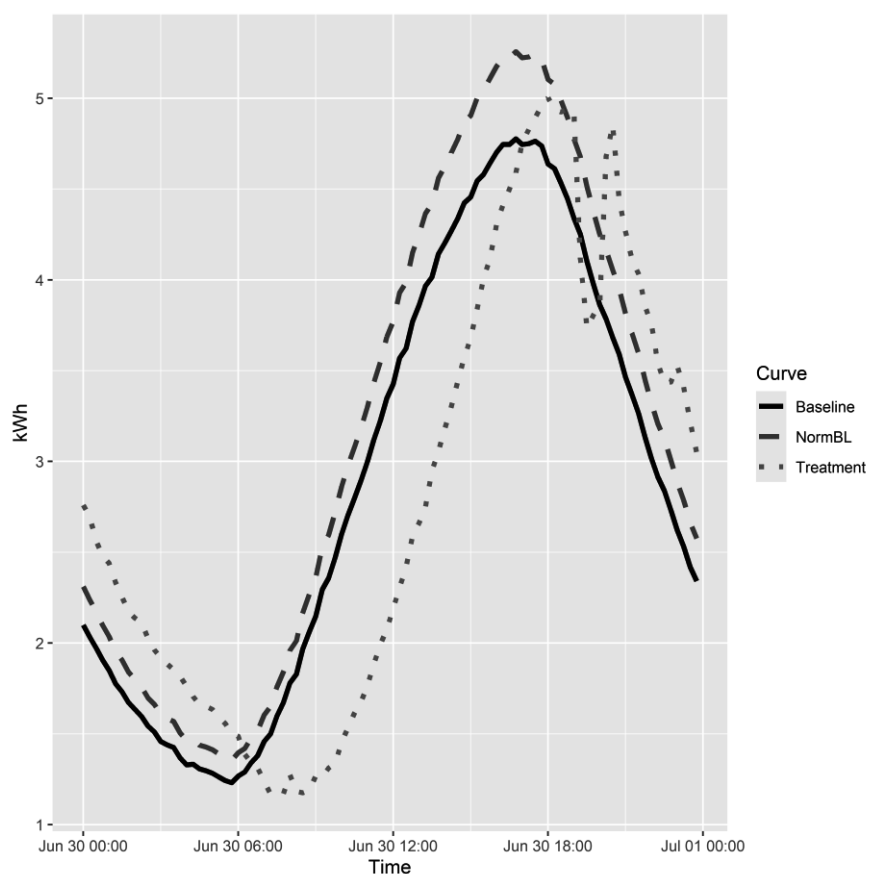


Figure 4-3: NPC DP11.RS Phase 2 Load Shape June 30, 2025

Table 4-9 details the demand reduction results by event period for the DP11 devices installed in single family homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP11.RS Manage and Build Demand Reduction Results***Table 4-9: NPC DP11.RS Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.36	0.00	-0.29	-0.23	-0.17	0.36	2
6/10/2025	0.33	0.00	-0.35	-0.26	-0.27	0.33	2
6/18/2025	0.43	0.00	-0.42	-0.35	-0.34	0.43	2
6/19/2025	0.38	0.00	-0.44	-0.35	-0.40	0.38	2
6/30/2025	0.36	0.00	-0.37	-0.25	-0.25	0.36	2
7/9/2025	0.38	0.00	-0.32	-0.25	-0.19	0.38	2
7/10/2025	0.36	0.00	-0.35	-0.27	-0.26	0.36	2
7/11/2025	0.39	0.00	-0.33	-0.24	-0.18	0.39	2
7/13/2025	0.40	0.00	-0.34	-0.25	-0.18	0.40	2
7/14/2025	0.39	0.00	-0.31	-0.24	-0.16	0.39	2
7/15/2025	0.36	0.00	-0.33	-0.25	-0.21	0.36	2
7/28/2025	0.30	0.00	-0.32	-0.24	-0.26	0.30	2
7/29/2025	0.30	0.00	-0.32	-0.24	-0.26	0.30	2
7/31/2025	0.27	0.00	-0.32	-0.23	-0.29	0.27	2
8/1/2025	0.32	0.00	-0.33	-0.23	-0.25	0.32	2
8/4/2025	0.28	0.00	-0.29	-0.21	-0.22	0.28	2
8/6/2025	0.35	0.00	-0.28	-0.20	-0.13	0.35	2
8/7/2025	0.35	0.00	-0.28	-0.18	-0.11	0.35	2
8/8/2025	0.36	0.00	-0.33	-0.23	-0.20	0.36	2
8/11/2025	0.35	0.00	-0.31	-0.23	-0.19	0.35	2
8/12/2025	0.37	0.00	-0.30	-0.23	-0.16	0.37	2
8/13/2025	0.33	0.00	-0.29	-0.21	-0.16	0.33	2
8/21/2025	0.42	0.00	-0.27	-0.19	-0.05	0.42	2
8/22/2025	0.37	0.00	-0.21	-0.15	0.01	0.37	2

NPC DP11.RS Manage VDR and Energy Savings

Table 4-10 details VDR and energy savings by event for DP11 devices installed in single family homes from the Manage population.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-10: NPC DP11.RS Manage VDR and Energy Savings*

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	14,270	5	13,568	4,869	-2,264
6/10/2025	14,235	6	13,408	4,454	-3,684
6/18/2025	14,007	6	13,122	5,638	-4,505
6/19/2025	13,980	7	13,003	4,943	-5,255
6/30/2025	13,702	5	13,079	4,712	-3,301
7/9/2025	13,545	4	12,940	4,920	-2,467
7/10/2025	13,533	5	12,916	4,685	-3,320
7/11/2025	13,514	4	12,919	4,965	-2,342
7/13/2025	13,480	4	12,974	5,243	-2,363
7/14/2025	13,479	3	13,009	5,094	-2,066
7/15/2025	13,455	4	12,856	4,648	-2,721
7/28/2025	13,250	5	12,571	3,726	-3,238
7/29/2025	13,236	5	12,518	3,752	-3,283
7/31/2025	13,197	5	12,475	3,388	-3,557
8/1/2025	13,171	5	12,482	3,917	-3,071
8/4/2025	13,140	7	12,270	3,474	-2,652
8/6/2025	13,118	5	12,520	4,323	-1,614
8/7/2025	13,084	4	12,496	4,427	-1,314
8/8/2025	13,071	4	12,490	4,484	-2,480
8/11/2025	13,045	4	12,542	4,433	-2,412
8/12/2025	13,038	4	12,564	4,646	-2,068
8/13/2025	13,013	3	12,650	4,230	-2,063
8/21/2025	12,904	4	12,353	5,143	-610
8/22/2025	12,884	6	12,161	4,469	71

4.4.1.2 NPC Ecobee Wi-Fi Thermostats (DP23.RS)

The following section details results from the DP23 DR event performance during the 2025 season.

NPC DP23.RS Event Load Shapes

Figure 4-4 shows the typical curtailment pattern for DP23.RS, as illustrated by the event day load on August 7, 2025. Energy savings associated with the DR event, which began at 19:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00.

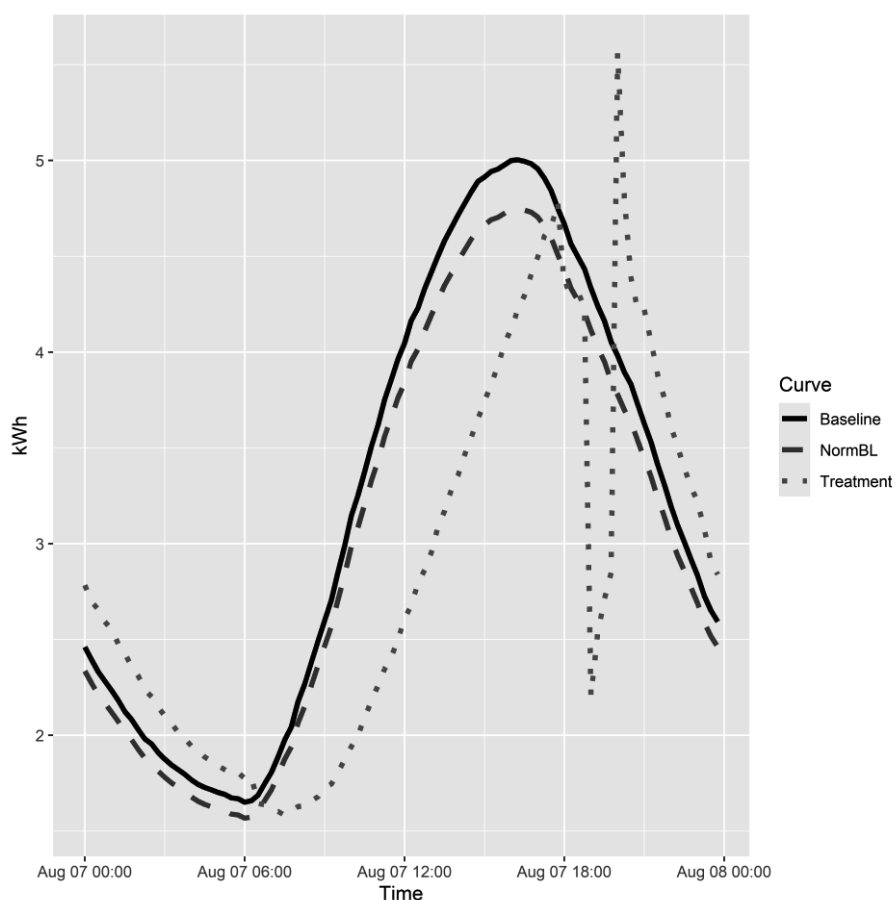


Figure 4-4: NPC DP23.RS Phase 1 Load Shape August 7, 2025

NPC DP23.RS Manage and Build Demand Reduction Results

Table 4-11 details the demand reduction results by event period for the DP23 devices installed in single family homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-11: NPC DP23.RS Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.87	0.00	-0.66	-0.42	-0.22	0.87	1
6/10/2025	0.88	0.00	-0.70	-0.46	-0.27	0.88	1
6/18/2025	1.15	0.00	-0.79	-0.47	-0.11	1.15	1
6/19/2025	1.10	0.00	-0.70	-0.41	-0.01	1.10	1
6/30/2025	0.96	0.00	-0.73	-0.47	-0.24	0.96	1
7/9/2025	0.97	0.00	-0.70	-0.46	-0.20	0.97	1
7/10/2025	0.93	0.00	-0.70	-0.47	-0.26	0.93	1
7/11/2025	0.95	0.00	-0.70	-0.46	-0.21	0.95	1
7/13/2025	1.09	0.00	-0.67	-0.36	0.06	1.09	1
7/14/2025	0.98	0.00	-0.68	-0.47	-0.18	0.98	1
7/15/2025	0.92	0.00	-0.70	-0.45	-0.24	0.92	1
7/28/2025	0.85	0.00	-0.70	-0.46	-0.31	0.85	1
7/29/2025	0.82	0.00	-0.70	-0.46	-0.34	0.82	1
7/31/2025	0.77	0.00	-0.69	-0.43	-0.35	0.77	1
8/1/2025	0.79	0.00	-0.69	-0.44	-0.34	0.79	1
8/4/2025	0.74	0.00	-0.65	-0.40	-0.31	0.74	1
8/6/2025	0.87	0.00	-0.67	-0.43	-0.23	0.87	1
8/7/2025	0.89	0.00	-0.67	-0.42	-0.20	0.89	1
8/8/2025	0.99	0.00	-0.67	-0.32	0.00	0.99	1
8/11/2025	1.03	0.00	-0.64	-0.34	0.04	1.03	1
8/12/2025	1.06	0.00	-0.63	-0.35	0.08	1.06	1
8/13/2025	1.01	0.00	-0.65	-0.34	0.01	1.01	1
8/21/2025	1.06	0.00	-0.64	-0.32	0.09	1.06	1
8/22/2025	0.89	0.00	-0.58	-0.24	0.07	0.89	1

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP23.RS Manage and Build VDR and Energy Savings**

Table 4-12 details VDR and energy savings by event for DP23 devices installed in single family homes from the Manage population.

Table 4-12: NPC DP23.RS Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	51,912	4	49,729	43,125	-10,895
6/10/2025	51,950	5	49,524	43,604	-13,576
6/18/2025	52,241	4	49,970	57,694	-5,592
6/19/2025	52,268	5	49,744	54,678	-652
6/30/2025	52,637	4	50,584	48,473	-12,106
7/9/2025	52,666	4	50,720	49,052	-10,040
7/10/2025	52,688	4	50,677	46,942	-12,990
7/11/2025	52,734	4	50,792	48,371	-10,720
7/13/2025	52,784	3	51,332	55,852	2,930
7/14/2025	52,772	3	51,299	50,108	-9,156
7/15/2025	52,779	3	50,957	46,946	-12,034
7/28/2025	52,978	4	50,751	43,167	-15,669
7/29/2025	53,003	4	50,647	41,320	-17,272
7/31/2025	53,062	4	50,787	38,993	-18,029
8/1/2025	53,098	4	50,850	40,069	-17,352
8/4/2025	53,083	5	50,547	37,245	-15,818
8/6/2025	53,040	4	51,091	44,227	-11,659
8/7/2025	53,049	3	51,255	45,704	-10,196
8/8/2025	53,076	4	51,209	50,881	-79
8/11/2025	53,080	3	51,495	52,903	2,238
8/12/2025	53,065	3	51,629	54,743	4,064
8/13/2025	53,055	3	51,411	51,996	523
8/21/2025	53,170	3	51,428	54,419	4,790
8/22/2025	53,216	4	51,103	45,256	3,708

Table 4-13 on the following page details VDR and energy savings by event for DP23 devices installed in single family homes from the Build population.

Table 4-13: NPC DP23.RS Build VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	2,394	4	2,293	1,991	-503
6/10/2025	2,407	5	2,295	2,020	-629
6/18/2025	2,473	4	2,366	2,730	-265
6/19/2025	2,488	5	2,368	2,601	-31
6/30/2025	2,590	4	2,489	2,382	-595
7/9/2025	2,670	4	2,571	2,485	-509
7/10/2025	2,684	4	2,582	2,390	-661
7/11/2025	2,704	4	2,605	2,478	-549
7/13/2025	2,729	3	2,654	2,884	151
7/14/2025	2,729	3	2,653	2,588	-473
7/15/2025	2,744	3	2,649	2,438	-625
7/28/2025	2,897	4	2,775	2,362	-857
7/29/2025	2,905	4	2,776	2,265	-947
7/31/2025	2,939	4	2,813	2,159	-998
8/1/2025	2,951	4	2,826	2,225	-964
8/4/2025	2,988	5	2,846	2,091	-888
8/6/2025	3,013	4	2,903	2,506	-661
8/7/2025	3,026	3	2,924	2,601	-580
8/8/2025	3,037	4	2,930	2,907	-5
8/11/2025	3,055	3	2,964	3,040	129
8/12/2025	3,059	3	2,976	3,157	234
8/13/2025	3,084	3	2,989	3,017	30
8/21/2025	3,173	3	3,069	3,239	285
8/22/2025	3,190	4	3,064	2,704	222

4.4.1.3 NPC EcoFactor s100 Wi-Fi Thermostats (DP47.RS)

The following section details results from the EcoFactor s100 (DP47) DR event performance during the 2025 season.

NPC DP47.RS Event Load Shapes

Figure 4-5 shows the typical curtailment pattern for DP47.RS, as illustrated by the event day load on July 13, 2025. In addition to the Treatment and Baseline curves, Figure 4-5 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 19:40, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve starting at approximately 20:40.

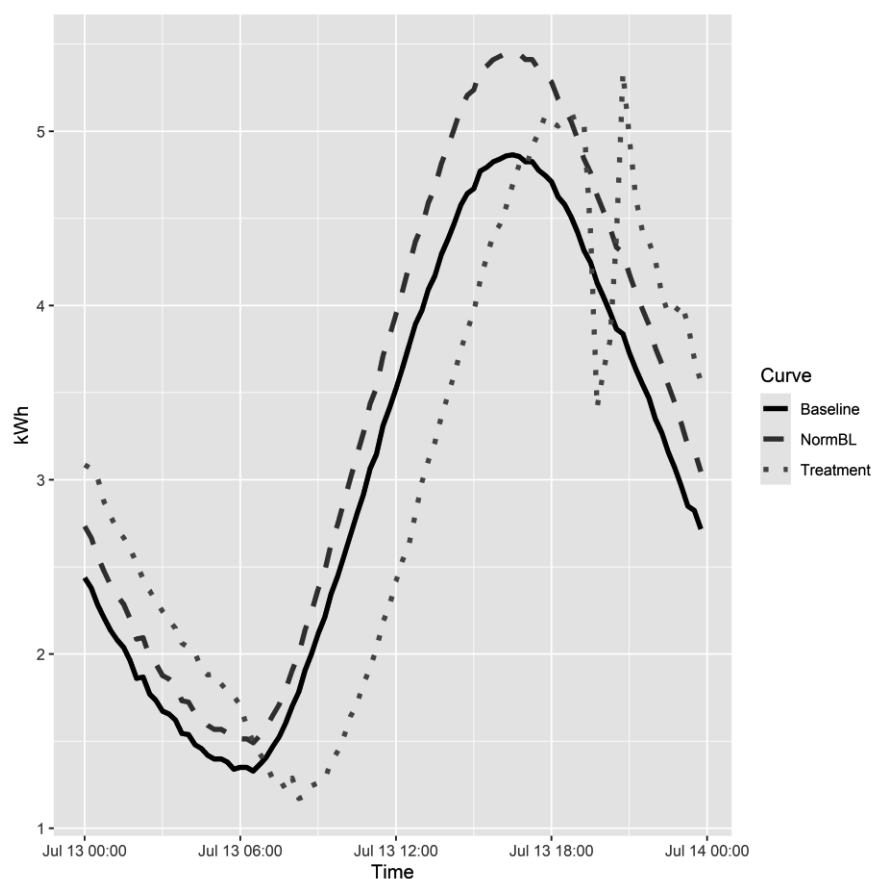


Figure 4-5: NPC DP47.RS Phase 3 Load Shape July 13, 2025

NPC DP47.RS Manage Demand Reduction Results

Table 4-14 details the demand reduction results by event period for the DP47 devices installed in single family homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-14: NPC DP47.RS Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.37	0.00	-0.43	-0.27	-0.33	0.37	3
6/10/2025	0.38	0.00	-0.42	-0.21	-0.26	0.38	3
6/18/2025	0.40	0.00	-0.52	-0.42	-0.53	0.40	3
6/19/2025	0.37	0.00	-0.51	-0.38	-0.53	0.37	3
6/30/2025	0.35	0.00	-0.44	-0.28	-0.37	0.35	3
7/9/2025	0.40	0.00	-0.39	-0.22	-0.22	0.40	3
7/10/2025	0.35	0.00	-0.45	-0.28	-0.38	0.35	3
7/11/2025	0.43	0.00	-0.40	-0.25	-0.21	0.43	3
7/13/2025	0.43	0.00	-0.44	-0.28	-0.30	0.43	3
7/14/2025	0.42	0.00	-0.41	-0.26	-0.25	0.42	3
7/15/2025	0.37	0.00	-0.39	-0.26	-0.29	0.37	3
7/28/2025	0.33	0.00	-0.39	-0.23	-0.30	0.33	3
7/29/2025	0.33	0.00	-0.37	-0.25	-0.28	0.33	3
7/31/2025	0.28	0.00	-0.39	-0.27	-0.37	0.28	3
8/1/2025	0.33	0.00	-0.36	-0.21	-0.23	0.33	3
8/4/2025	0.29	0.00	-0.33	-0.23	-0.28	0.29	3
8/6/2025	0.35	0.00	-0.33	-0.20	-0.18	0.35	3
8/7/2025	0.35	0.00	-0.37	-0.25	-0.27	0.35	3
8/8/2025	0.40	0.00	-0.33	-0.21	-0.14	0.40	3
8/11/2025	0.40	0.00	-0.37	-0.25	-0.23	0.40	3
8/12/2025	0.38	0.00	-0.40	-0.27	-0.30	0.38	3
8/13/2025	0.38	0.00	-0.35	-0.25	-0.23	0.38	3
8/21/2025	0.44	0.00	-0.34	-0.20	-0.10	0.44	3
8/22/2025	0.37	0.00	-0.29	-0.14	-0.06	0.37	3

NPC DP47.RS Manage VDR and Energy Savings

Table 4-15 details VDR and energy savings by event for DP47 devices installed in single family homes from the Manage population.

Table 4-15: NPC DP47.RS Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	9,720	5	9,283	3,431	-3,098
6/10/2025	9,695	4	9,260	3,476	-2,393
6/18/2025	9,493	5	9,028	3,616	-4,808
6/19/2025	9,466	5	8,973	3,281	-4,753
6/30/2025	9,170	4	8,801	3,098	-3,238
7/9/2025	9,032	4	8,689	3,431	-1,892
7/10/2025	9,019	4	8,657	3,016	-3,312
7/11/2025	8,984	4	8,644	3,712	-1,833
7/13/2025	8,946	3	8,635	3,705	-2,549
7/14/2025	8,945	3	8,661	3,632	-2,171
7/15/2025	8,936	4	8,567	3,114	-2,461
7/28/2025	8,732	4	8,355	2,726	-2,530
7/29/2025	8,719	5	8,306	2,705	-2,357
7/31/2025	8,662	4	8,273	2,339	-3,091
8/1/2025	8,649	4	8,282	2,782	-1,936
8/4/2025	8,623	5	8,182	2,361	-2,293
8/6/2025	8,613	4	8,261	2,903	-1,502
8/7/2025	8,588	4	8,243	2,848	-2,215
8/8/2025	8,578	4	8,248	3,307	-1,160
8/11/2025	8,555	3	8,268	3,277	-1,899
8/12/2025	8,541	3	8,247	3,136	-2,455
8/13/2025	8,523	3	8,308	3,127	-1,905
8/21/2025	8,429	4	8,133	3,552	-789
8/22/2025	8,400	5	7,986	2,952	-499

4.4.2 NPC PowerShift Results for Multifamily Homes

4.4.2.1 NPC EcoFactor Smart Thermostats (DP11.RM)

NPC DP11.RM Event Load Shapes

Figure 4-6 depicts a typical hourly load profile for DP11 devices installed in multifamily homes, illustrated by the August 21, 2025, demand response event. In addition to the Treatment and Baseline curves, Figure 4-6 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 19:20, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve starting at approximately 20:20.

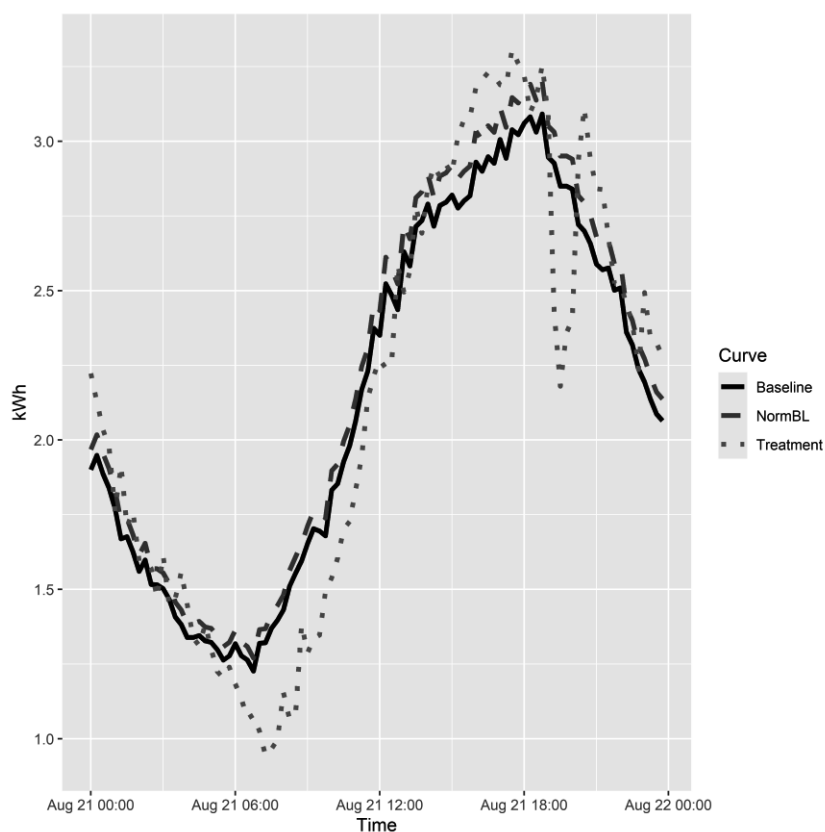


Figure 4-6: NPC DP11.RM Phase 2 Load Shape August 21, 2025

NPC DP11.RM Manage and Build Demand Reduction Results

Table 4-16 details the demand reduction results by event period for the DP11 devices installed in multifamily homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-16: NPC DP11.RM Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.71	0.00	0.07	0.20	0.97	0.71	2
6/10/2025	0.64	0.00	-0.09	0.08	0.63	0.64	2
6/18/2025	0.66	0.00	-0.15	-0.08	0.43	0.66	2
6/19/2025	0.56	0.00	-0.11	0.08	0.52	0.56	2
6/30/2025	0.66	0.00	-0.14	-0.09	0.43	0.66	2
7/9/2025	0.58	0.00	-0.15	-0.07	0.36	0.58	2
7/10/2025	0.53	0.00	-0.07	0.07	0.54	0.53	2
7/11/2025	0.65	0.00	-0.10	-0.07	0.46	0.65	2
7/13/2025	0.61	0.00	-0.20	-0.10	0.31	0.61	2
7/14/2025	0.54	0.00	-0.07	-0.04	0.44	0.54	2
7/15/2025	0.64	0.00	-0.16	-0.09	0.39	0.64	2
7/28/2025	0.48	0.00	-0.20	-0.09	0.18	0.48	2
7/29/2025	0.45	0.00	-0.07	0.14	0.53	0.45	2
7/31/2025	0.47	0.00	-0.12	0.00	0.35	0.47	2
8/1/2025	0.52	0.00	-0.12	0.04	0.43	0.52	2
8/4/2025	0.37	0.00	-0.25	-0.03	0.09	0.37	2
8/6/2025	0.55	0.00	-0.02	0.14	0.67	0.55	2
8/7/2025	0.62	0.00	-0.04	0.14	0.73	0.62	2
8/8/2025	0.55	0.00	-0.06	0.08	0.57	0.55	2
8/11/2025	0.59	0.00	0.03	0.17	0.78	0.59	2
8/12/2025	0.53	0.00	-0.15	-0.04	0.34	0.53	2
8/13/2025	0.49	0.00	-0.18	-0.10	0.20	0.49	2
8/21/2025	0.59	0.00	-0.19	-0.01	0.39	0.59	2
8/22/2025	0.54	0.00	-0.11	-0.06	0.37	0.54	2

NPC DP11.RM Manage VDR and Energy Savings

Table 4-17 details VDR and energy savings by event for DP11 devices installed in multifamily homes from the Manage population.

Table 4-17: NPC DP11.RM Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	372	10	337	240	327
6/10/2025	372	9	339	218	213
6/18/2025	370	9	337	222	144
6/19/2025	370	10	334	185	174
6/30/2025	365	8	336	221	144
7/9/2025	361	7	335	196	121
7/10/2025	361	7	336	181	181
7/11/2025	361	8	334	214	154
7/13/2025	360	8	332	202	103
7/14/2025	360	9	329	180	144
7/15/2025	359	10	322	206	126
7/28/2025	354	8	325	155	60
7/29/2025	354	9	322	146	172
7/31/2025	354	9	321	152	112
8/1/2025	354	9	322	165	139
8/4/2025	354	8	327	121	30
8/6/2025	352	7	326	181	220
8/7/2025	351	9	321	200	233
8/8/2025	351	11	314	171	180
8/11/2025	351	6	331	195	258
8/12/2025	351	7	328	173	111
8/13/2025	350	5	334	163	67
8/21/2025	348	9	318	187	125
8/22/2025	347	10	312	168	116

4.4.2.2 NPC ecobee Wi-Fi Thermostats (DP23.RM)

The following section details results from the DP23 DR event performance during the 2025 season.

NPC DP23.RM Event Load Shapes

Figure 4-7 shows the typical curtailment pattern for DP23.RM, as illustrated by the event day load on June 10, 2025. In addition to the Treatment and Baseline curves, Figure 4-7 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 19:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00.

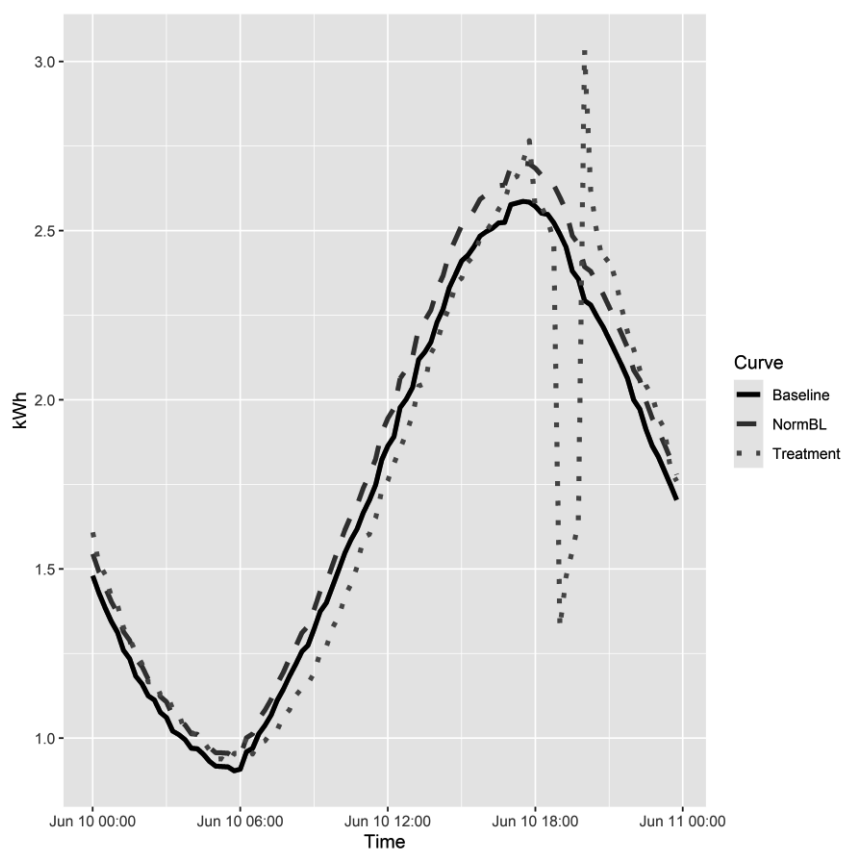


Figure 4-7: NPC DP23.RM Phase 1 Load Shape June 10, 2025

NPC DP23.RM Manage and Build Demand Reduction Results

Table 4-18 details the demand reduction results by event period for the DP23 devices installed in multifamily homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-18: NPC DP23.RM Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.92	0.00	-0.29	-0.15	0.49	0.92	1
6/10/2025	0.96	0.00	-0.26	-0.09	0.61	0.96	1
6/18/2025	1.07	0.00	-0.36	-0.14	0.56	1.07	1
6/19/2025	1.05	0.00	-0.24	-0.07	0.74	1.05	1
6/30/2025	1.03	0.00	-0.28	-0.12	0.63	1.03	1
7/9/2025	1.05	0.00	-0.25	-0.10	0.70	1.05	1
7/10/2025	1.03	0.00	-0.27	-0.12	0.64	1.03	1
7/11/2025	1.00	0.00	-0.29	-0.14	0.57	1.00	1
7/13/2025	0.98	0.00	-0.35	-0.13	0.49	0.98	1
7/14/2025	1.01	0.00	-0.27	-0.12	0.61	1.01	1
7/15/2025	0.94	0.00	-0.35	-0.18	0.40	0.94	1
7/28/2025	0.92	0.00	-0.34	-0.18	0.40	0.92	1
7/29/2025	0.90	0.00	-0.32	-0.18	0.42	0.90	1
7/31/2025	0.87	0.00	-0.31	-0.14	0.43	0.87	1
8/1/2025	0.89	0.00	-0.32	-0.15	0.43	0.89	1
8/4/2025	0.87	0.00	-0.30	-0.12	0.45	0.87	1
8/6/2025	0.93	0.00	-0.32	-0.18	0.44	0.93	1
8/7/2025	0.97	0.00	-0.32	-0.14	0.51	0.97	1
8/8/2025	0.93	0.00	-0.39	-0.15	0.39	0.93	1
8/11/2025	0.94	0.00	-0.39	-0.14	0.42	0.94	1
8/12/2025	0.98	0.00	-0.34	-0.16	0.47	0.98	1
8/13/2025	0.93	0.00	-0.36	-0.13	0.44	0.93	1
8/21/2025	0.95	0.00	-0.40	-0.17	0.39	0.95	1
8/22/2025	0.82	0.00	-0.39	-0.15	0.28	0.82	1

NPC DP23.RM Manage and Build VDR and Energy Savings

Table 4-19 details VDR and energy savings by event for DP23 devices installed in multifamily homes from the Manage population.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 4-19: NPC DP23.RM Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	5,199	9	4,724	4,356	2,322
6/10/2025	5,192	9	4,717	4,510	2,851
6/18/2025	5,208	9	4,753	5,071	2,664
6/19/2025	5,208	8	4,774	5,028	3,538
6/30/2025	5,207	9	4,763	4,877	2,982
7/9/2025	5,169	8	4,744	4,958	3,311
7/10/2025	5,170	8	4,761	4,894	3,056
7/11/2025	5,171	8	4,777	4,743	2,716
7/13/2025	5,178	7	4,833	4,697	2,345
7/14/2025	5,176	7	4,823	4,837	2,933
7/15/2025	5,176	8	4,776	4,474	1,903
7/28/2025	5,177	9	4,727	4,341	1,877
7/29/2025	5,183	8	4,755	4,284	1,978
7/31/2025	5,183	9	4,724	4,120	2,043
8/1/2025	5,182	8	4,761	4,219	2,025
8/4/2025	5,173	9	4,687	4,016	2,097
8/6/2025	5,165	8	4,768	4,415	2,086
8/7/2025	5,163	8	4,743	4,558	2,419
8/8/2025	5,168	8	4,757	4,418	1,860
8/11/2025	5,159	7	4,776	4,480	1,978
8/12/2025	5,161	7	4,783	4,641	2,257
8/13/2025	5,159	8	4,749	4,415	2,071
8/21/2025	5,156	8	4,766	4,521	1,839
8/22/2025	5,160	9	4,714	3,842	1,295

Table 4-20 details VDR and energy savings by event for DP23 devices installed in multifamily homes from the Build population.

Table 4-20: NPC DP23.RM Build VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	513	10	464	445	237
6/10/2025	514	10	465	462	292
6/18/2025	529	9	481	533	280
6/19/2025	531	9	485	531	373
6/30/2025	550	9	501	532	325
7/9/2025	570	9	521	566	378
7/10/2025	575	8	528	564	352
7/11/2025	579	8	533	550	315
7/13/2025	580	7	540	545	272
7/14/2025	580	7	539	561	340
7/15/2025	580	8	533	519	221
7/28/2025	625	9	569	542	234
7/29/2025	627	9	573	536	247
7/31/2025	630	9	572	518	257
8/1/2025	636	8	582	536	257
8/4/2025	643	10	580	517	270
8/6/2025	651	8	599	577	273
8/7/2025	653	8	598	597	317
8/8/2025	655	8	601	580	244
8/11/2025	663	8	612	597	264
8/12/2025	665	8	614	621	302
8/13/2025	668	8	613	592	278
8/21/2025	694	8	639	631	256
8/22/2025	697	9	634	538	181

4.4.2.3 NPC EcoFactor s100 Wi-Fi Thermostats (DP47.RM)

The following section details results from the EcoFactor s100 (DP47) DR event performance during the 2025 season.

NPC DP47.RM Event Load Shapes

Figure 4-8 shows the typical curtailment pattern for DP47 devices installed in multifamily homes, as illustrated by the event day load on July 31, 2025. In addition to the Treatment and Baseline curves, Figure 4-8 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 19:40, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve starting at approximately 20:40.

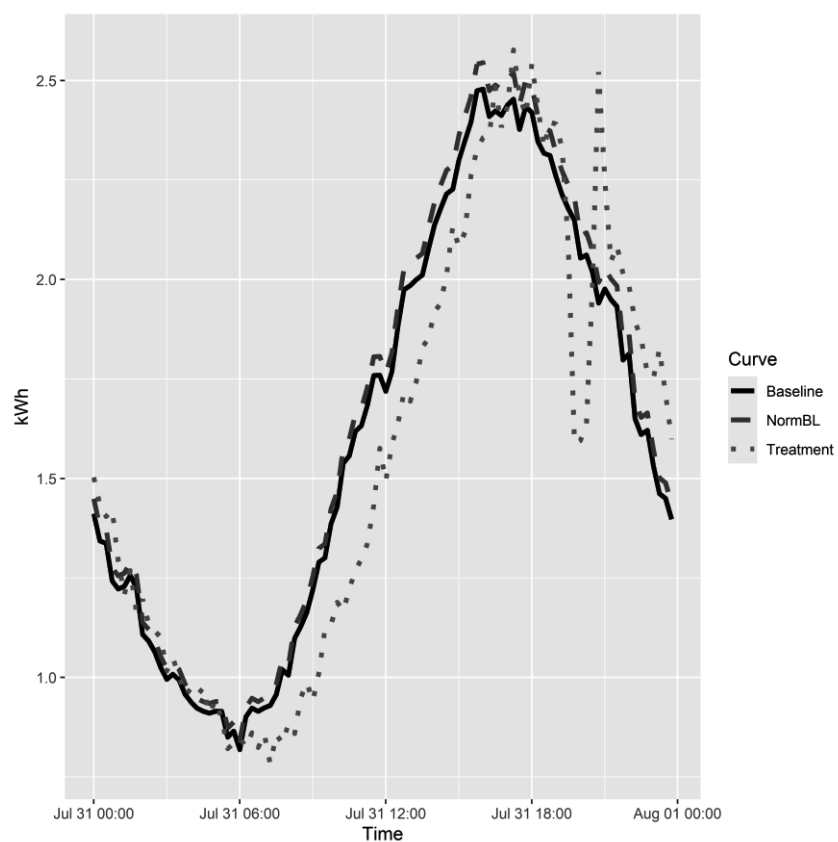


Figure 4-8: NPC DP47.RM Phase 3 Load Shape July 31, 2025

NPC DP47.RM Manage Demand Reduction Results

Table 4-21 details the demand reduction results by event period for the DP47 devices installed in multifamily homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-21: NPC DP47.RM Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.37	0.00	-0.14	-0.08	0.14	0.37	3
6/10/2025	0.37	0.00	-0.22	-0.06	0.10	0.37	3
6/18/2025	0.52	0.00	-0.27	-0.18	0.07	0.52	3
6/19/2025	0.53	0.00	-0.16	0.00	0.37	0.53	3
6/30/2025	0.48	0.00	-0.14	-0.01	0.32	0.48	3
7/9/2025	0.45	0.00	-0.23	-0.09	0.13	0.45	3
7/10/2025	0.52	0.00	-0.12	0.00	0.39	0.52	3
7/11/2025	0.44	0.00	-0.25	-0.05	0.14	0.44	3
7/13/2025	0.46	0.00	-0.26	-0.01	0.19	0.46	3
7/14/2025	0.50	0.00	-0.32	-0.13	0.06	0.50	3
7/15/2025	0.51	0.00	-0.10	0.00	0.41	0.51	3
7/28/2025	0.37	0.00	-0.26	-0.21	-0.11	0.37	3
7/29/2025	0.35	0.00	-0.11	-0.07	0.17	0.35	3
7/31/2025	0.44	0.00	-0.23	-0.17	0.05	0.44	3
8/1/2025	0.43	0.00	-0.11	-0.01	0.31	0.43	3
8/4/2025	0.34	0.00	-0.18	-0.11	0.05	0.34	3
8/6/2025	0.50	0.00	-0.16	-0.06	0.29	0.50	3
8/7/2025	0.36	0.00	-0.10	-0.14	0.12	0.36	3
8/8/2025	0.49	0.00	-0.11	-0.02	0.36	0.49	3
8/11/2025	0.40	0.00	-0.12	-0.01	0.28	0.40	3
8/12/2025	0.48	0.00	-0.21	-0.03	0.24	0.48	3
8/13/2025	0.39	0.00	-0.20	-0.13	0.06	0.39	3
8/21/2025	0.40	0.00	-0.19	0.00	0.20	0.40	3
8/22/2025	0.32	0.00	-0.22	-0.07	0.03	0.32	3

NPC DP47.RM Manage VDR and Energy Savings

Table 4-22 details VDR and energy savings by event for DP47 devices installed in multifamily homes from the Manage population.

Table 4-22: NPC DP47.RM Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	648	12	570	208	77
6/10/2025	650	13	565	209	54
6/18/2025	627	12	551	287	38
6/19/2025	624	12	547	291	204
6/30/2025	613	9	557	268	180
7/9/2025	598	11	535	240	70
7/10/2025	597	10	540	280	212
7/11/2025	597	10	535	236	74
7/13/2025	594	9	541	248	103
7/14/2025	594	11	532	267	30
7/15/2025	592	10	534	270	218
7/28/2025	580	11	517	188	-56
7/29/2025	576	11	514	177	86
7/31/2025	573	11	511	226	25
8/1/2025	573	12	505	217	156
8/4/2025	571	14	490	164	22
8/6/2025	571	13	498	251	144
8/7/2025	570	13	495	178	58
8/8/2025	569	11	504	249	183
8/11/2025	566	10	507	206	140
8/12/2025	564	10	508	246	124
8/13/2025	562	9	511	199	32
8/21/2025	554	11	495	194	98
8/22/2025	553	13	482	154	15

4.4.3 NPC PowerShift Overrides

PowerShift customers with an EcoFactor PCT, ecobee PCT, or EcoFactor s100 PCT can override the DR event setting either online, via a smart phone/tablet application, or directly on the physical thermostat. As with Cool Share customers, PowerShift customers' event overrides are recorded in a log. Table 4-23, Table 4-24, and Table 4-25 provide the override rates for DP11, DP23, and DP47 DPs for each event, broken out by event period. Because all devices had the same phasing for all events, event overrides by phase are not presented in this report.

Override percentage for DP11 and DP47 in 2025 were comparable to those observed in 2024. For DP11, an average of 9 percent of devices overrode events in 2025, compared to 10 percent in 2024. For DP47, the average override percentage was 11 percent for both 2025 and 2024.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

DP23 override percentages continue to decrease. The DP23 override percentage in 2022 was 34 percent; in 2023, it decreased to 20 percent, and in 2024, it decreased to 14 percent. By 2025, the average percent of devices that overrode events decreased to 10 percent.

Table 4-23: Override Rates for NPC DP11

Date	Event High Temperature (° F)	Overrides in First Event Hour	Overrides in Second Event Hour	Total Event Overrides
6/9/2025	106	8.93%	-	8.93%
6/10/2025	108	8.96%	-	8.96%
6/18/2025	108	8.38%	-	8.38%
6/19/2025	107	7.64%	-	7.64%
6/30/2025	108	8.61%	-	8.61%
7/9/2025	110	8.92%	-	8.92%
7/10/2025	108	8.63%	-	8.63%
7/11/2025	108	8.78%	-	8.78%
7/13/2025	110	9.44%	-	9.44%
7/14/2025	111	9.84%	-	9.84%
7/15/2025	109	9.01%	-	9.01%
7/28/2025	105	8.15%	-	8.15%
7/29/2025	105	8.56%	-	8.56%
7/31/2025	104	8.27%	-	8.27%
8/1/2025	105	7.42%	-	7.42%
8/4/2025	102	8.09%	-	8.09%
8/6/2025	107	9.26%	-	9.26%
8/7/2025	107	9.13%	-	9.13%
8/8/2025	108	8.56%	-	8.56%
8/11/2025	108	10.50%	-	10.50%
8/12/2025	112	10.34%	-	10.34%
8/13/2025	110	9.90%	-	9.90%
8/21/2025	110	10.20%	-	10.20%
8/22/2025	104	8.02%	-	8.02%
Average	107	8.90%	-	8.90%

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-24: Override Rates for NPC DP23*

Date	Event High Temperature (° F)	Overrides in First Event Hour	Overrides in Second Event Hour	Total Event Overrides
6/9/2025	106	9.49%	-	9.49%
6/10/2025	108	9.71%	-	9.71%
6/18/2025	108	9.41%	-	9.41%
6/19/2025	107	9.23%	-	9.23%
6/30/2025	108	11.20%	-	11.20%
7/9/2025	110	9.78%	-	9.78%
7/10/2025	108	9.85%	-	9.85%
7/11/2025	108	9.72%	-	9.72%
7/13/2025	110	10.32%	-	10.32%
7/14/2025	111	10.59%	-	10.59%
7/15/2025	109	10.01%	-	10.01%
7/28/2025	105	9.55%	-	9.55%
7/29/2025	105	9.52%	-	9.52%
7/31/2025	104	13.72%	-	13.72%
8/1/2025	105	8.95%	-	8.95%
8/4/2025	102	9.22%	-	9.22%
8/6/2025	107	9.71%	-	9.71%
8/7/2025	107	9.57%	-	9.57%
8/8/2025	108	9.86%	-	9.86%
8/11/2025	108	10.97%	-	10.97%
8/12/2025	112	10.64%	-	10.64%
8/13/2025	110	10.34%	-	10.34%
8/21/2025	110	10.80%	-	10.80%
8/22/2025	104	9.62%	-	9.62%
Average	107	10.07%	-	10.07%

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-25: Override Rates for NPC DP47*

Date	Event High Temperature (°F)	Overrides in First Event Hour	Overrides in Second Event Hour	Total Event Overrides
6/9/2025	106	10.25%	-	10.25%
6/10/2025	108	10.95%	-	10.95%
6/18/2025	108	10.36%	-	10.36%
6/19/2025	107	10.34%	-	10.34%
6/30/2025	108	11.46%	-	11.46%
7/9/2025	110	11.96%	-	11.96%
7/10/2025	108	11.29%	-	11.29%
7/11/2025	108	10.74%	-	10.74%
7/13/2025	110	12.18%	-	12.18%
7/14/2025	111	12.35%	-	12.35%
7/15/2025	109	11.33%	-	11.33%
7/28/2025	105	11.39%	-	11.39%
7/29/2025	105	11.05%	-	11.05%
7/31/2025	104	10.18%	-	10.18%
8/1/2025	105	9.83%	-	9.83%
8/4/2025	102	11.51%	-	11.51%
8/6/2025	107	11.65%	-	11.65%
8/7/2025	107	12.11%	-	12.11%
8/8/2025	108	11.37%	-	11.37%
8/11/2025	108	13.88%	-	13.88%
8/12/2025	112	13.44%	-	13.44%
8/13/2025	110	13.04%	-	13.04%
8/21/2025	110	13.65%	-	13.65%
8/22/2025	104	10.69%	-	10.69%
Average	107	11.54%	-	11.54%

4.5 NPC Service Territory Bring Your Own Thermostat Results

This section reports demand reduction and energy savings results for the BYOT component in the NPC service territory. The device population evaluated include DP49 and DP51. The kW factors ($\Delta kW_g(e)$) and kWh factors ($\Delta kWh_g(e)$) are provided for each device type and the subgroup-event VDR, and net energy savings for each event.

4.5.1 NPC Bring Your Own Thermostat Results for Single-Family Homes

4.5.1.1 NPC Bring Your Own Thermostat ecobee Wi-Fi Thermostats (DP49.RS)

The following section details results from the BYOT ecobee (DP49) DR event performance during the 2025 season.

NPC DP49.RS Event Load Shapes

Figure 4-9 shows the typical curtailment pattern for DP49.RS, as illustrated by the event day load on August 12, 2025. Energy savings associated with the DR event, which began at 19:40, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:40.

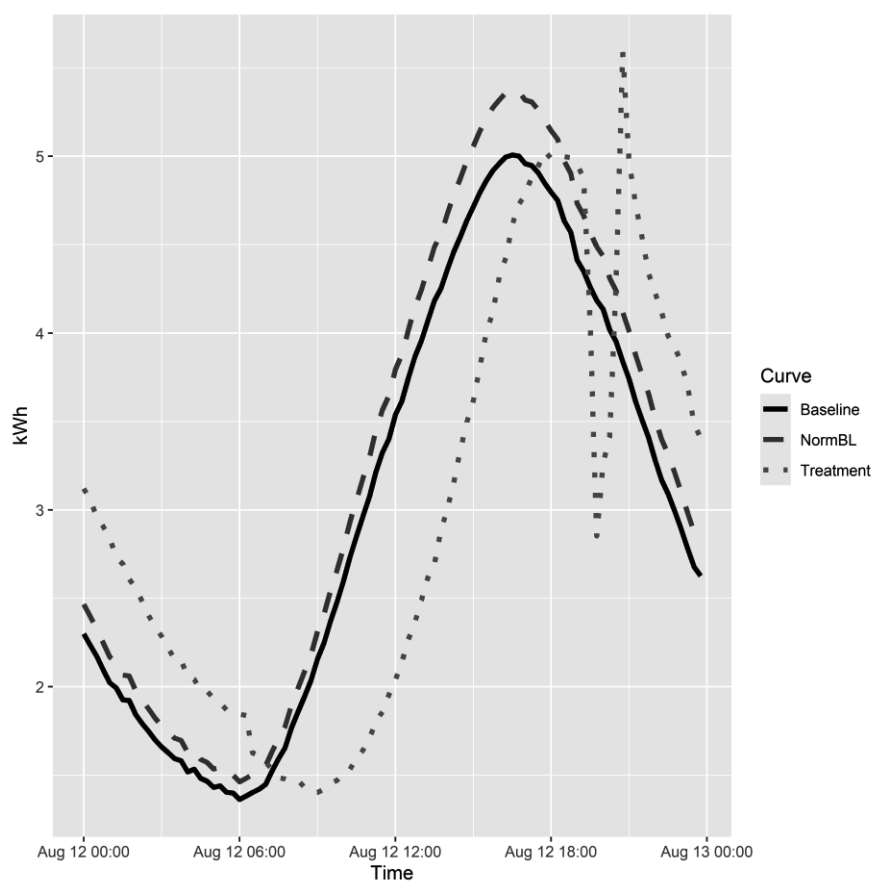


Figure 4-9: NPC DP49.RS Phase 3 Load Shape August 12, 2025

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

Table 4-26 details the demand reduction results by event period for the DP49 devices installed in single family homes.

NPC DP49.RS Demand Reduction Results*Table 4-26: NPC DP49.RS Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.55	0.00	-1.10	-0.75	-1.29	0.55	3
6/10/2025	0.60	0.00	-1.14	-0.76	-1.30	0.60	3
6/18/2025	0.90	0.00	-1.29	-0.91	-1.30	0.90	3
6/19/2025	0.69	0.00	-1.18	-1.10	-1.59	0.69	3
6/30/2025	0.66	0.00	-1.17	-0.82	-1.34	0.66	3
7/9/2025	0.73	0.00	-1.12	-0.78	-1.18	0.73	3
7/10/2025	0.42	0.00	-1.01	-0.77	-1.36	0.42	3
7/11/2025	0.72	0.00	-1.09	-0.74	-1.12	0.72	3
7/13/2025	0.85	0.00	-1.07	-0.68	-0.90	0.85	3
7/14/2025	0.72	0.00	-1.15	-0.81	-1.25	0.72	3
7/15/2025	0.38	0.00	-0.87	-0.65	-1.14	0.38	3
7/28/2025	0.56	0.00	-1.11	-0.76	-1.31	0.56	3
7/29/2025	0.56	0.00	-1.06	-0.73	-1.23	0.56	3
7/31/2025	0.53	0.00	-1.03	-0.72	-1.22	0.53	3
8/1/2025	0.55	0.00	-1.05	-0.75	-1.25	0.55	3
8/4/2025	0.51	0.00	-1.01	-0.70	-1.21	0.51	3
8/6/2025	0.57	0.00	-1.13	-0.79	-1.35	0.57	3
8/7/2025	0.62	0.00	-1.11	-0.80	-1.29	0.62	3
8/8/2025	0.87	0.00	-0.96	-0.63	-0.72	0.87	3
8/11/2025	0.84	0.00	-0.99	-0.66	-0.81	0.84	3
8/12/2025	0.89	0.00	-1.00	-0.68	-0.79	0.89	3
8/13/2025	0.82	0.00	-1.00	-0.67	-0.86	0.82	3
8/21/2025	0.91	0.00	-1.01	-0.65	-0.75	0.91	3
8/22/2025	0.77	0.00	-0.89	-0.54	-0.66	0.77	3

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP49.RS VDR and Energy Savings**

Table 4-27 details VDR and energy savings by event for DP49 devices installed in single family homes from the Manage population.

Table 4-27: NPC DP49.RS Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	7,416	9	6,715	3,713	-8,648
6/10/2025	7,416	10	6,672	3,982	-8,614
6/18/2025	7,408	8	6,792	6,140	-8,769
6/19/2025	7,407	10	6,656	4,564	-10,537
6/30/2025	7,393	9	6,710	4,374	-8,959
7/9/2025	7,363	8	6,745	4,905	-7,907
7/10/2025	7,363	9	6,711	2,829	-9,081
7/11/2025	7,359	8	6,760	4,861	-7,521
7/13/2025	7,357	6	6,947	5,889	-6,262
7/14/2025	7,356	7	6,816	4,878	-8,483
7/15/2025	7,356	10	6,656	2,529	-7,539
7/28/2025	7,386	10	6,630	3,676	-8,655
7/29/2025	7,386	11	6,565	3,670	-8,056
7/31/2025	7,383	11	6,592	3,460	-8,010
8/1/2025	7,384	11	6,598	3,615	-8,246
8/4/2025	7,382	12	6,520	3,307	-7,846
8/6/2025	7,381	8	6,763	3,873	-9,069
8/7/2025	7,401	7	6,848	4,248	-8,777
8/8/2025	7,399	7	6,874	5,983	-4,928
8/11/2025	7,402	6	6,971	5,815	-5,642
8/12/2025	7,398	6	6,974	6,213	-5,459
8/13/2025	7,396	7	6,887	5,580	-5,929
8/21/2025	8,082	7	7,544	6,857	-5,663
8/22/2025	8,084	10	7,316	5,594	-4,847

Table 4-28 details VDR and energy savings by event for DP49 devices installed in single family homes from the Build population.

Table 4-28: NPC DP49.RS Build VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	1,464	10	1,323	745	-1,736
6/10/2025	1,463	10	1,313	799	-1,729
6/18/2025	1,454	8	1,331	1,226	-1,751
6/19/2025	1,453	10	1,303	911	-2,103
6/30/2025	1,450	9	1,313	873	-1,788
7/9/2025	1,443	9	1,320	977	-1,575
7/10/2025	1,443	9	1,313	563	-1,808
7/11/2025	1,443	8	1,323	969	-1,499
7/13/2025	1,439	6	1,357	1,171	-1,246
7/14/2025	1,439	7	1,332	970	-1,687
7/15/2025	1,435	10	1,296	501	-1,494
7/28/2025	1,634	10	1,463	828	-1,949
7/29/2025	1,636	11	1,451	827	-1,816
7/31/2025	1,635	11	1,456	780	-1,805
8/1/2025	1,632	11	1,455	813	-1,855
8/4/2025	1,632	12	1,438	744	-1,765
8/6/2025	1,631	9	1,492	871	-2,041
8/7/2025	1,645	8	1,520	962	-1,987
8/8/2025	1,645	7	1,526	1,355	-1,116
8/11/2025	1,644	6	1,546	1,316	-1,277
8/12/2025	1,640	6	1,544	1,403	-1,233
8/13/2025	1,639	7	1,524	1,260	-1,338
8/21/2025	1,044	7	973	902	-745
8/22/2025	1,044	10	943	735	-637

4.5.1.2 NPC Bring Your Own Thermostat Resideo Wi-Fi Thermostats (DP51.RS)

The following section details results from the BYOT Resideo (DP51) DR event performance during the 2025 season.

NPC DP51.RS Event Load Shapes

Figure 4-10 shows the typical curtailment pattern for DP51.RS, as illustrated by the event day load on July 14, 2025. Energy savings associated with the DR event, which began at 19:20, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:20.

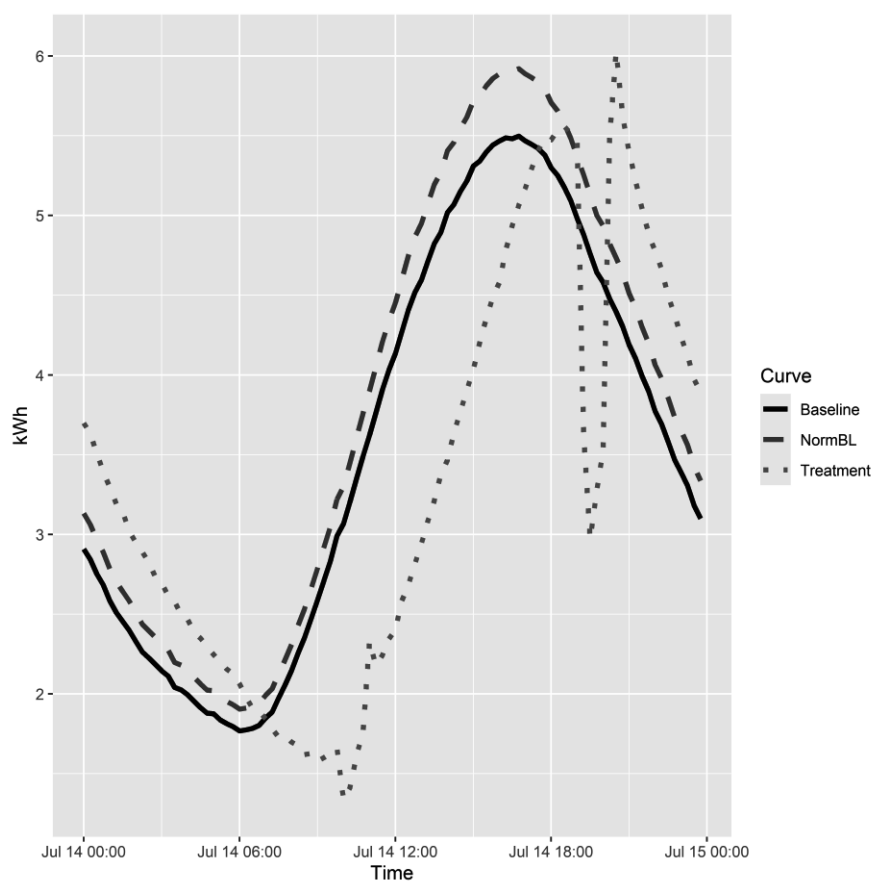


Figure 4-10: NPC DP51.RS Phase 2 Load Shape July 14, 2025

NPC DP51.RS Demand Reduction Results

Table 4-29 details the demand reduction results by event period for the DP51 devices installed in single family homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-29: NPC DP51.RS Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	1.55	0.00	-0.88	-0.57	0.10	1.55	2
6/10/2025	1.57	0.00	-0.98	-0.67	-0.09	1.57	2
6/18/2025	1.74	0.00	-1.24	-0.98	-0.48	1.74	2
6/19/2025	1.56	0.00	-1.28	-0.98	-0.70	1.56	2
6/30/2025	1.50	0.00	-0.96	-0.69	-0.15	1.50	2
7/9/2025	1.65	0.00	-0.98	-0.72	-0.05	1.65	2
7/10/2025	1.57	0.00	-1.02	-0.75	-0.21	1.57	2
7/11/2025	1.63	0.00	-0.99	-0.72	-0.08	1.63	2
7/13/2025	1.69	0.00	-0.99	-0.73	-0.04	1.69	2
7/14/2025	1.71	0.00	-0.95	-0.73	0.03	1.71	2
7/15/2025	1.61	0.00	-0.93	-0.65	0.04	1.61	2
7/28/2025	1.42	0.00	-0.97	-0.64	-0.19	1.42	2
7/29/2025	1.39	0.00	-0.99	-0.67	-0.26	1.39	2
7/31/2025	1.32	0.00	-0.98	-0.63	-0.29	1.32	2
8/1/2025	1.36	0.00	-0.99	-0.65	-0.27	1.36	2
8/4/2025	1.24	0.00	-0.93	-0.58	-0.28	1.24	2
8/6/2025	1.49	0.00	-0.91	-0.63	-0.05	1.49	2
8/7/2025	1.52	0.00	-0.92	-0.61	-0.01	1.52	2
8/8/2025	1.56	0.00	-0.91	-0.67	-0.02	1.56	2
8/11/2025	1.63	0.00	-0.89	-0.63	0.10	1.63	2
8/12/2025	1.61	0.00	-1.00	-0.77	-0.16	1.61	2
8/13/2025	1.56	0.00	-0.91	-0.63	0.02	1.56	2
8/21/2025	1.67	0.00	-0.88	-0.66	0.13	1.67	2
8/22/2025	1.47	0.00	-0.72	-0.48	0.27	1.47	2

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP51.RS VDR and Energy Savings**

Table 4-30 and Table 4-31 details VDR and energy savings by event for DP51 devices installed in single family homes from the Build population.

Table 4-30: NPC DP51.RS Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	13,023	8	11,917	18,440	1,201
6/10/2025	13,023	9	11,831	18,522	-1,035
6/18/2025	13,079	9	11,888	20,588	-5,742
6/19/2025	13,075	10	11,787	18,312	-8,271
6/30/2025	13,116	8	12,100	18,070	-1,764
7/9/2025	13,094	8	12,110	19,951	-587
7/10/2025	13,094	8	12,109	18,972	-2,479
7/11/2025	13,091	8	12,088	19,660	-1,023
7/13/2025	13,086	6	12,263	20,623	-445
7/14/2025	13,086	6	12,285	20,938	406
7/15/2025	13,087	7	12,108	19,489	476
7/28/2025	13,169	8	12,101	17,123	-2,304
7/29/2025	13,169	9	12,009	16,685	-3,129
7/31/2025	13,169	9	12,032	15,875	-3,497
8/1/2025	13,165	8	12,073	16,441	-3,193
8/4/2025	13,160	10	11,830	14,652	-3,246
8/6/2025	13,153	8	12,161	18,028	-614
8/7/2025	13,155	7	12,181	18,452	-70
8/8/2025	13,154	7	12,214	19,007	-246
8/11/2025	13,147	6	12,299	20,015	1,254
8/12/2025	13,148	6	12,294	19,718	-1,997
8/13/2025	13,237	7	12,263	19,036	190
8/21/2025	14,495	7	13,479	22,507	1,710
8/22/2025	14,494	9	13,228	19,449	3,558
6/9/2025	13,023	8	11,917	18,440	1,201
6/10/2025	13,023	9	11,831	18,522	-1,035
6/18/2025	13,079	9	11,888	20,588	-5,742
6/19/2025	13,075	10	11,787	18,312	-8,271
6/30/2025	13,116	8	12,100	18,070	-1,764
7/9/2025	13,094	8	12,110	19,951	-587
7/10/2025	13,094	8	12,109	18,972	-2,479
7/11/2025	13,091	8	12,088	19,660	-1,023
7/13/2025	13,086	6	12,263	20,623	-445

Table 4-31: NPC DP51.RS Build VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	3,100	9	2,834	4,430	289
6/10/2025	3,100	9	2,813	4,450	-249
6/18/2025	3,278	9	2,976	5,211	-1,453
6/19/2025	3,279	10	2,952	4,637	-2,094
6/30/2025	3,432	8	3,163	4,777	-466
7/9/2025	3,431	8	3,171	5,274	-155
7/10/2025	3,431	8	3,170	5,015	-655
7/11/2025	3,430	8	3,165	5,197	-270
7/13/2025	3,426	6	3,208	5,448	-118
7/14/2025	3,426	6	3,214	5,531	107
7/15/2025	3,424	8	3,165	5,144	126
7/28/2025	3,727	8	3,422	4,893	-659
7/29/2025	3,728	9	3,396	4,769	-894
7/31/2025	3,725	9	3,400	4,534	-999
8/1/2025	3,722	8	3,410	4,693	-912
8/4/2025	3,722	10	3,342	4,183	-927
8/6/2025	3,719	8	3,435	5,148	-175
8/7/2025	3,719	7	3,441	5,268	-20
8/8/2025	3,718	7	3,449	5,425	-70
8/11/2025	3,714	7	3,472	5,710	358
8/12/2025	3,713	7	3,469	5,624	-570
8/13/2025	4,045	7	3,744	5,876	59
8/21/2025	2,760	7	2,564	4,335	329
8/22/2025	2,760	9	2,516	3,745	685

4.5.2 NPC Bring Your Own Thermostat Results for Multifamily Homes

4.5.2.1 NPC Bring Your Own Thermostat ecobee Wi-Fi Thermostats (DP49.RM)

The following section details results from the BYOT ecobee (DP49) DR event performance during the 2025 season.

NPC DP49.RM Event Load Shapes

Figure 4-11 on the next page shows the typical curtailment pattern for DP49.RM, as illustrated by the event day load on June 9, 2025. Energy savings associated with the DR event, which began at 19:40, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:40.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

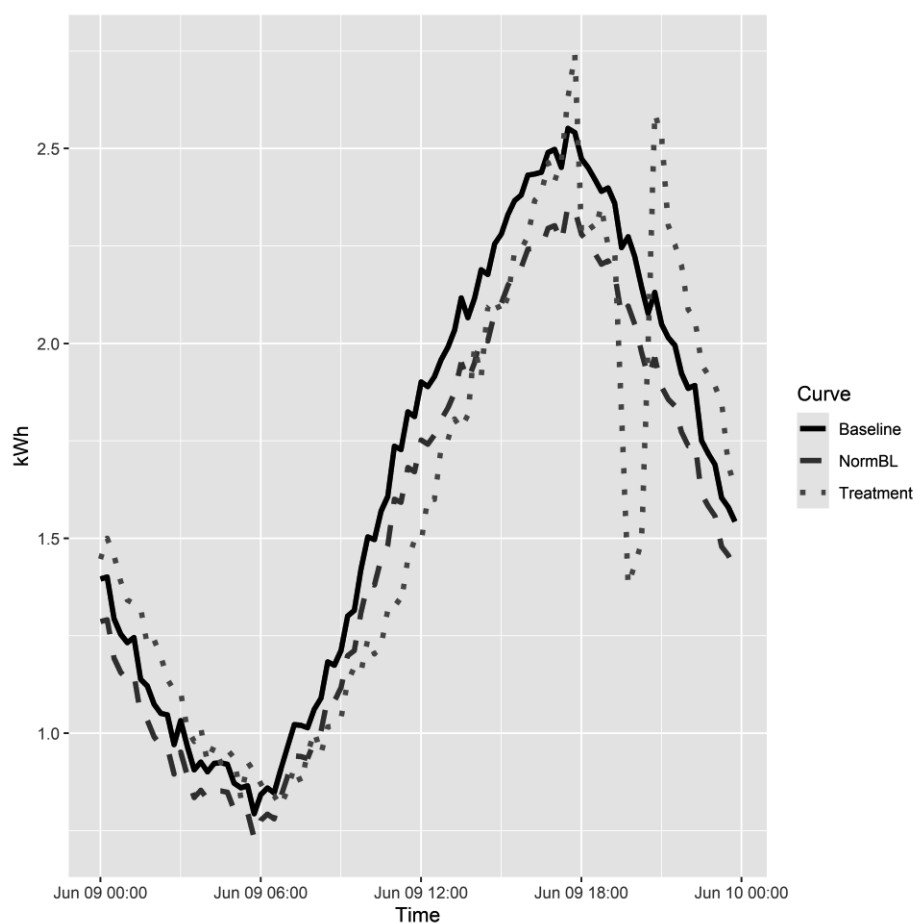


Figure 4-11: NPC DP49.RM Phase 3 Load Shape June 9, 2025

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP49.RM Demand Reduction Results**

Table 4-32 details the demand reduction results by event period for the DP49 devices installed in multi-family homes.

Table 4-32: NPC DP49.RM Demand Reduction Results

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.44	0.00	-0.52	-0.36	-0.45	0.44	3
6/10/2025	0.47	0.00	-0.55	-0.37	-0.44	0.47	3
6/18/2025	0.66	0.00	-0.45	-0.30	-0.08	0.66	3
6/19/2025	0.57	0.00	-0.37	-0.39	-0.18	0.57	3
6/30/2025	0.51	0.00	-0.50	-0.35	-0.34	0.51	3
7/9/2025	0.52	0.00	-0.51	-0.39	-0.37	0.52	3
7/10/2025	0.30	0.00	-0.44	-0.39	-0.53	0.30	3
7/11/2025	0.48	0.00	-0.52	-0.42	-0.45	0.48	3
7/13/2025	0.68	0.00	-0.50	-0.32	-0.13	0.68	3
7/14/2025	0.58	0.00	-0.50	-0.32	-0.23	0.58	3
7/15/2025	0.30	0.00	-0.40	-0.39	-0.49	0.30	3
7/28/2025	0.44	0.00	-0.43	-0.37	-0.34	0.44	3
7/29/2025	0.44	0.00	-0.57	-0.32	-0.44	0.44	3
7/31/2025	0.43	0.00	-0.49	-0.40	-0.46	0.43	3
8/1/2025	0.41	0.00	-0.56	-0.34	-0.49	0.41	3
8/4/2025	0.36	0.00	-0.50	-0.40	-0.55	0.36	3
8/6/2025	0.48	0.00	-0.51	-0.39	-0.42	0.48	3
8/7/2025	0.40	0.00	-0.65	-0.50	-0.76	0.40	3
8/8/2025	0.58	0.00	-0.46	-0.28	-0.16	0.58	3
8/11/2025	0.52	0.00	-0.44	-0.42	-0.34	0.52	3
8/12/2025	0.59	0.00	-0.53	-0.40	-0.34	0.59	3
8/13/2025	0.64	0.00	-0.40	-0.28	-0.02	0.64	3
8/21/2025	0.56	0.00	-0.51	-0.41	-0.37	0.56	3
8/22/2025	0.50	0.00	-0.43	-0.32	-0.24	0.50	3

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP49.RM VDR and Energy Savings**

Table 4-33 details VDR and energy savings by event for DP49 devices installed in multifamily homes from the Manage population.

Table 4-33: NPC DP49.RM Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	648	13	565	243	-253
6/10/2025	651	12	570	268	-252
6/18/2025	655	9	593	391	-50
6/19/2025	656	10	588	338	-103
6/30/2025	657	13	574	294	-197
7/9/2025	654	12	574	296	-214
7/10/2025	654	10	588	173	-312
7/11/2025	654	12	578	277	-260
7/13/2025	656	9	596	405	-77
7/14/2025	656	11	587	341	-133
7/15/2025	656	12	576	172	-282
7/28/2025	661	13	574	254	-197
7/29/2025	661	15	559	250	-246
7/31/2025	662	15	565	238	-261
8/1/2025	663	12	581	234	-287
8/4/2025	662	17	550	198	-301
8/6/2025	662	12	582	279	-243
8/7/2025	663	12	587	228	-447
8/8/2025	664	12	584	338	-92
8/11/2025	664	10	600	314	-203
8/12/2025	664	10	595	349	-200
8/13/2025	664	11	593	382	-12
8/21/2025	679	11	605	340	-220
8/22/2025	679	14	584	296	-142

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

Table 4-34 details VDR and energy savings by event for DP49 devices installed in multifamily homes from the Build population.

Table 4-34: NPC DP49.RM Build VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	116	13	101	44	-46
6/10/2025	116	13	101	48	-45
6/18/2025	116	10	105	70	-9
6/19/2025	116	11	104	61	-18
6/30/2025	115	13	100	52	-35
7/9/2025	115	12	101	52	-38
7/10/2025	115	10	103	31	-55
7/11/2025	115	12	102	49	-46
7/13/2025	115	9	104	72	-14
7/14/2025	115	11	103	60	-23
7/15/2025	115	12	101	31	-50
7/28/2025	121	13	105	47	-37
7/29/2025	121	16	102	46	-46
7/31/2025	122	15	104	44	-49
8/1/2025	122	13	107	44	-53
8/4/2025	123	17	102	37	-57
8/6/2025	123	12	108	53	-46
8/7/2025	168	12	148	59	-115
8/8/2025	168	12	148	87	-24
8/11/2025	168	10	152	80	-52
8/12/2025	168	11	150	90	-51
8/13/2025	168	11	150	98	-3
8/21/2025	158	11	140	80	-52
8/22/2025	158	14	136	70	-33

4.5.2.2 NPC Bring Your Own Thermostat Resideo Wi-Fi Thermostats (DP51.RM)

The following section details results from the BYOT Resideo (DP51) DR event performance during the 2025 season.

NPC DP51.RM Event Load Shapes

Figure 4-12 shows the typical curtailment pattern for DP51.RM, as illustrated by the event day load on June 19, 2025. Energy savings associated with the DR event, which began at 18:20, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 19:20.

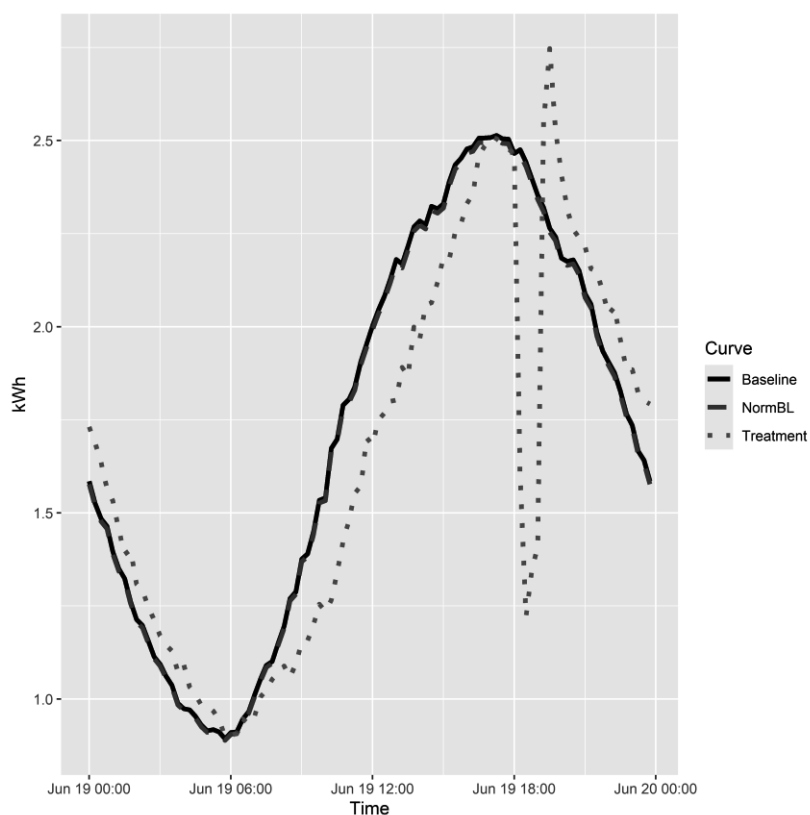


Figure 4-12: NPC DP51.RM Phase 2 Load Shape June 19, 2025

NPC DP51.RM Demand Reduction Results

Table 4-35 details the demand reduction results by event period for the DP51 devices installed in single family homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-35: NPC DP51.RM Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor	kW Factor Phase
6/9/2025	0.95	0.00	-0.28	-0.16	0.51	0.95	2
6/10/2025	1.06	0.00	-0.24	-0.23	0.60	1.06	2
6/18/2025	1.12	0.00	-0.29	-0.17	0.66	1.12	2
6/19/2025	0.99	0.00	-0.32	-0.17	0.51	0.99	2
6/30/2025	0.89	0.00	-0.21	-0.14	0.55	0.89	2
7/9/2025	1.05	0.00	-0.31	-0.19	0.56	1.05	2
7/10/2025	0.98	0.00	-0.37	-0.23	0.40	0.98	2
7/11/2025	0.95	0.00	-0.35	-0.23	0.36	0.95	2
7/13/2025	1.00	0.00	-0.33	-0.23	0.46	1.00	2
7/14/2025	1.03	0.00	-0.32	-0.18	0.54	1.03	2
7/15/2025	0.98	0.00	-0.28	-0.20	0.51	0.98	2
7/28/2025	0.90	0.00	-0.33	-0.18	0.38	0.90	2
7/29/2025	0.85	0.00	-0.33	-0.24	0.28	0.85	2
7/31/2025	0.91	0.00	-0.27	-0.15	0.49	0.91	2
8/1/2025	0.83	0.00	-0.32	-0.20	0.32	0.83	2
8/4/2025	0.81	0.00	-0.33	-0.21	0.27	0.81	2
8/6/2025	0.94	0.00	-0.26	-0.16	0.52	0.94	2
8/7/2025	0.99	0.00	-0.30	-0.16	0.53	0.99	2
8/8/2025	0.95	0.00	-0.30	-0.19	0.46	0.95	2
8/11/2025	0.99	0.00	-0.29	-0.16	0.54	0.99	2
8/12/2025	0.97	0.00	-0.33	-0.27	0.37	0.97	2
8/13/2025	1.00	0.00	-0.27	-0.15	0.58	1.00	2
8/21/2025	0.98	0.00	-0.29	-0.18	0.51	0.98	2
8/22/2025	0.90	0.00	-0.24	-0.17	0.50	0.90	2

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***NPC DP51.RM Manage and Build VDR and Energy Savings**

Table 4-36 and Table 4-37 details VDR and energy savings by event for DP51 devices installed in multifamily homes from the Manage and Build population.

Table 4-36: NPC DP51.RM Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	1,875	16	1,570	1,487	805
6/10/2025	1,878	15	1,596	1,679	952
6/18/2025	1,882	16	1,586	1,764	1,048
6/19/2025	1,882	16	1,579	1,554	800
6/30/2025	1,901	14	1,629	1,458	897
7/9/2025	1,902	14	1,641	1,716	913
7/10/2025	1,902	14	1,630	1,606	643
7/11/2025	1,899	14	1,629	1,532	592
7/13/2025	1,898	12	1,673	1,679	769
7/14/2025	1,898	14	1,630	1,680	880
7/15/2025	1,901	13	1,645	1,620	841
7/28/2025	1,905	15	1,611	1,435	615
7/29/2025	1,905	15	1,625	1,372	450
7/31/2025	1,907	15	1,618	1,468	794
8/1/2025	1,905	15	1,622	1,339	511
8/4/2025	1,908	18	1,563	1,253	423
8/6/2025	1,907	14	1,648	1,543	854
8/7/2025	1,907	15	1,617	1,582	847
8/8/2025	1,907	14	1,635	1,546	757
8/11/2025	1,909	14	1,636	1,609	886
8/12/2025	1,910	14	1,647	1,589	603
8/13/2025	1,911	15	1,633	1,615	948
8/21/2025	2,155	13	1,866	1,809	949
8/22/2025	2,154	16	1,809	1,616	894

Table 4-37: NPC DP51.RM Build VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	580	17	484	466	252
6/10/2025	582	15	493	527	299
6/18/2025	592	16	497	562	334
6/19/2025	592	16	495	495	255
6/30/2025	758	15	648	589	363
7/9/2025	758	14	652	692	368
7/10/2025	758	15	648	647	259
7/11/2025	758	14	649	619	239
7/13/2025	758	12	667	679	311
7/14/2025	758	14	650	679	355
7/15/2025	758	14	655	654	339
7/28/2025	768	16	648	585	251
7/29/2025	768	15	654	560	183
7/31/2025	766	15	648	596	323
8/1/2025	765	15	650	544	208
8/4/2025	768	18	627	510	172
8/6/2025	769	14	663	630	348
8/7/2025	769	15	650	645	345
8/8/2025	771	14	660	632	310
8/11/2025	768	14	657	655	361
8/12/2025	769	14	662	647	246
8/13/2025	791	15	675	676	397
8/21/2025	553	14	478	471	247
8/22/2025	553	16	463	420	233

4.5.3 NPC Bring Your Own Thermostat Overrides

BYOT customers with an ecobee or Resideo PCT can override the DR event setting either online, via a smart phone/tablet application, or directly on the physical thermostat. Like the Carrier PCTs, these events are recorded in a system log.

Average DP49 device overrides were 20 percent in 2025, which was approximately 2 percent higher than in 2024. Unlike in 2023 and 2024, complete DP51 device override data was provided, and the average device override rate was 5 percent.

Table 4-38 and Table 4-39 provide the override rates for DP49 and DP51 DPs for each event, broken out by event period. Because all devices had the same phasing for all events, event overrides by phase tables are not presented in this report.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-38: Override Rates for NPC DP49*

Date	Event High Temperature (° F)	Overrides in First Event Hour	Overrides in Second Event Hour	Total Event Overrides
6/9/2025	106	20.74%	-	20.74%
6/10/2025	108	20.59%	-	20.59%
6/18/2025	108	19.17%	-	19.17%
6/19/2025	107	19.31%	-	19.31%
6/30/2025	108	19.10%	-	19.10%
7/9/2025	110	20.64%	-	20.64%
7/10/2025	108	20.37%	-	20.37%
7/11/2025	108	20.34%	-	20.34%
7/13/2025	110	20.95%	-	20.95%
7/14/2025	111	20.91%	-	20.91%
7/15/2025	109	20.35%	-	20.35%
7/28/2025	105	19.94%	-	19.94%
7/29/2025	105	19.63%	-	19.63%
7/31/2025	104	19.36%	-	19.36%
8/1/2025	105	19.67%	-	19.67%
8/4/2025	102	20.03%	-	20.03%
8/6/2025	107	20.00%	-	20.00%
8/7/2025	107	20.20%	-	20.20%
8/8/2025	108	19.93%	-	19.93%
8/11/2025	108	20.82%	-	20.82%
8/12/2025	112	20.39%	-	20.39%
8/13/2025	110	20.37%	-	20.37%
8/21/2025	110	20.13%	-	20.13%
8/22/2025	104	19.80%	-	19.80%
Average	107	20.11%	-	20.11%

Table 4-39: Override Rates for NPC DP51

Date	Event High Temperature (° F)	Overrides in First Event Hour	Overrides in Second Event Hour	Total Event Overrides
6/9/2025	106	4.52%	-	4.52%
6/10/2025	108	5.23%	-	5.23%
6/18/2025	108	5.12%	-	5.12%
6/19/2025	107	4.14%	-	4.14%
6/30/2025	108	1.69%	-	1.69%
7/9/2025	110	5.09%	-	5.09%
7/10/2025	108	5.28%	-	5.28%
7/11/2025	108	4.60%	-	4.60%
7/13/2025	110	5.10%	-	5.10%
7/14/2025	111	5.69%	-	5.69%
7/15/2025	109	5.10%	-	5.10%
7/28/2025	105	4.28%	-	4.28%
7/29/2025	105	4.61%	-	4.61%
7/31/2025	104	4.59%	-	4.59%
8/1/2025	105	4.23%	-	4.23%
8/4/2025	102	4.09%	-	4.09%
8/6/2025	107	4.92%	-	4.92%
8/7/2025	107	0.61%	-	0.61%
8/8/2025	108	4.38%	-	4.38%
8/11/2025	108	5.75%	-	5.75%
8/12/2025	112	5.78%	-	5.78%
8/13/2025	110	5.76%	-	5.76%
8/21/2025	110	6.24%	-	6.24%
8/22/2025	104	4.83%	-	4.83%
Average	107	4.65%	-	4.65%

4.6 NPC Service Territory Non-Thermostat Demand Response Results

This section reports demand reduction and energy savings results for the Non-Thermostat DR components, including Battery Storage, Pool Pumps, and Water Heaters. The kW factors ($\Delta kW_g(e)$) and kWh factors ($\Delta kWh_g(e)$) are also provided for each device type along with the subgroup-event VDR, and net energy savings for each event.

4.6.1 NPC Battery Storage Demand Response Results

The following section details results from the Battery Storage DR event performance during the 2025 season.

Figure 4-13 shows the curtailment patterns observed during battery storage events. Energy savings are depicted in the graph by the consumption drop coinciding with that time and is the area below

the Baseline curve and above the DRKWH curve.

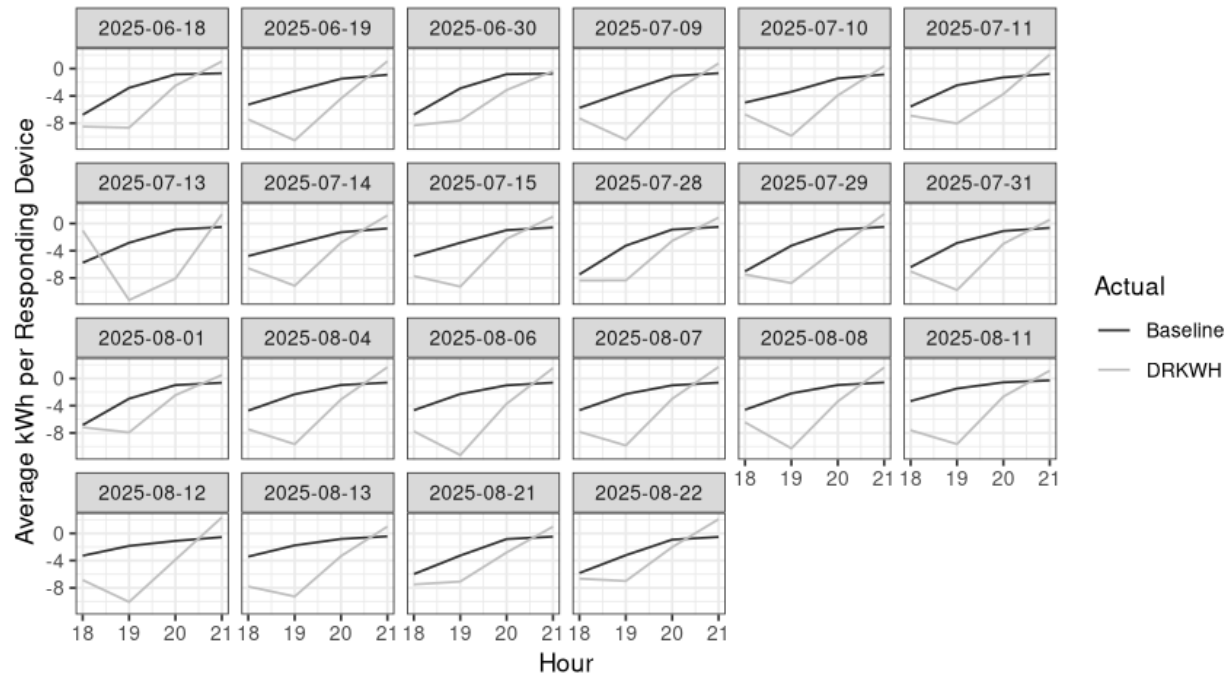


Figure 4-13: NPC Event-Level Battery Storage Load Shapes

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

Table 4-40 details the demand reduction results by event period derived from battery storage DR.

Table 4-40: NPC Battery Storage Demand Reduction Results

Date	kWh Factor	kW Factor	NRD %	Available Devices	VDR	Energy Savings (kWh)
6/18/2025	7.50	5.85	20.83	24	111.16	142.53
6/19/2025	10.13	7.23	29.17	24	122.99	172.14
6/30/2025	7.04	4.71	25.00	24	84.86	126.65
7/1/2025	9.51	7.08	20.83	24	134.47	180.65
7/9/2025	8.96	6.48	20.83	24	123.05	170.29
7/10/2025	8.05	5.60	12.50	24	117.69	168.95
7/11/2025	15.61	8.41	8.33	24	185.10	343.40
7/13/2025	7.64	6.12	12.50	24	128.50	160.42
7/14/2025	7.70	6.43	16.67	24	128.68	154.07
7/15/2025	6.76	5.10	8.33	24	112.25	148.71
7/28/2025	8.16	5.49	8.33	24	120.79	179.45
7/29/2025	8.77	6.91	20.83	24	131.22	166.70
7/31/2025	6.44	4.96	0.00	24	119.03	154.47
8/1/2025	9.45	7.33	12.50	24	153.94	198.36
8/4/2025	11.67	8.96	0.00	23	206.14	268.38
8/6/2025	9.54	7.56	4.17	24	173.86	219.41
8/7/2025	10.49	8.08	0.00	24	194.03	251.80
8/8/2025	10.25	8.16	12.50	24	171.39	215.33
8/11/2025	10.98	8.23	16.67	24	164.54	219.53
8/12/2025	10.01	7.50	8.33	24	165.07	220.31
8/13/2025	5.79	3.82	0.00	24	91.69	138.94
8/21/2025	4.88	3.78	8.33	24	83.24	107.34
8/22/2025	7.50	5.85	20.83	24	111.16	142.53

4.6.2 NPC Pool Pump Demand Response Results

The following section details results from the Pool Pumps DR event performance during the 2025 season. Table 4-41 details the demand reduction results by event period for pool pump DR. Figure 4-14 shows the curtailment patterns observed during pool pump events. Energy savings are depicted in the graph by the consumption drop coinciding with that time and is the area below the normalized baseline curve (“NormBL”) and above the DR curve (“Treatment”).

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

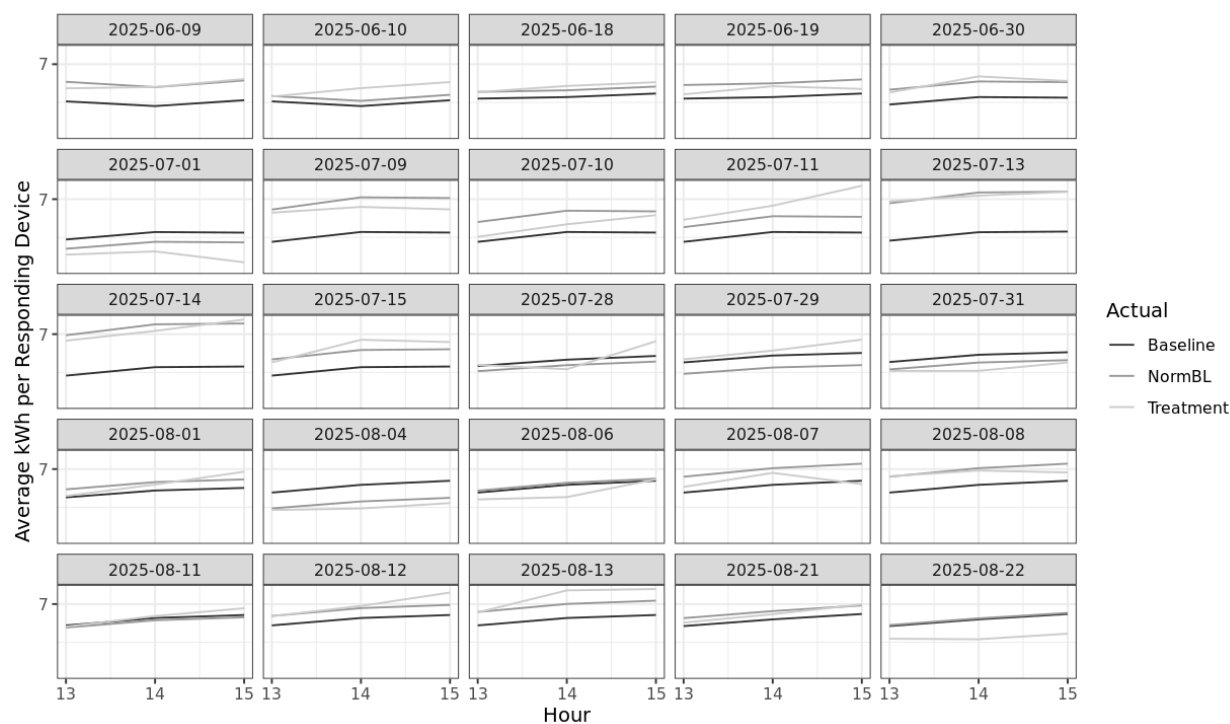


Figure 4-14: NPC Event-Level Pool Pump Load Shapes

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-41: NPC Pool Pump Demand Reduction Results*

Date	kWh Factor	kW Factor	NRD %	Available Devices	VDR	Energy Savings (kWh)
6/9/2025	0.25	0.26	0.00	45	11.50	11.24
6/10/2025	-0.48	0.02	0.00	45	0.80	-21.77
6/18/2025	-0.17	0.01	0.00	45	0.23	-7.45
6/19/2025	0.48	0.36	0.00	45	16.36	21.51
6/30/2025	-0.09	0.11	0.00	45	4.99	-3.93
7/1/2025	0.61	0.38	0.00	45	16.93	27.38
7/9/2025	0.50	0.38	0.00	45	16.94	22.43
7/10/2025	1.11	0.58	0.00	45	26.08	50.06
7/11/2025	-0.71	-0.29	0.00	45	-13.14	-31.78
7/13/2025	0.05	0.13	0.00	45	5.64	2.22
7/14/2025	0.47	0.26	0.00	45	11.61	21.16
7/15/2025	-0.29	0.12	0.00	45	5.19	-12.88
7/28/2025	-0.09	0.16	0.00	45	7.10	-4.01
7/29/2025	-1.24	-0.57	19.57	46	-21.14	-45.75
7/31/2025	0.39	0.33	17.39	46	12.38	14.69
8/1/2025	0.35	0.26	19.57	46	9.58	13.08
8/4/2025	0.34	0.28	17.39	46	10.54	12.94
8/6/2025	0.91	0.56	17.39	46	21.32	34.43
8/7/2025	0.58	0.40	17.39	46	15.20	22.20
8/8/2025	0.08	0.09	17.39	46	3.54	2.93
8/11/2025	-0.21	-0.04	19.57	46	-1.47	-7.62
8/12/2025	-0.08	0.01	19.57	46	0.33	-2.83
8/13/2025	-0.51	0.02	19.57	46	0.66	-18.99
8/21/2025	0.30	0.17	0.00	45	7.86	13.37
8/22/2025	1.36	0.82	0.00	45	36.97	61.06

4.6.3 NPC Water Heater Demand Response Results

The following section details results from the Water Heater DR event performance during the 2025 season.

Figure 4-15 shows the curtailment patterns observed during water heater events. Energy savings are depicted in the graph by the consumption drop coinciding with that time and is the area below the normalized baseline curve and above the DRKWH curve starting at approximately 19:00. Conversely, the snapback energy consumption is represented by the area above the Baseline curve and below the Treatment curve, starting at approximately 21:00.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

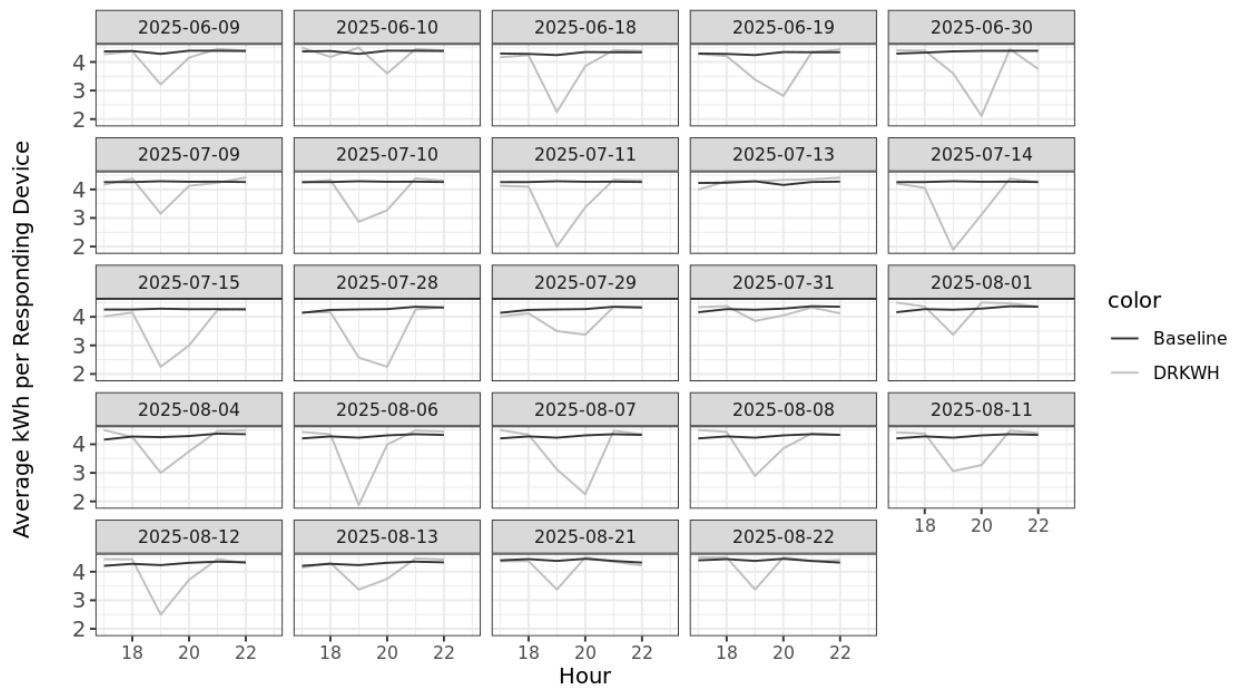


Figure 4-15: NPC Event-Level Water Heater Load Shapes

Table 4-42 details the demand reduction results by event period derived from water heater DR.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-42: NPC Water Heater Demand Reduction Results*

Date	kWh Factor	kW Factor	NRD %	Available Devices	VDR	Energy Savings (kWh)
6/9/2025	1.23	1.07	1.32	152	160.44	184.77
6/10/2025	0.50	0.79	1.32	152	119.20	74.44
6/18/2025	2.36	1.99	1.32	151	296.78	352.02
6/19/2025	2.29	1.54	1.32	151	228.76	341.33
6/30/2025	3.62	2.27	1.34	149	334.18	532.33
7/9/2025	1.16	1.14	1.33	150	168.11	171.64
7/10/2025	2.26	1.42	1.33	150	210.49	334.90
7/11/2025	3.06	2.29	1.33	150	338.31	452.87
7/13/2025	-0.40	0.00	1.33	150	0.37	-59.68
7/14/2025	3.45	2.40	1.33	150	354.73	510.05
7/15/2025	3.30	2.04	1.33	150	301.31	489.12
7/28/2025	3.80	2.02	1.33	150	299.17	562.26
7/29/2025	1.65	0.90	1.33	150	132.67	244.26
7/31/2025	0.90	0.39	1.33	150	58.07	133.74
8/1/2025	0.56	0.87	1.33	150	129.43	82.18
8/4/2025	1.56	1.25	1.33	150	184.93	230.35
8/6/2025	2.43	2.36	1.33	150	348.75	359.76
8/7/2025	3.03	2.06	1.33	150	305.11	448.41
8/8/2025	1.76	1.34	1.33	150	197.79	261.00
8/11/2025	2.02	1.17	1.33	150	173.28	298.80
8/12/2025	2.27	1.73	1.33	150	256.75	335.36
8/13/2025	1.21	0.86	1.33	150	126.66	178.82
8/21/2025	1.08	1.00	1.33	150	148.32	160.51
8/22/2025	0.87	1.00	1.33	150	148.46	128.96

4.7 Combined NPC Service Territory Results

The event that produced the highest VDR in 2025 was on June 18. This event, unlike most events in 2025, began at 18:00 rather than 19:00. Most of the other events with above-average VDR occurred in mid-August. Energy savings were also positive for mid-August events beginning on August 8.

Most July events exhibited negative energy savings across the event and snapback hours, indicating that homes experienced snapback energy usage increases relative to the baseline that were greater than the energy savings during the event period. In addition, half of the July events had lower than average VDR. July 2025 was cooler than average in the NPC service territory, and unlike prior years, the record high for calendar year 2025 was in mid-August rather than July. These temperature anomalies may have contributed to lower than average VDR and negative energy savings in July, along with higher than average VDR and positive energy savings in mid-August 2025.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

Because the non-thermostat DR DPs were small in comparison to the thermostat DPs, non-thermostat DR made a negligible contribution to combined VDR and energy savings.

Table 4-43 summarizes combined Cool Share, PowerShift, BYOT, and Non-Thermostat DR results by event day.

Table 4-43: NPC Cool Share, PowerShift, BYOT, and Non-Thermostat Results

Date	Available Devices	Overall %NRD	Responding Devices	VDR	kWh Savings from DR
6/9/2025	138,752	6.37%	129,911	102,851	-13,156
6/10/2025	138,735	6.73%	129,393	104,139	-18,955
6/18/2025	138,930	6.46%	129,955	128,730	-19,268
6/19/2025	138,906	7.16%	128,963	118,396	-19,541
6/30/2025	139,153	5.89%	130,954	110,907	-18,458
7/9/2025	138,827	5.59%	131,071	116,396	-9,752
7/10/2025	138,843	5.66%	130,983	108,267	-21,040
7/11/2025	138,845	5.51%	131,190	113,892	-13,711
7/13/2025	138,841	4.52%	132,560	125,096	3,095
7/14/2025	138,822	4.71%	132,283	118,711	-9,234
7/15/2025	138,804	5.65%	130,959	108,232	-14,687
7/28/2025	139,405	6.36%	130,536	100,104	-24,979
7/29/2025	139,424	6.69%	130,090	97,218	-27,398
7/31/2025	139,414	6.65%	130,147	92,253	-29,207
8/1/2025	139,412	6.46%	130,412	95,215	-27,946
8/4/2025	139,345	7.55%	128,827	87,827	-25,380
8/6/2025	139,272	5.70%	131,327	104,643	-15,237
8/7/2025	139,308	5.57%	131,543	107,499	-12,733
8/8/2025	139,329	5.47%	131,713	116,843	2,557
8/11/2025	139,284	4.75%	132,670	119,544	4,509
8/12/2025	139,244	4.70%	132,694	122,475	2,276
8/13/2025	139,657	5.01%	132,654	117,098	1,458
8/21/2025	139,724	5.19%	132,479	124,531	10,672
8/22/2025	139,746	6.59%	130,532	105,693	12,519

4.8 SPPC Service Territory PowerShift Results

The following section reports demand reduction and energy savings results for the PowerShift Build and Manage components, for which the device population include EcoFactor smart PCTs (DP12), ecobee Wi-Fi thermostats (DP24), and EcoFactor s100 Wi-Fi thermostats (DP46). The Evaluator also reported the kW factors ($\Delta kW_g(e)$), kWh factors ($\Delta kWh_g(e)$) for each device type and the subgroup-event VDR, and net energy savings for each event broken out into the Manage and Build program participants.

4.8.1 SPPC PowerShift Results for Single-Family Homes

4.8.1.1 SPPC EcoFactor Smart Thermostats (DP12.D1)

SPPC DP12.D1 Event Load Shapes

Figure 4-16 shows the typical curtailment pattern for DP12.D1, as illustrated by the event day load on July 15, 2025. Energy savings associated with the DR event, which began at 19:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve starting at approximately 21:00 respectively.

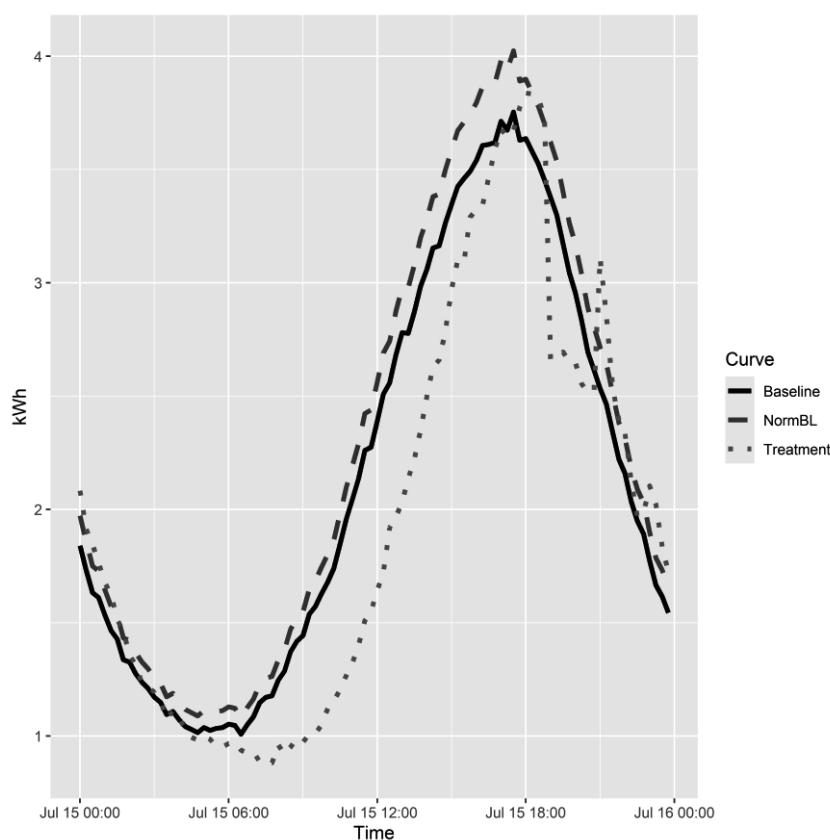


Figure 4-16: SPPC DP12.D1 Load Shape July 15, 2025

SPPC DP12.D1 Manage Demand Reduction Results

Table 4-44 provides the demand reduction results in terms of kW savings by hour for all event and snapback hours. Positive values indicate energy savings, while negative values indicate increased load relative to baseline. Negative values are typically associated with snapback hours.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-44: SPPC DP12.D1 Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.65	0.35	-0.16	-0.02	0.81	0.65
6/10/2025	0.63	0.31	-0.21	-0.07	0.66	0.63
6/18/2025	0.64	0.24	-0.33	-0.18	0.37	0.64
7/13/2025	0.74	0.38	-0.16	0.02	1.00	0.74
7/14/2025	0.65	0.33	-0.13	0.00	0.84	0.65
7/15/2025	0.65	0.34	-0.13	0.04	0.89	0.65
8/11/2025	0.77	0.29	-0.13	-0.02	0.92	0.77
8/12/2025	0.71	0.41	-0.21	-0.02	0.89	0.71
8/13/2025	0.61	0.23	-0.22	-0.13	0.49	0.61
8/21/2025	0.71	0.32	-0.20	0.02	0.85	0.71
8/22/2025	0.70	0.46	-0.11	0.00	1.06	0.70

SPPC DP12.D1 Manage VDR and Energy Savings

Table 4-45 details VDR and energy savings by event for EcoFactor devices installed in single family homes from the Manage population.

Table 4-45: SPPC DP12.D1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	2,159	15	1,837	1,199	1,500
6/10/2025	2,157	15	1,824	1,153	1,196
6/18/2025	2,133	18	1,740	1,111	641
7/13/2025	2,057	11	1,826	1,360	1,829
7/14/2025	2,057	10	1,851	1,210	1,566
7/15/2025	2,055	11	1,821	1,171	1,619
8/11/2025	1,982	17	1,652	1,272	1,515
8/12/2025	1,979	16	1,653	1,181	1,467
8/13/2025	1,976	13	1,722	1,046	840
8/21/2025	1,957	19	1,595	1,141	1,365
8/22/2025	1,946	13	1,688	1,183	1,781

4.8.1.2 SPPC ecobee Wi-Fi Thermostats (DP24.D1)

SPPC DP24.D1 Event Load Shapes

Figure 4-17 details the hourly load profile of DP24.D1 devices installed in single family homes during the August 11, 2025 DR event. In addition to the Treatment and Baseline curves, Figure 4-17 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00.

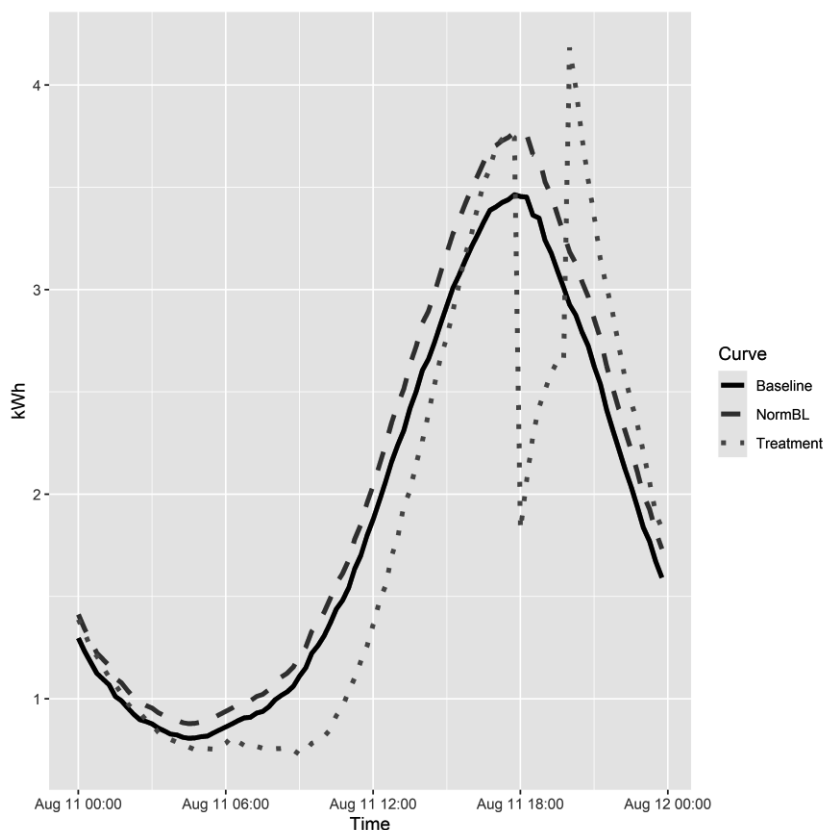


Figure 4-17: SPPC DP24.D1 Load Shape August 11, 2025

SPPC DP24.D1 Manage and Build Demand Reduction Results

Table 4-46 details the demand reduction results by event period for the ecobee devices installed in single family homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-46: SPPC DP24.D1 Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	1.00	0.57	-0.54	-0.28	0.75	1.00
6/10/2025	0.90	0.48	-0.61	-0.38	0.39	0.90
6/18/2025	1.11	0.61	-0.67	-0.31	0.73	1.11
7/13/2025	1.19	0.61	-0.61	-0.30	0.89	1.19
7/14/2025	0.98	0.45	-0.66	-0.32	0.44	0.98
7/15/2025	0.83	0.37	-0.65	-0.25	0.31	0.83
8/11/2025	1.25	0.65	-0.63	-0.33	0.94	1.25
8/12/2025	1.12	0.56	-0.69	-0.35	0.64	1.12
8/13/2025	1.03	0.53	-0.64	-0.32	0.60	1.03
8/21/2025	1.06	0.56	-0.66	-0.31	0.65	1.06
8/22/2025	1.10	0.70	-0.57	-0.23	1.00	1.10

SPPC DP24.D1 Manage and Build VDR and Energy Savings

Table 4-47 details VDR and energy savings by event for ecobee devices installed in single family homes from the Manage population whereas Table 4-48 shows the same results for devices from the Build population.

Table 4-47: SPPC DP24.D1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	7,001	10	6,326	6,325	4,772
6/10/2025	7,010	8	6,461	5,824	2,493
6/18/2025	7,046	12	6,206	6,871	4,556
7/13/2025	7,127	7	6,626	7,839	5,900
7/14/2025	7,125	6	6,672	6,538	2,973
7/15/2025	7,130	7	6,597	5,503	2,028
8/11/2025	7,222	10	6,484	8,132	6,116
8/12/2025	7,224	10	6,486	7,263	4,139
8/13/2025	7,222	8	6,639	6,869	4,033
8/21/2025	7,239	12	6,393	6,778	4,171
8/22/2025	7,256	9	6,602	7,301	6,588

Table 4-48: SPPC DP24.D1 Build VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	269	10	243	245	185
6/10/2025	271	8	250	226	97
6/18/2025	274	12	241	269	178
7/13/2025	295	7	274	327	246
7/14/2025	295	6	276	273	124
7/15/2025	295	8	273	229	85
8/11/2025	338	10	304	377	284
8/12/2025	343	10	308	342	195
8/13/2025	346	8	318	327	192
8/21/2025	372	12	329	344	212
8/22/2025	373	9	340	371	335

4.8.1.3 SPPC EcoFactor s100 Wi-Fi Thermostats (DP46.D1)

SPPC DP46.D1 Event Load Shapes

Figure 4-18 illustrates a typical hourly load profile for DP46.D1 devices installed in single family homes during the August 12, 2025 DR event. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00.

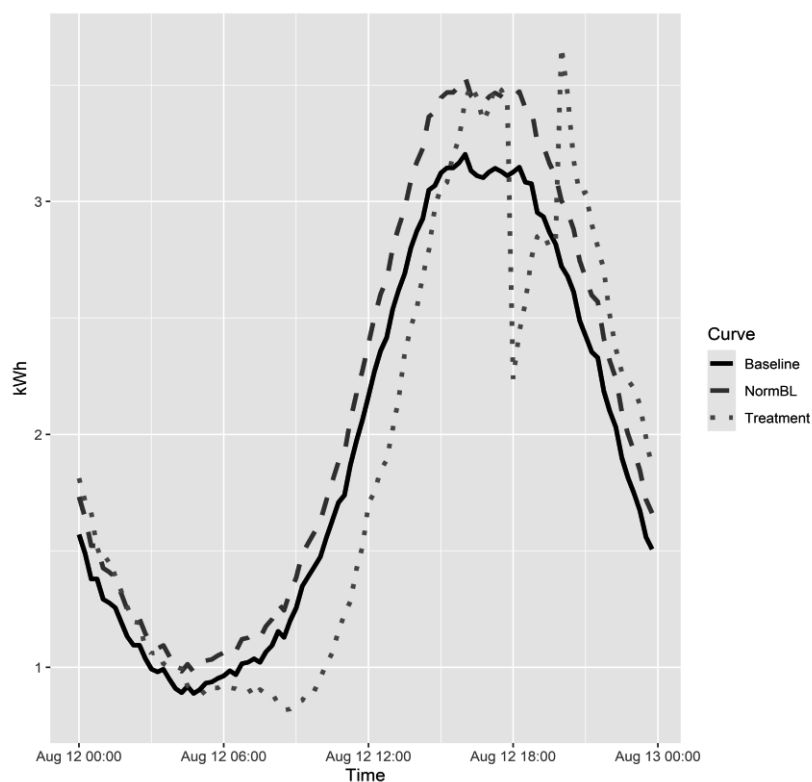


Figure 4-18: SPPC DP46.D1 Load Shape August 12, 2025

SPPC DP46.D1 Manage Demand Reduction Results

Table 4-49 details the demand reductions (kW savings) by hour for all event and snapback hours for EcoFactor s100 devices installed in single family homes. Positive values indicate energy savings, while negative values indicate increase in load relative to baseline. Negative values are typically associated with snapback hours.

Table 4-49: SPPC DP46.D1 Demand Reduction Results

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.59	0.29	-0.33	-0.26	0.29	0.59
6/10/2025	0.57	0.21	-0.35	-0.28	0.16	0.57
6/18/2025	0.69	0.29	-0.45	-0.33	0.19	0.69
7/13/2025	0.89	0.41	-0.29	-0.11	0.88	0.89
7/14/2025	0.78	0.27	-0.44	-0.24	0.36	0.78
7/15/2025	0.64	0.17	-0.39	-0.11	0.31	0.64
8/11/2025	0.80	0.26	-0.39	-0.28	0.39	0.80
8/12/2025	0.76	0.29	-0.36	-0.25	0.44	0.76
8/13/2025	0.69	0.27	-0.34	-0.16	0.46	0.69
8/21/2025	0.74	0.33	-0.33	-0.15	0.59	0.74
8/22/2025	0.82	0.53	-0.22	-0.07	1.06	0.82

SPPC DP46.D1 Manage VDR and Energy Savings

Table 4-50 details VDR and energy savings by event for EcoFactor s100 devices installed in single family homes from the Manage population.

Table 4-50: SPPC DP46.D1 Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	2,169	14	1,865	1,099	548
6/10/2025	2,163	14	1,852	1,054	281
6/18/2025	2,130	16	1,779	1,227	340
7/13/2025	2,037	11	1,817	1,621	1,610
7/14/2025	2,037	10	1,843	1,438	670
7/15/2025	2,032	11	1,811	1,150	564
8/11/2025	1,931	14	1,655	1,324	647
8/12/2025	1,927	15	1,643	1,247	728
8/13/2025	1,925	13	1,680	1,165	770
8/21/2025	1,905	18	1,567	1,171	921
8/22/2025	1,899	14	1,642	1,358	1,749

4.8.2 SPPC PowerShift Results for Multifamily Homes*4.8.2.1 SPPC EcoFactor Smart Thermostats (DP12.DM1)***SPPC DP12.DM1 Event Load Shapes**

Figure 4-19 shows the typical curtailment pattern for the DP12.DM1 (multifamily) rate class during the June 18, 2025, DR event. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve starting at approximately 20:00.

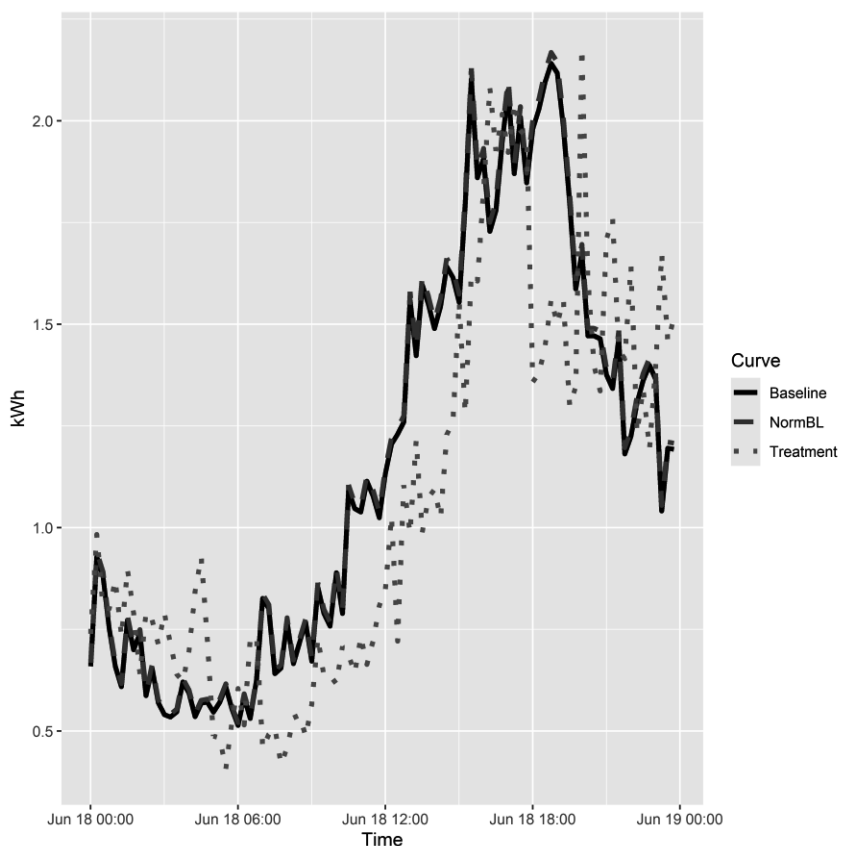


Figure 4-19: SPPC DP12.DM1 Load Shape June 18, 2025

SPPC DP12.DM1 Manage Demand Reduction Results

The following table provides the demand reduction results in kW savings by hour for all event and snapback hours. Positive values indicate energy savings, while negative values indicate increased load relative to baseline. Negative values are typically associated with snapback hours.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-51: SPPC DP12.DM1 Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.99	0.96	0.22	0.28	2.45	0.99
6/10/2025	0.76	0.46	0.14	0.28	1.64	0.76
6/18/2025	0.65	0.47	-0.09	-0.22	0.81	0.65
7/13/2025	1.41	1.24	0.19	0.40	3.23	1.41
7/14/2025	0.87	0.81	0.17	0.14	1.99	0.87
7/15/2025	0.60	0.52	0.37	-0.13	1.36	0.60
8/11/2025	1.51	1.02	0.50	0.70	3.73	1.51
8/12/2025	1.64	1.17	0.68	0.52	4.00	1.64
8/13/2025	1.26	0.97	0.64	0.85	3.72	1.26
8/21/2025	0.74	0.62	-0.08	0.08	1.37	0.74
8/22/2025	0.99	0.58	0.02	-0.06	1.53	0.99

SPPC DP12.DM1 Manage VDR and Energy Savings

Table 4-52 details VDR and energy savings by event for EcoFactor devices installed in multifamily homes from the Manage population.

Table 4-52: SPPC DP12.DM1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	46	24	35	34	85
6/10/2025	46	24	35	26	57
6/18/2025	45	32	31	20	25
7/13/2025	43	22	34	47	108
7/14/2025	43	20	35	30	69
7/15/2025	43	15	37	22	50
8/11/2025	40	23	31	47	116
8/12/2025	40	18	33	54	132
8/13/2025	40	10	36	45	134
8/21/2025	39	20	31	23	43
8/22/2025	39	18	32	32	49

4.8.2.2 SPPC ecobee Wi-Fi Thermostats (DP24.DM1)**SPPC DP24.DM1 Event Load Shapes**

Figure 4-20 illustrates the hourly load profile of DP24.DM1 devices installed in multifamily homes during the August 22, 2025, DR event. In addition to the Treatment and Baseline curves, Figure 4-20 also shows the Baseline curve normalized to the Treatment curve, as described in Section 3.4.5. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized

Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00.

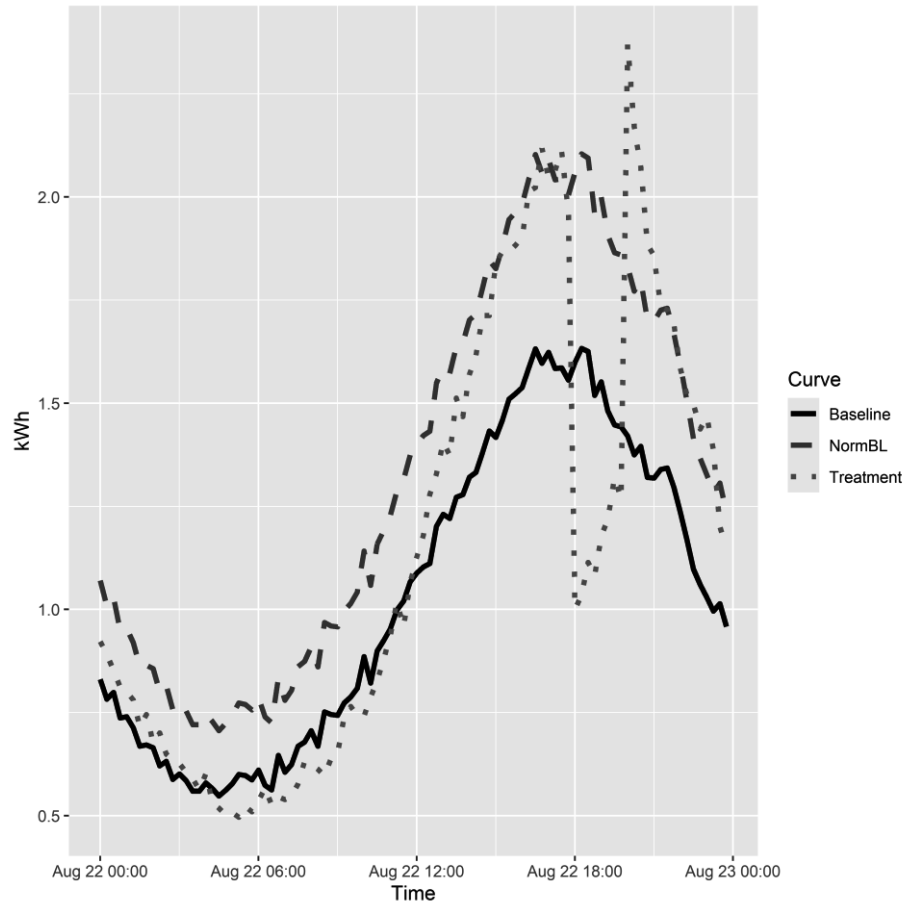


Figure 4-20: SPPC DP24.DM1 Load Shape August 22, 2025

SPPC DP24.DM1 Manage and Build Demand Reduction Results

Table 4-53 details the demand reduction results by event period for the DP24 devices installed in multifamily homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-53: SPPC DP24.DM1 Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.83	0.53	-0.31	-0.15	0.90	0.83
6/10/2025	0.83	0.60	-0.27	-0.11	1.05	0.83
6/18/2025	0.90	0.62	-0.34	-0.15	1.03	0.90
7/13/2025	0.98	0.64	-0.36	-0.13	1.12	0.98
7/14/2025	0.77	0.34	-0.50	-0.31	0.31	0.77
7/15/2025	0.76	0.45	-0.30	-0.18	0.73	0.76
8/11/2025	1.00	0.65	-0.21	0.04	1.47	1.00
8/12/2025	0.92	0.60	-0.33	-0.08	1.10	0.92
8/13/2025	0.80	0.60	-0.33	0.02	1.08	0.80
8/21/2025	0.82	0.50	-0.41	0.01	0.91	0.82
8/22/2025	0.96	0.63	-0.34	-0.05	1.21	0.96

SPPC DP24.DM1 Manage and Build VDR and Energy Savings

Table 4-54 details VDR and energy savings for ecobee devices installed in multifamily homes from the Manage population whereas Table 4-55 shows the same results for devices from the Build population.

Table 4-54: SPPC DP24.DM1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	525	18	432	357	388
6/10/2025	524	13	454	376	479
6/18/2025	525	22	410	370	422
7/13/2025	524	16	440	428	491
7/14/2025	522	13	453	346	139
7/15/2025	522	15	445	335	322
8/11/2025	523	18	426	422	627
8/12/2025	523	18	427	391	469
8/13/2025	523	16	438	350	474
8/21/2025	528	20	423	348	384
8/22/2025	528	17	440	420	532

Table 4-55: SPPC DP24.DM1 Build VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	45	18	37	31	33
6/10/2025	45	13	39	32	41
6/18/2025	46	22	36	32	37
7/13/2025	52	16	44	43	49
7/14/2025	52	13	45	35	14
7/15/2025	52	15	44	34	32
8/11/2025	59	19	48	48	71
8/12/2025	59	18	48	44	53
8/13/2025	60	17	50	41	55
8/21/2025	65	20	52	43	48
8/22/2025	65	17	54	52	66

4.8.2.3 SPPC EcoFactor s100 Wi-Fi Thermostats (DP46.DM1)

SPPC DP46.DM1 Event Load Shapes

Figure 4-21 details the hourly load profile of DP46.DM1 devices installed in multifamily homes during the August 21, 2025. DR event. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00.

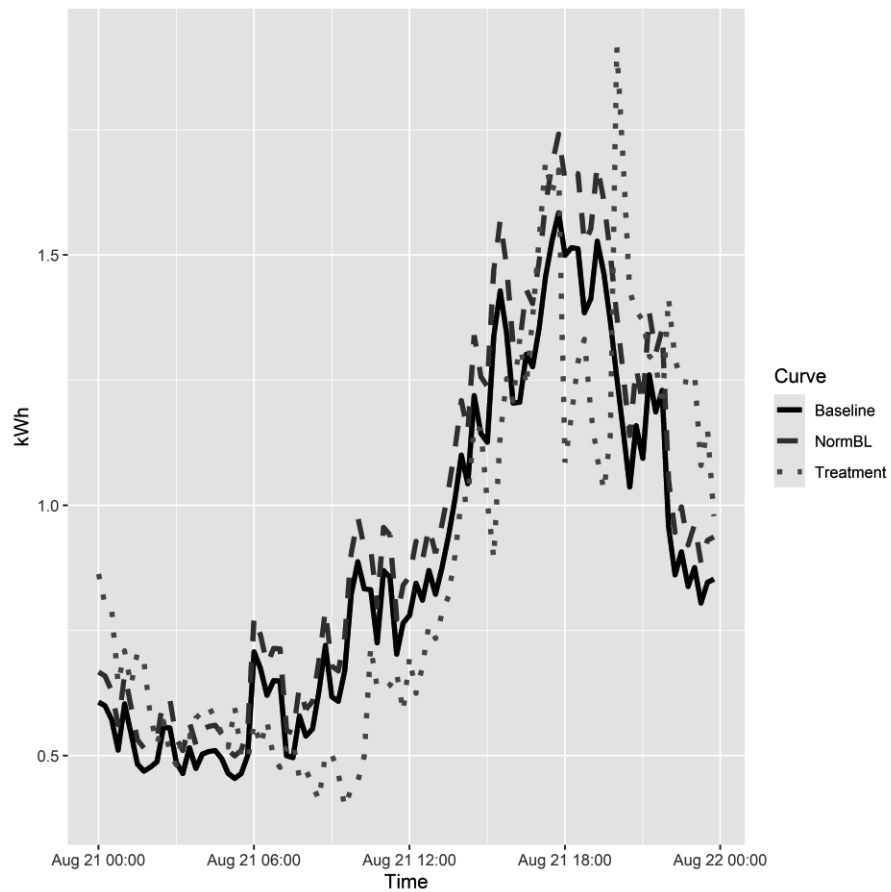


Figure 4-21: SPPC DP46.DM1 Load Shape August 21, 2025

SPPC DP46.DM1 Manage Demand Reduction Results

Table 4-56 details the demand reductions (kW savings) by hour for all event, and snapback hours for EcoFactor s100 devices installed in multifamily homes. Positive values indicate energy savings, while negative indicate increased load relative to baseline.

Table 4-56: SPPC DP46.DM1 Demand Reduction Results

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.12	-0.06	-0.34	-0.27	-0.55	0.12
6/10/2025	0.34	0.34	0.10	0.19	0.97	0.34
6/18/2025	0.59	0.52	0.33	0.53	1.96	0.59
7/13/2025	0.53	0.52	0.03	0.11	1.19	0.53
7/14/2025	0.52	0.32	0.00	-0.18	0.66	0.52
7/15/2025	0.54	0.10	-0.21	-0.16	0.25	0.54
8/11/2025	0.34	0.24	-0.26	-0.26	0.06	0.34
8/12/2025	0.76	0.65	0.06	0.18	1.65	0.76
8/13/2025	0.57	0.42	-0.07	-0.02	0.91	0.57
8/21/2025	0.39	0.46	-0.33	0.02	0.54	0.46
8/22/2025	0.58	0.14	-0.55	-0.43	-0.26	0.58

SPPC DP46.DM1 Manage VDR and DR Energy Savings

Table 4-57 details VDR and energy savings by event for EcoFactor s100 devices installed in multifamily homes from the Manage population.

Table 4-57: SPPC DP46.DM1 Manage VDR and Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	110	25	83	10	-46
6/10/2025	110	29	78	27	76
6/18/2025	108	32	73	43	144
7/13/2025	100	25	75	40	90
7/14/2025	100	24	76	40	50
7/15/2025	100	28	72	39	18
8/11/2025	98	25	73	25	4
8/12/2025	97	23	75	56	123
8/13/2025	97	25	72	42	66
8/21/2025	95	32	65	30	35
8/22/2025	95	23	73	42	-19

4.8.3 SPPC PowerShift Overrides

Customers with EcoFactor, EcoFactor s100 PCT, or ecobee device can override the DR event setting either online, via a smart phone/tablet application, or directly on the physical thermostat. The following tables provide the override rates during each event for DP12, DP24, and DP46. On average, the DP12 rate was 5 percent in 2025, which is lower than the 2024 override rate of 7 percent. DP24 had an override rate that was twice the override rate observed in 2024 (25 percent

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

vs. 13 percent), but the override rate was also affected by a power outage on June 10, 2025.²⁴ DP46 had a similar, albeit lower, override rate compared to 2024 (5 percent vs. 7 percent).

Table 4-58: Override Rates for SPPC DP12

Date	Event High Temperature (° F)	Percent of Overrides in First Event Hour	Percent of Overrides in Second Event Hour	Total Event Overrides
6/9/2025	92	0.90%	3.15%	4.05%
6/10/2025	93	1.18%	3.44%	4.62%
6/18/2025	94	1.03%	3.64%	4.67%
7/13/2025	103	1.25%	3.92%	5.16%
7/14/2025	102	1.42%	4.75%	6.17%
7/15/2025	96	1.13%	3.33%	4.46%
8/11/2025	98	0.92%	4.37%	5.29%
8/12/2025	102	1.29%	4%	5.30%
8/13/2025	97	1.11%	3.39%	4.50%
8/21/2025	95	0.93%	3.67%	4.61%
8/22/2025	98	1%	3.07%	4.07%
Average	97	1.11%	3.70%	4.8%

Table 4-59: Override Rates for SPPC DP24

Date	Event High Temperature (° F)	Percent of Overrides in First Event Hour	Percent of Overrides in Second Event Hour	Total Event Overrides
6/9/2025	92	14.66%	4.88%	19.54%
6/10/2025	93	54.07%	2.98%	56.98%
6/18/2025	94	15.43%	4.68%	20.08%
7/13/2025	103	17.01%	6.91%	23.85%
7/14/2025	102	17.92%	7.05%	24.93%
7/15/2025	96	16.60%	6.22%	22.76%
8/11/2025	98	17.16%	5.32%	22.45%
8/12/2025	102	16.46%	5.52%	21.94%
8/13/2025	97	16.29%	5.06%	21.35%
8/21/2025	95	16.01%	5.32%	21.31%
8/22/2025	98	15.25%	5.16%	20.41%
Average	97	19.71%	5.37%	25.05%

²⁴ <https://mynews4.com/news/local/power-outage-leaves-8000-nv-energy-customers-in-reno-without-electricity>. Last Accessed: December 26, 2025.

Table 4-60: Override Rates for SPPC DP46

Date	Event High Temperature (° F)	Percent of Overrides in First Event Hour	Percent of Overrides in Second Event Hour	Total Event Overrides
6/9/2025	92	1.07%	3.72%	4.79%
6/10/2025	93	1.41%	2.94%	4.35%
6/18/2025	94	1.44%	2.93%	4.37%
7/13/2025	103	1.32%	5.16%	6.48%
7/14/2025	102	1.86%	4.44%	6.30%
7/15/2025	96	1.02%	4.63%	5.65%
8/11/2025	98	1.77%	4.11%	5.88%
8/12/2025	102	0.95%	3.87%	4.82%
8/13/2025	97	1.33%	3.56%	4.89%
8/21/2025	95	1.22%	3.66%	4.88%
8/22/2025	98	0.97%	3.22%	4.19%
Average	97	1.31%	3.84%	5.15%

4.9 SPPC Service Territory Bring Your Own Thermostat Results

This section reports demand reduction and energy savings results for the BYOT component for which the device population includes DP48 and DP50. The kW factors ($\Delta kW_g(e)$) and kWh factors ($\Delta kWh_g(e)$) are reported for each device type and the subgroup-event VDR, and net energy savings for each event.

4.9.1 SPPC Bring Your Own Thermostat Results for Single-Family Homes

4.9.1.1 SPPC Bring Your Own Thermostat ecobee Wi-Fi Thermostats (DP48.D1)

The following section details results from the BYOT ecobee (DP48) DR event performance during the 2025 season.

SPPC DP48.D1 Event Load Shapes

Figure 4-22 details the hourly load profile of DP48.D1 devices installed in single family homes during the June 9, 2025, DR event. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00 in the plot.

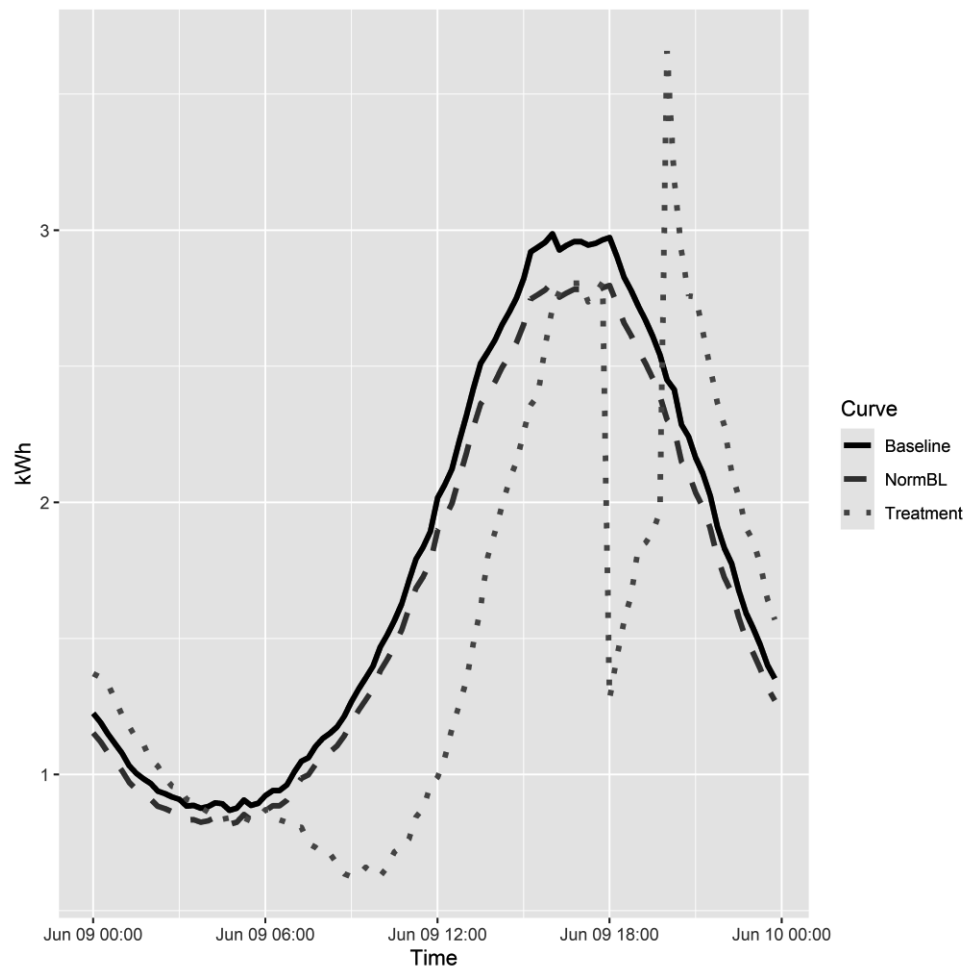


Figure 4-22: SPPC DP48.D1 Load Shape June 9, 2025

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026***SPPC DP48.D1 Demand Reduction Results**

Table 4-61 details the demand reduction results by event period for the DP48 devices installed in single family homes.

Table 4-61: SPPC DP48.D1 Demand Reduction Results

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	1.21	0.58	-0.91	-0.62	0.26	1.21
6/10/2025	1.05	0.41	-0.99	-0.74	-0.28	1.05
6/18/2025	1.28	0.57	-1.02	-0.67	0.17	1.28
7/13/2025	1.50	0.66	-0.84	-0.51	0.81	1.50
7/14/2025	1.21	0.42	-1.07	-0.68	-0.13	1.21
7/15/2025	1.03	0.39	-1.04	-0.57	-0.21	1.03
8/11/2025	1.53	0.67	-0.97	-0.64	0.59	1.53
8/12/2025	1.37	0.56	-1.05	-0.72	0.18	1.37
8/13/2025	1.19	0.53	-1.00	-0.60	0.13	1.19
8/21/2025	1.37	0.67	-1.07	-0.65	0.34	1.37
8/22/2025	1.43	0.80	-0.88	-0.53	0.82	1.43

SPPC DP48.D1 Manage and Build VDR and Energy Savings

Table 4-62 details VDR and energy savings by event for DP48 devices installed in single family homes from the Manage population.

Table 4-62: SPPC DP48.D1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	2,490	12	2,190	2,625	552.
6/10/2025	2,490	10	2,238	2,334	-626
6/18/2025	2,488	13	2,168	2,790	374
7/13/2025	2,480	10	2,243	3,372	1,823
7/14/2025	2,480	10	2,243	2,710	-284
7/15/2025	2,478	11	2,213	2,276	-452
8/11/2025	2,488	10	2,230	3,411	1,320
8/12/2025	2,487	11	2,206	3,018	381
8/13/2025	2,486	10	2,231	2,657	292
8/21/2025	2,780	12	2,440	3,349	814
8/22/2025	2,780	10	2,503	3,578	2,036

Table 4-63 details VDR and energy savings by event for DP48 devices installed in single family homes from the Build population.

Table 4-63: SPPC DP48.D1 Build VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	509	12	447	543	114
6/10/2025	509	10	457	483	-130
6/18/2025	508	13	442	577	77
7/13/2025	504	10	455	694	375
7/14/2025	504	10	455	557	-58
7/15/2025	504	11	449	468	-93
8/11/2025	581	10	520	803	310
8/12/2025	580	11	514	709	89
8/13/2025	580	10	520	624	69
8/21/2025	337	12	295	411	100
8/22/2025	337	10	303	440	250

4.9.1.2 SPPC Bring Your Own Thermostat Resideo Wi-Fi Thermostats (DP50.D1)

The following section details results from the BYOT Resideo (DP50) DR event performance during the 2025 season.

SPPC DP50.D1 Event Load Shapes

Figure 4-23 details the hourly load profile of DP50.D1 devices installed in single family homes during the July 13, 2025 DR event. Energy savings associated with the DR event, which began at 19:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 21:00 in the plot.

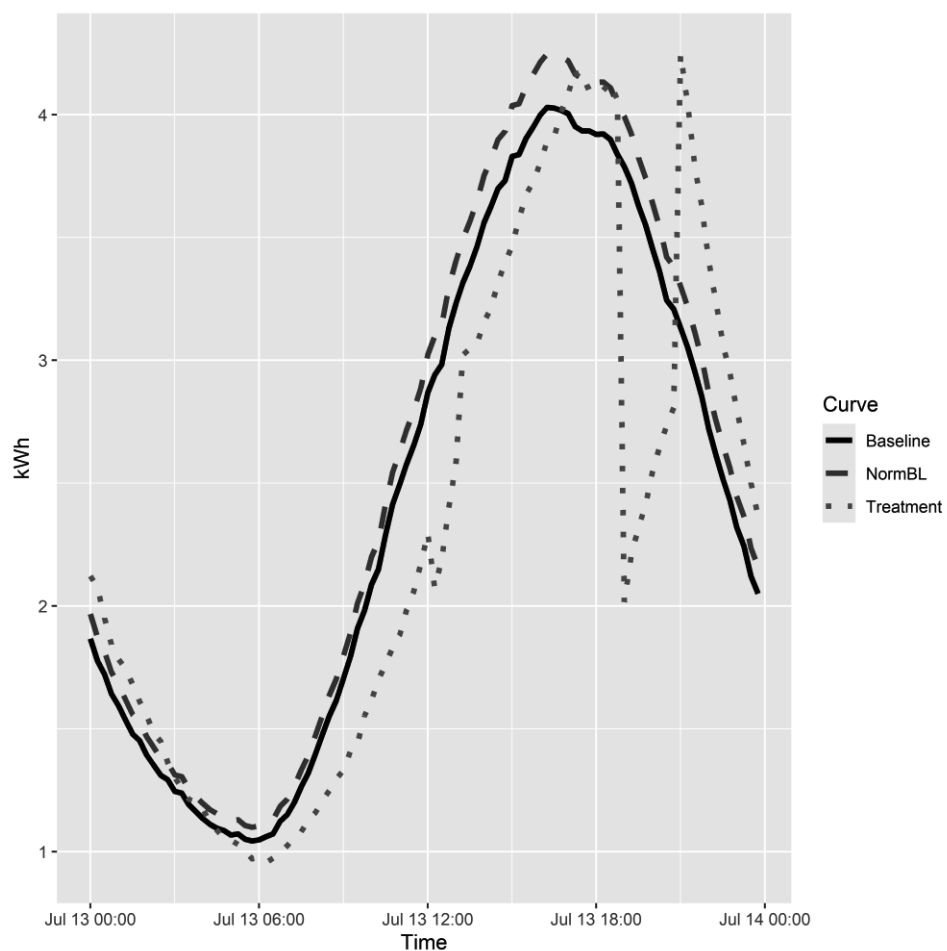


Figure 4-23: SPPC DP50.D1 Load Shape July 13, 2025

SPPC DP50.D1 Demand Reduction Results

Table 4-64 details the demand reduction results by event period for the DP50 devices installed in single family homes.

Table 4-64: SPPC DP50.D1 Demand Reduction Results

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	1.32	0.74	-0.80	-0.47	0.78	1.32
6/10/2025	1.27	0.68	-0.83	-0.52	0.59	1.27
6/18/2025	1.50	0.88	-0.79	-0.49	1.10	1.50
7/13/2025	1.61	0.80	-0.76	-0.46	1.21	1.61
7/14/2025	1.56	0.74	-0.72	-0.38	1.21	1.56
7/15/2025	1.34	0.65	-0.76	-0.40	0.82	1.34
8/11/2025	1.71	0.88	-0.77	-0.57	1.25	1.71
8/12/2025	1.72	0.97	-0.78	-0.52	1.38	1.72
8/13/2025	1.46	0.73	-0.92	-0.63	0.63	1.46
8/21/2025	1.56	0.90	-0.71	-0.56	1.18	1.56
8/22/2025	1.58	0.97	-0.69	-0.54	1.31	1.58

SPPC DP50.D1 Manage and Build VDR and Energy Savings

Table 4-65 and Table 4-66 details VDR and energy savings by event for DP50 devices installed in single family homes from the Build population.

Table 4-65: SPPC DP50.D1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	3,316	19	2,678	3,508	2,074
6/10/2025	3,315	19	2,699	3,402	1,603
6/18/2025	3,323	22	2,600	3,889	2,854
7/13/2025	3,325	16	2,809	4,519	3,381
7/14/2025	3,325	15	2,835	4,405	3,411
7/15/2025	3,325	15	2,841	3,787	2,333
8/11/2025	3,333	17	2,751	4,678	3,416
8/12/2025	3,334	18	2,722	4,673	3,763
8/13/2025	3,339	15	2,828	4,110	1,792
8/21/2025	3,665	20	2,946	4,577	3,466
8/22/2025	3,665	16	3,075	4,847	4,046

Table 4-66: SPPC DP50.D1 Build VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	1,024	19	825	1,093	646
6/10/2025	1,024	19	831	1,061	500
6/18/2025	1,091	22	851	1,289	946
7/13/2025	1,126	16	949	1,546	1,156
7/14/2025	1,126	15	958	1,507	1,167
7/15/2025	1,126	15	960	1,296	798
8/11/2025	1,199	18	987	1,701	1,242
8/12/2025	1,199	19	976	1,698	1,368
8/13/2025	1,289	16	1,089	1,603	699
8/21/2025	950	20	761	1,198	907
8/22/2025	950	16	795	1,270	1,060

4.9.2 SPPC Bring Your Own Thermostat Results for Multifamily Homes

4.9.2.1 SPPC Bring Your Own Thermostat ecobee Wi-Fi Thermostats (DP48.DM1)

The following section details results from the BYOT ecobee (DP48) DR event performance during the 2025 season.

SPPC DP48.DM1 Event Load Shapes

Figure 4-24 illustrates the hourly load profile of DP48.DM1 devices installed in multifamily homes during the August 13, 2025, DR event. Energy savings associated with the DR event, which began at 18:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 20:00 in the plot.

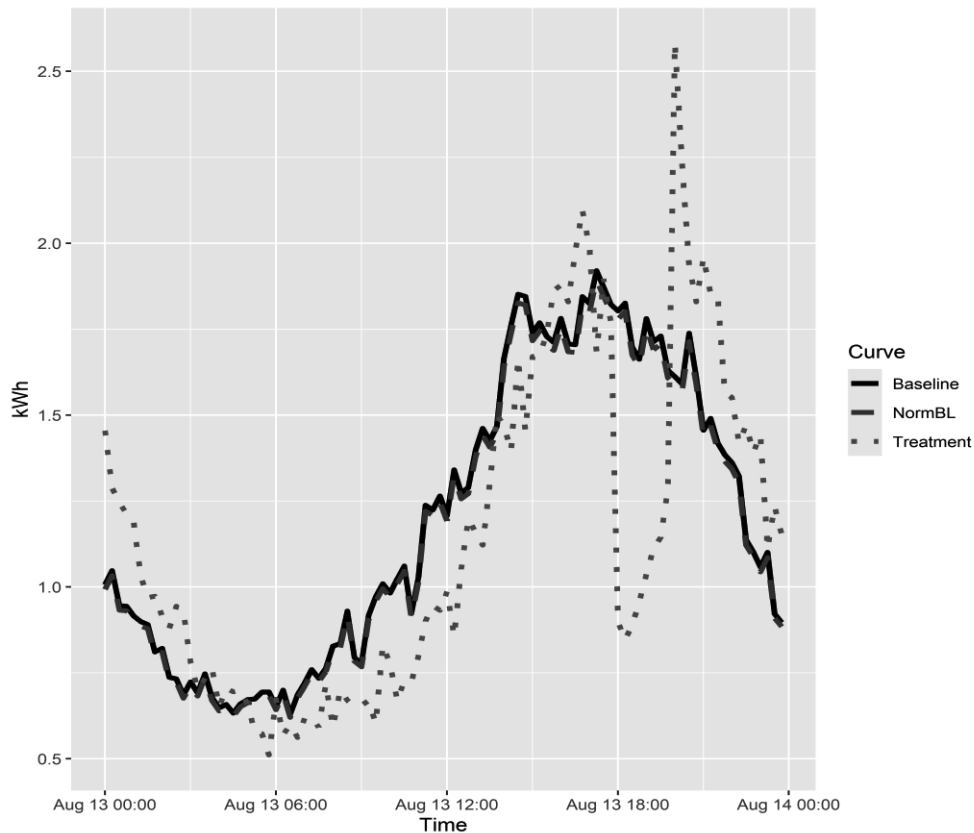


Figure 4-24: SPPC DP48.DM1 Load Shape August 13, 2025

SPPC DP48.DM1 Demand Reduction Results

Table 4-67 details the demand reduction results by event period for the DP48 devices installed in multifamily homes.

Table 4-67: SPPC DP48.DM1 Demand Reduction Results

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.98	0.62	-0.41	-0.58	0.60	0.98
6/10/2025	0.93	0.65	-0.36	-0.49	0.73	0.93
6/18/2025	0.88	0.56	-0.52	-0.46	0.45	0.88
7/13/2025	1.13	0.84	-0.35	-0.30	1.33	1.13
7/14/2025	0.64	0.14	-0.94	-0.91	-1.06	0.64
7/15/2025	0.52	0.28	-0.69	-0.60	-0.50	0.52
8/11/2025	1.11	0.83	-0.36	0.11	1.68	1.11
8/12/2025	1.11	0.62	-0.77	-0.43	0.53	1.11
8/13/2025	0.82	0.54	-0.52	-0.38	0.44	0.82
8/21/2025	0.94	0.68	-0.49	-0.17	0.96	0.94
8/22/2025	1.09	0.73	-0.46	0.01	1.37	1.09

SPPC DP48.DM1 Manage and Build VDR and Energy Savings

Table 4-68 details VDR and energy savings by event for DP48 devices installed in multifamily homes from the Manage population.

Table 4-68: SPPC DP48.DM1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	113	20	90	88	53.81
6/10/2025	113	20	90	83	65.55
6/18/2025	112	22	87	76	39.01
7/13/2025	112	16	94	106	124.25
7/14/2025	112	11	100	64	-105.17
7/15/2025	112	9	102	53	-51.14
8/11/2025	111	20	88	98	147.95
8/12/2025	111	19	89	99	47.33
8/13/2025	111	23	86	70	38.19
8/21/2025	124	16	104	97	99.59
8/22/2025	124	18	102	112	139.80

Table 4-69 details VDR and energy savings by event for DP48 devices installed in multifamily homes from the Build population.

Table 4-69: SPPC DP48.DM1 Build VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	31	21	25	24	14.96
6/10/2025	31	21	25	23	18.22
6/18/2025	31	23	24	21	10.94
7/13/2025	31	17	26	30	34.89
7/14/2025	31	11	28	18	-29.57
7/15/2025	31	9	28	15	-14.39
8/11/2025	34	21	27	30	45.93
8/12/2025	34	20	27	31	14.70
8/13/2025	34	23	26	22	11.85
8/21/2025	21	16	18	17	17.09
8/22/2025	21	18	17	19	23.98

4.9.2.2 SPPC Bring Your Own Thermostat Resideo Wi-Fi Thermostats (DP50.DM1)

The following section details results from the BYOT Resideo (DP50) DR event performance during the 2025 season.

SPPC DP50.DM1 Event Load Shapes

Figure 4-25 illustrates the hourly load profile of DP50.DM1 devices installed in multifamily homes during the July 14, 2025, DR event. Energy savings associated with the DR event, which began at 19:00, are depicted in the graph by the consumption drop coinciding with that time and is the area below the Normalized Baseline curve and above the Treatment curve. Conversely, the snapback energy consumption is represented by the area above the Normalized Baseline curve and below the Treatment curve, starting at approximately 21:00 in the plot.

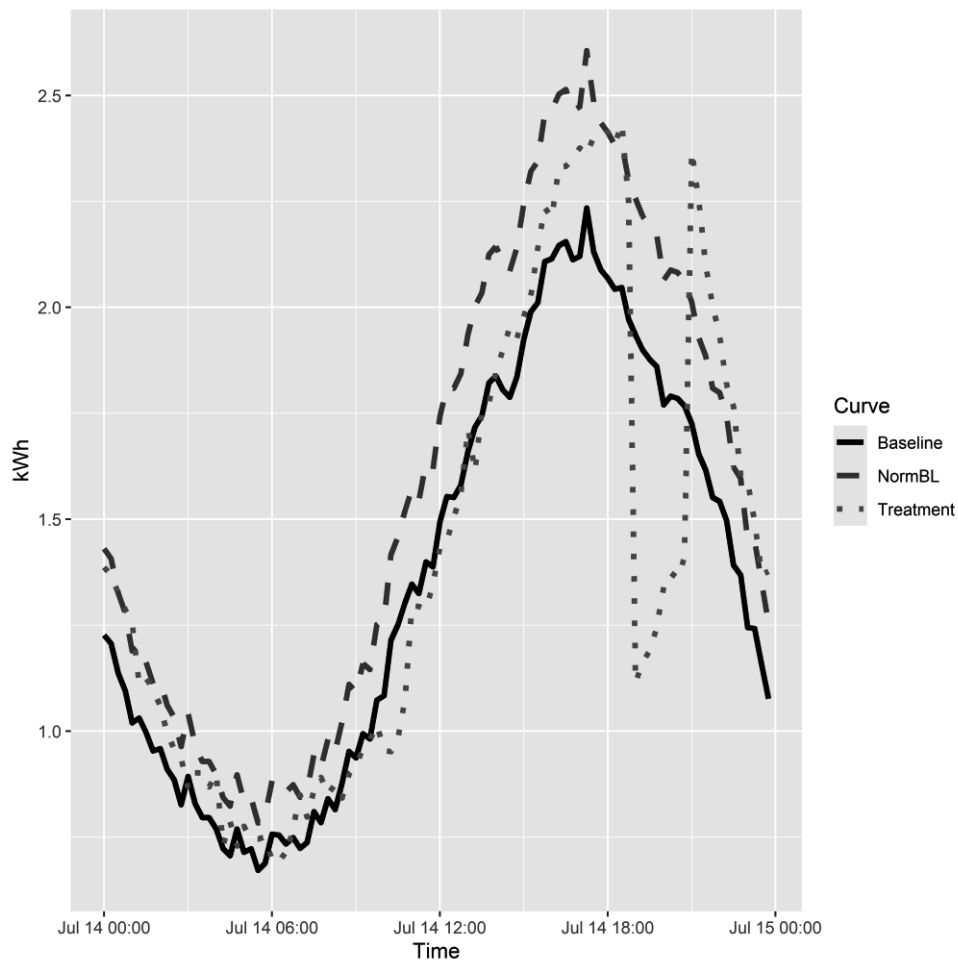


Figure 4-25: SPPC DP50.DM1 Load Shape July 14, 2025

SPPC DP50.DM1 Demand Reduction Results

Table 4-70 details the demand reduction results by event period for the DP50 devices installed in multifamily homes.

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-70: SPPC DP50.DM1 Demand Reduction Results*

Date	Event1	Event2	Snap1	Snap2	kWh Factor	kW Factor
6/9/2025	0.82	0.48	-0.36	-0.13	0.80	0.82
6/10/2025	0.94	0.79	-0.34	-0.20	1.19	0.94
6/18/2025	1.12	0.76	-0.30	-0.05	1.53	1.12
7/13/2025	1.01	0.58	-0.30	-0.15	1.14	1.01
7/14/2025	1.01	0.69	-0.27	-0.09	1.35	1.01
7/15/2025	1.00	0.68	-0.23	-0.07	1.38	1.00
8/11/2025	1.11	0.77	-0.19	-0.08	1.61	1.11
8/12/2025	1.04	0.77	-0.35	-0.13	1.32	1.04
8/13/2025	0.96	0.76	-0.32	-0.06	1.34	0.96
8/21/2025	0.98	0.78	-0.15	-0.02	1.59	0.98
8/22/2025	0.98	0.61	-0.37	-0.25	0.97	0.98

SPPC DP50.DM1 Build VDR and Energy Savings

Table 4-71 and Table 4-72 details VDR and energy savings by event for DP50 devices installed in multifamily homes from the Build population.

Table 4-71: SPPC DP50.DM1 Manage VDR and DR Energy Savings

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	289	28	208	169	165
6/10/2025	289	29	204	192	242
6/18/2025	290	31	200	223	305
7/13/2025	290	20	233	235	264
7/14/2025	289	19	235	237	315
7/15/2025	289	25	217	216	297
8/11/2025	291	28	210	232	335
8/12/2025	291	28	210	217	276
8/13/2025	291	27	213	205	285
8/21/2025	333	29	236	231	374
8/22/2025	333	24	254	248	244

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 4-72: SPPC DP50.DM1 Build VDR and DR Energy Savings*

Date	Available Devices	Percent NRD	Responding Devices	VDR (kW)	Energy Savings (kWh)
6/9/2025	125	28	90	74	72
6/10/2025	125	30	88	84	105
6/18/2025	131	32	90	101	139
7/13/2025	131	20	105	107	121
7/14/2025	131	19	106	108	144
7/15/2025	131	25	98	99	136
8/11/2025	136	28	97	110	158
8/12/2025	136	28	97	102	130
8/13/2025	140	27	102	100	138
8/21/2025	96	30	67	68	109
8/22/2025	96	24	73	73	72

4.9.3 SPPC Bring Your Own Thermostat Overrides

Customers with an ecobee or Resideo device can override the DR event setting either online, via a smart phone/tablet application, or directly on the physical thermostat. Table 4-73 provides the override rates during each event for DP48. The DP48 override rate in 2025 was twice the override rate in 2024 (25 percent vs. 13 percent); however, similar to DP24 (Section 4.8.3), this increase was influenced by a power outage on June 10, 2025. Table 4-74 provides the override rates during each event for DP50. The average override rate for DP50 was 7 percent.

Table 4-73: Override Rates for SPPC DP48

Date	Event High Temperature (° F)	Percent of Overrides in First Event Hour	Percent of Overrides in Second Event Hour	Total Event Overrides
6/9/2025	92	15.52%	4.42%	19.94%
6/10/2025	93	48.54%	2.70%	51.24%
6/18/2025	94	17.13%	4.27%	21.40%
7/13/2025	103	18.29%	6.30%	24.58%
7/14/2025	102	19.09%	5.53%	24.62%
7/15/2025	96	17.91%	4.80%	22.71%
8/11/2025	98	17.82%	4.70%	22.52%
8/12/2025	102	17.77%	4.36%	22.13%
8/13/2025	97	17.09%	4.48%	21.58%
8/21/2025	95	16.27%	4.47%	20.75%
8/22/2025	98	16.37%	4.26%	20.63%
Average	97	20.16%	4.57%	24.74%

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 4-74: Override Rates for SPPC DP50

Date	Event High Temperature (° F)	Percent of Overrides in First Event Hour	Percent of Overrides in Second Event Hour	Total Event Overrides
6/9/2025	92	3.37%	2.91%	6.28%
6/10/2025	93	7.05%	2.61%	9.66%
6/18/2025	94	4.44%	0.87%	5.32%
7/13/2025	103	5.89%	1.21%	7.10%
7/14/2025	102	5.69%	1.35%	7.04%
7/15/2025	96	4.55%	1.35%	5.90%
8/11/2025	98	5.20%	3.51%	8.71%
8/12/2025	102	4.25%	2.90%	7.16%
8/13/2025	97	3.95%	2.87%	6.82%
8/21/2025	95	4.55%	3.22%	7.77%
8/22/2025	98	4.79%	2.67%	7.46%
Average	97	4.88%	2.32%	7.20%

4.10 SPPC Service Territory Non-Thermostat Demand Response Results

This section reports demand reduction and energy savings results for the Non-Thermostat DR components, including Battery Storage and Water Heaters. Subgroup factors ($\Delta kW_g(e)$) and kWh factors ($\Delta kWh_g(e)$) are reported for each device type along with the subgroup-event VDR, and net energy savings for each event.

4.10.1 SPPC Battery Storage Demand Response Results

The following section details results from the Battery Storage DR event performance during the 2025 season.

Figure 4-26 shows the curtailment patterns observed during battery storage DR events. Energy savings are depicted in the graph by the consumption drop coinciding with that time and is the area below the Baseline curve and above the DRKWH curve.

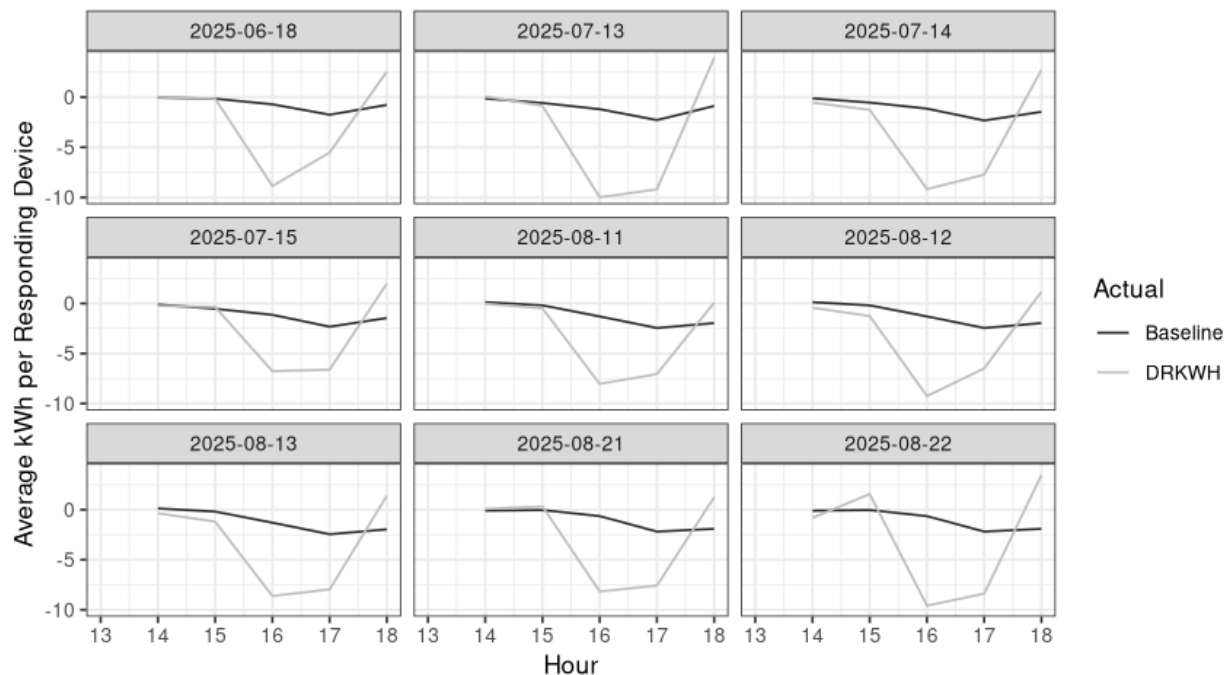


Figure 4-26: SPPC Event-Level Battery Storage Load Shapes

Table 4-75 details the demand reduction results by event period derived from battery storage DR.

Table 4-75: SPPC Battery Storage Demand Reduction Results

Date	kWh Factor	kW Factor	NRD %	Available Devices	VDR (kW)	Energy Savings (kWh)
6/18/2025	11.93	8.15	0.00	15	122.29	178.96
7/13/2025	15.71	8.80	6.67	15	123.14	219.93
7/14/2025	13.44	8.04	0.00	15	120.53	201.59
7/15/2025	9.91	5.62	0.00	15	84.37	148.66
8/11/2025	11.33	6.73	0.00	14	94.21	158.56
8/12/2025	11.98	7.94	0.00	14	111.20	167.70
8/13/2025	12.83	7.32	0.00	14	102.48	179.58
8/21/2025	12.92	7.52	0.00	14	105.28	180.84
8/22/2025	15.14	8.94	0.00	15	134.05	227.05

4.10.2 SPPC Water Heater Demand Response Results

The following section details results from the Water Heater DR event performance during the 2025 season.

Figure 4-27 shows the curtailment patterns observed during water heater DR events. Energy savings are depicted in the graph by the consumption drop coinciding with that time and is the area below the baseline curve and above the DR curve starting at approximately 17:00. Conversely, the snapback energy consumption is represented by the area above the Baseline curve and below the Treatment curve, starting at approximately 19:00.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

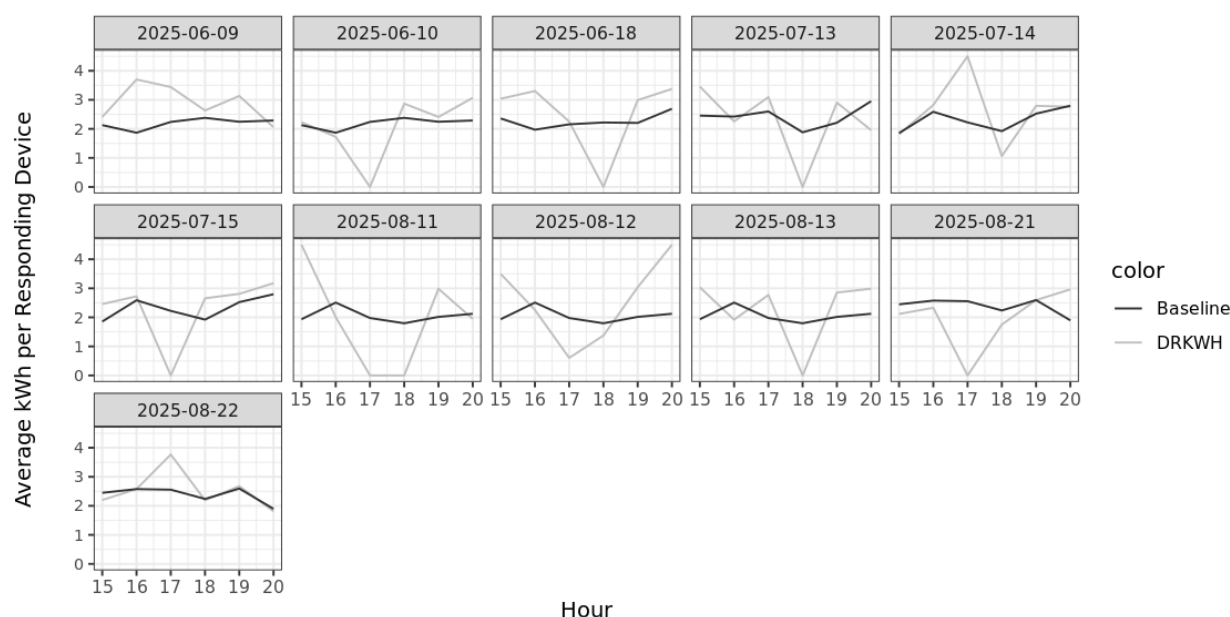


Figure 4-27: SPPC Event-Level Water Heater Load Shapes

Table 4-76 details the demand reduction results by event period derived from water heater DR.

Table 4-76: SPPC Water Heater Demand Reduction Results

Date	kWh Factor	kW Factor	NRD %	Available Devices	VDR	Energy Savings (kWh)
6/9/2025	-2.11	0.23	14.29	14	2.78	-25
6/10/2025	0.81	2.24	14.29	14	26.87	10
6/18/2025	0.66	2.22	14.29	14	26.63	8
7/13/2025	1.70	1.88	14.29	14	22.58	20
7/14/2025	-1.65	0.86	14.29	14	10.32	-20
7/15/2025	-1.40	-0.29	14.29	14	-3.42	-17
8/11/2025	1.19	1.98	14.29	14	23.72	14
8/12/2025	-1.60	1.37	14.29	14	16.47	-19
8/13/2025	-2.50	-0.80	14.29	14	-9.54	-30
8/21/2025	-0.58	0.49	14.29	14	5.83	-7
8/22/2025	-1.16	0.09	14.29	14	1.02	-14

4.11 Combined SPPC Service Territory Results

VDR in the SPPC service territory peaked on August 11, 2025, at over 22,000 kW which was during an August heat wave. The other day where VDR exceeded 22,000 kW was July 13, the hottest day of the year. Energy savings peaked on August 22, 2025, during a late-August heat wave. Both VDR and energy savings were lowest on June 10, 2025; however, the DR event on

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

that day was also influenced by a power outage in the Reno area. Overrides for DP24 and DP48 were also affected by the power outage (Sections 4.8.3 and 4.9.3).

As with the NPC Non-Thermostat DR program component, because the non-thermostat DR DPs were small in comparison to the thermostat DPs, non-thermostat DR made a negligible contribution to combined VDR and energy savings.

Table 4-77 summarizes the combined PowerShift, BYOT, and Non-Thermostat DR results by event day.

Table 4-77: SPPC Service Territory Combined Results

Date	Available Devices	Overall % NRD	Responding Devices	VDR	kWh Savings from DR
6/9/2025	20,235	13.90%	17,421	17,426.08	11,132.44
6/10/2025	20,236	12.84%	17,637	16,407.83	6,508.44
6/18/2025	20,310	16.28%	17,004	19,059.52	11,274.50
7/13/2025	20,263	10.80%	18,075	22,457.55	17,843.22
7/14/2025	20,258	9.97%	18,238	19,646.84	10,346.91
7/15/2025	20,254	10.95%	18,037	16,773.97	7,802.65
8/11/2025	20,394	13.66%	17,609	22,828.05	16,527.28
8/12/2025	20,392	13.98%	17,540	21,252.41	13,523.44
8/13/2025	20,487	11.77%	18,076	19,369.48	10,038.71
8/21/2025	20,534	15.52%	17,347	19,937.17	13,239.10
8/22/2025	20,536	12.25%	18,020	21,479.22	19,165.46

4.12 M&V Inputs for Cost-Effectiveness Modeling

Table 4-78 presents summarized M&V results used to support NV Energy's cost-effectiveness modeling for the Residential DR program. Per unit savings were calculated at the Device level. Total Capacity represents ex-post peak VDR, accounting for the proportion of NRDs (Table 1-3 and Table 1-6). Total Annual Savings represents the total energy saving (Table 1-4 and Table 1-7). Savings per Unit were calculated as weighted average values in proportion to the size of each DP. Effective Useful Life for the Manage population reflects a weighted average of remaining effective useful life across all DPs, assuming an initial lifetime of 10 years. Annual therms savings were calculated by multiplying the number of smart thermostat devices at the end of program year 2025 by the deemed therms saving value discussed in Appendix A and by the percentage of homes

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026*

in SPPC (69%) and NPC (60%) that have gas fueled heat²⁵.

Table 4-78: M&V Inputs for Cost-Effectiveness Modeling

Service Territory	Program Component	Number of Units	Total Capacity Savings (kW/Yr)	Capacity Savings (kW/unit)	Total Annual Savings (kWh/Yr)	Annual Savings (kWh/unit)	Effective Useful Life	Annual Therms (therms/Year)
NPC	Cool Share, PowerShift, and BYOT (Manage)	127,355	120,241	0.94	27,755,029	218	5.2	1,299,021
	PowerShift & BYOT (Build)	10,706	12,745	1.19	3,104,146	290	10	109,201
	Non-Thermostat DR	240	650	2.71	11,090	46	11.98	1,612
SPPC	PowerShift & BYOT (Manage)	18,287	20,948	1.15	3,467,744	190	6.5	605,665
	PowerShift & BYOT (Build)	2,248	2,865	1.27	459,714	204	10	74,454
	Non-Thermostat DR	35	192	5.50	1,583	45	11.5	563

²⁵ 2016 RASS survey results for SPPC and NPC.

5 ENERGY SAVINGS CURVES

This chapter describes the use of energy savings curves in the 2025 Residential DR program. For a more general discussion of energy savings curves please see the Evaluator's Technical Appendix.²⁶

DR for DPs in the residential sector was achieved through the direct load control of energy management devices that employ software-based optimization to reduce energy usage. The residential devices included in the program can save energy during “event” and “non-event” days through several mechanisms. During the cooling season, devices may save energy by running the air handler for several minutes after the compressive cooling cycle has ended; this effectively turns the air handler into a direct evaporative cooler and provides a cooling “boost” after each air conditioning cycle. The devices can also save energy by altering the thermostat set points throughout the calendar year.

To develop hourly energy savings curves, the Evaluator used a combination of methods, including the averaging of whole-house meter data and impact evaluation results. The Evaluator modeled the demand response performance by reviewing impact evaluation results. All energy savings associated with Cool Share, PowerShift, and BYOT DR occur during DR event related hours. As such, the relevant energy savings curve for each DP was derived from the DP's event performance (including event period reductions and snapback). All the other hours in the demand response energy savings curve which were not event, or snapback hours were assigned a value of zero, as no program-attributable savings occur during those hours.

In addition to the energy savings curves described above, the Evaluator also used deemed values to estimate hourly energy efficiency impacts associated with smart thermostat optimization as a percentage of the whole-house usage for a typical customer. The PowerShift and BYOT populations consist of participants with smart thermostats. As described in Appendix A: Annual Energy Savings Deemed Value Summary and Background, the PowerShift, and BYOT savings curves for the 2025 MV report are derived from a normalized load shape from the whole-house meter data of participants during the 2019 and 2021-2025 program years. DR events could not be excluded from the analysis, but the energy saved from the DR program was subtracted from the estimated smart thermostat optimization impact before deemed values were reported.

Given that the HVAC system controlled by the smart thermostat dominates a typical NV Energy customer's whole-house load profile, the Evaluator believes that this aggregated whole-house load profile provides an accurate curve for forecasting energy savings into hourly bins. The energy savings and demand reduction impacts were combined through simple addition, with the energy savings curves normalized to represent the typical customer.

²⁶ M&V Topics:

Calculation Methodology and Monthly Energy (kWh) Savings per Rate Class, ADM Associates, Inc. (“ADM”). July 16, 2025

6 CONCLUSIONS AND RECOMMENDATIONS

The results from this M&V study of the Residential DR program are summarized in this chapter. The results indicate that the DR program provided significant kW reductions during critical peak hours, allowing NV Energy greater flexibility in resource management.

Table 6-1: M&V Summary Results from 2025 NPC Service Territory Residential Demand Response Program

Program Component	Device Population	%NRD	Available Devices	kW Factor	Max VDR (kW)
Cool Share (Manage)	DP1.RM	16.49	4,195	0.37	1,296.20
	DP1.RS	7.45	19,865	0.62	11,398.74
PowerShift (Manage)	DP11M.RM	8.29	225	0.71	146.51
	DP11M.RS	4.80	9,388	0.43	3,843.07
	DP23M.RM	8.12	5,217	1.07	5,128.92
	DP23M.RS	3.78	57,424	1.15	63,541.38
	DP47M.RM	11.11	304	0.53	143.22
	DP47M.RS	4.09	5,226	0.44	2,205.39
BYOT (Manage)	DP49M.RM	11.98	722	0.68	432.14
	DP49M.RS	8.62	8,040	0.91	6,685.73
	DP51M.RM	14.68	2,205	1.12	2,107.06
	DP51M.RS	7.88	14,544	1.74	23,312.40
PowerShift (Build)	DP23B.RM	8.44	964	1.07	944.42
	DP23B.RS	3.78	4,414	1.15	4,884.22
BYOT (Build)	DP49B.RM	12.14	167	0.68	99.77
	DP49B.RS	8.79	1,224	0.91	1,015.93
	DP51B.RM	14.90	778	1.12	741.53
	DP51B.RS	7.96	3,159	1.74	5,059.13
Non-Thermostat DR (Manage)	Battery Storage	12.12	27	8.96	212.60
	Pool Pumps	7.39	44	0.82	33.41
	Water Heaters	1.33	34	2.40	80.52
Non-Thermostat DR (Build)	Battery Storage	12.12	3	8.96	23.62
	Pool Pumps	7.39	8	0.82	6.08
	Water Heaters	1.33	124	2.40	293.65
Total			138,301		133,635.63

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 6-2: NPC Service Territory Demand Response Verified 2025 Energy Savings*

Program	Device Population²⁷	2025 DR Energy Savings (Events), kWh	2025 EE Energy Savings (Optimization), kWh	2025 Total Energy Savings, kWh
Cool Share (Manage)	DP1	156,351	-	156,351
PowerShift (Manage)	DP11	-57,030	493,038	436,008
	DP23	-124,604	18,414,984	18,290,380
	DP47	-53,428	1,625,820	1,572,392
BYOT (Manage)	DP49	-188,106	2,576,028	2,387,922
	DP51	-12,230	4,924,206	4,911,976
PowerShift (Build)	DP23	-2,686	1,581,132	1,578,446
BYOT (Build)	DP49	-38,982	408,954	369,972
	DP51	-1,750	1,157,478	1,155,728
Non-Thermostat DR (Manage and Build)	Battery Storage	4,108	-	4,108
	Pool Pumps	174	-	174
	Water Heaters	6,808	-	6,808
Total		-311,375	31,181,640	30,870,265

²⁷ The calculation of energy savings was completed on each DP using econometric models (not broken out by rate class).

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 6-3: M&V Summary Results from 2025 SPPC Service Territory Residential Demand Response Program

Program Component	Device Population	%NRD	Available Devices	kW Factor	Max VDR (kW)
PowerShift (Manage)	DP12M.D1	14.47	1,481	0.77	975.36
	DP12M.DM1	20.37	30	1.64	39.18
	DP24M.D1	9.04	7,959	1.25	9,049.38
	DP24M.DM1	16.96	547	1.00	454.23
	DP46M.D1	13.55	1,313	0.89	1,010.23
	DP46M.DM1	26.48	60	0.76	33.53
BYOT (Manage)	DP48M.D1	10.81	2,776	1.53	3,788.15
	DP48M.DM1	17.76	123	1.13	114.31
	DP50M.D1	17.38	3,665	1.72	5,208.20
	DP50M.DM1	26.12	333	1.12	275.54
PowerShift (Build)	DP24B.D1	9.03	537	1.25	610.64
	DP24B.DM1	17.08	107	1.00	88.72
BYOT (Build)	DP48B.D1	10.95	378	1.53	515.01
	DP48B.DM1	18.07	25	1.13	23.15
	DP50B.D1	17.60	1,075	1.72	1,523.58
	DP50B.DM1	26.55	126	1.12	103.65
Non-Thermostat DR (Manage)	Battery Storage	0.74	16	8.94	141.98
	Water Heaters	14.29	17	2.24	32.64
Non-Thermostat DR (Build)	Battery Storage	0.74	2	8.94	17.75
Total			20,570		24,005.23

Table 6-4: SPPC Service Territory Demand Response Verified 2025 Energy Savings

Program	Device Population ²⁸	2025 DR Energy Savings (Events), kWh	2025 EE Energy Savings (Optimization), kWh	2025 Total Energy Savings (kWh)
PowerShift (Manage)	DP12	15,629	259,584	275,213
	DP24	51,283	1,440,192	1,491,475
	DP46	9,061	237,328	246,389
BYOT (Manage)	DP48	6,814	593,632	600,446
	DP50	35,117	819,104	854,221
PowerShift (Build)	DP24	2,575	110,656	113,231
BYOT (Build)	DP48	1,252	83,824	85,076
	DP50	11,807	249,600	261,407
Non-Thermostat DR (Manage and Build)	Battery Storage	1,663	-	1,663
	Water Heaters	-80	-	-80
Total		135,121	3,793,920	3,929,041

²⁸ The calculation of energy savings was completed on each DP using econometric models (not broken out by rate class).

6.1 NPC Service Territory

Accounting for NRDs and participant overrides, during a DR Event, the NPC service territory Residential DR program could achieve a demand reduction of 133,636 kW if all devices available at the end of 2025 were to operate simultaneously and achieve their maximum demand reduction during the same hour. This represents a cooling load that the DR program can reduce during critical peak demand periods on the NPC service territory's grid, without taking into account T&D line loss.

Maximum VDR and DR energy savings were lower than those observed in 2024.

6.2 SPPC Service Territory

Accounting for NRDs and participant overrides, during a Residential DR event the SPPC service territory Residential DR program could achieve a demand reduction of 24,005 kW if all available devices at the end of 2025 were to operate simultaneously and achieve their maximum demand reduction during the same hour. This represents a cooling load that the DR program can shift to off-peak hours during critical peak demand periods on the SPPC service territory's grid, without taking into account T&D line losses.

Maximum VDR and DR energy savings were similar to those observed in 2024.

6.3 Recommendations

The Evaluator provides the following recommendations to potentially improve the Residential DR program components in future years:

- It is recommended that NV Energy increase customer engagement and develop training materials (one sheets, online short course, etc.) to teach participants about the importance of full participation in DR events even when they fall at later hours of the day. This can increase event performance and customer satisfaction with the program.
- NV Energy should consider using the information about event performance (kW factors, NRDs, kWh factors) during specific time-of-day DR event calls from previous years M&V Reports when developing the options for types of DR event schedules. Including more specific expectations for event performance by event start time would provide the NV Energy team with the information needed to deploy the Residential DR program resources strategically and with more flexibility.
- In the NPC service territory, NV Energy enrolled 124 water heaters in PY2025, quintupling the size of the program. However, in the SPPC service territory, no water heaters were enrolled. It is recommended that NV Energy increase the water heater DP in the SPPC service territory.

7 APPENDIX A: ANNUAL ENERGY SAVINGS DEEMED VALUE SUMMARY AND BACKGROUND

7.1 Annual Energy Savings Deemed Value Summary and Background Overview

This chapter provides a description of the Evaluator's analytical steps for determining the annual energy savings (kWh) deemed values for program year 2025.

In previous program years (2021-2024), the Evaluator had taken a weighted average (by count of sampled participants) of savings values for three types of smart thermostat devices across eight years of data and then calculated the annual energy savings deemed values for the NPC and SPPC service territories. In program year 2025, the Evaluator conducted an updated analysis of the energy savings value using data from program years 2019 and 2021-2025. Notably, usage data from program year 2020 were excluded from the analysis due to the atypical conditions resulting from the COVID pandemic. However, devices installed in program year 2020 were not excluded.

For the NPC service territory, this analysis resulted in a deemed annual savings value of 294 kWh per participant. For the SPPC service territory, the annual deemed values were 208 kWh per participant (Table 7-1).

Table 7-1: 2025 Deemed Annual Energy Savings for NV Energy's Residential DR Program

Territory	Annual Energy Savings	
	Electric Savings	Natural Gas
NPC	294 kWh	17 Therms
SPPC	208 kWh	48 Therms

Calculating the energy savings associated with the smart thermostat optimization via the difference-in-differences methodology relies on modelling the average consumption for both the test and control groups during both the period before and after the thermostat was installed. The Evaluator utilized regression analysis to estimate these values.

The basic specification for the regression modeling is illustrated as follows. Consider modeling the energy use of a customer who is benefitting from optimization. In simplest terms, average daily electricity use can be separated between weather-sensitive and non-weather-sensitive factors. is the regression model used to estimate optimization savings is specified as:

$$\begin{aligned}
 AEC_t = & \alpha_0 + \alpha_1 Post_t + \alpha_2 Treat_i + \alpha_3 CDDperDay_t + \alpha_4 HDDperDay_t \\
 & + \alpha_5 Post_t * Treat_i + \alpha_6 Post_t * CDDperDay_t + \alpha_7 Treat_i * CDDperDay_t \\
 & + \alpha_8 Post_t * Treat_i * CDDperDay_t + \alpha_9 Post_t * HDDperDay_t \\
 & + \alpha_{10} Treat_i * HDDperDay_t + \alpha_{11} Post_t * Treat_i * HDDperDay_t
 \end{aligned}$$

Equation 12

Where:

- AEC_t is average daily use of electricity for period t for a customer;
- $Post_t$ indicates the billing period after the device was installed;
- $Treat_i$ indicates whether a customer i is in the treatment group;
- $CDDperDay_t$ ²⁹ is cooling degree days during day t ;
- $HDDperDay_t$ ³⁰ is heating degree days during day t ;
- ε_t is an error term;
- α_0 is the intercept term;
- α_n are the coefficients.

The model includes interaction terms to capture how electricity usage responds differently to temperature variations and program participation. Specifically, it accounts for differences in usage between treatment and control groups after the intervention ($Post_t * Treat_i$), changes in sensitivity to cooling and heating needs over time ($Post_t * CDDperDay_t$ and $Post_t * HDDperDay_t$), and baseline differences in temperature sensitivity between treated and untreated customers ($Treat_i * CDDperDay_t$ and $Treat_i * HDDperDay_t$). Additionally, three-way interactions ($Post_t * Treat_i * CDDperDay_t$ and $Post_t * Treat_i * HDDperDay_t$) capture how the treatment effect on temperature sensitivity evolved after the intervention.

The regression equations were estimated by applying estimation procedures that combine both the cross-sectional and the time-series dimensions of the data. In particular, regression models were estimated by pooling cross-sectional observations (i.e., participants who had their smart devices installed in 2020, 2021, 2022, 2023, and 2024, and control group members) with time-series observations (i.e., monthly electricity consumption from January 2019 – March 2025).

Unlike the SPPC service territory, the NPC service territory did not require a seasonal split. Instead, a single regression model was used that includes both cooling degree days and heating degree days. The climate and energy patterns of the NPC service territory do not exhibit a stark division between winter and summer as in the SPPC service territory. Both heating and cooling demand may occur year-round, or they overlap consistently. Table 7-2 details the daily electricity savings associated with the NPC service territory.

²⁹ The number of cooling degree days per month was calculated using hourly weather data from NOAA. First the number of cooling degree days for each hour was calculated by subtracting the base temperature of 60 degrees from the actual temperature (if the actual temperature was lower than the base temperature then there were 0 cooling degree days during that hour). Next, the average number of cooling degree days per day was calculated for each day.

³⁰ The number of heating degree days per month was calculated using hourly weather data from NOAA. First the number of heating degree days for each hour was calculated by subtracting the actual temperature from the base temperature of 40 (if the base temperature was lower than the actual temperature then there were 0 heating degree days during that hour). Next, the average number of heating degree days per day was calculated for each day.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 7-2: Average Daily Electricity Savings (kWh), NPC Service Territory, Space Cooling

Treatment Group		Control Group		NPC Estimated Average per Premise Daily Electricity Savings
Average Daily Post- Installation Period Consumption (kWh)	Average Daily Pre- Installation Period Consumption (kWh)	Average Daily Post- Installation Period Consumption (kWh)	Average Daily Pre- Installation Period Consumption (kWh)	
30.44	21.81	33.60	23.23	1.64

The annual per premise energy savings associated with smart thermostat optimization in NPC service territory during space heating and cooling are estimated at 301 kWh (184 days x 1.64 kWh) (Table 7-2).

Because monthly consumption data were also used for the analysis of the NPC energy efficiency optimization savings DR event days could not be excluded from the analysis. To ensure adequate removal of DR event savings, the Evaluator calculated the average net energy impacts per device from the DR events for all NPC devices: 7.40 kWh (Table 7-3). The energy savings related to the DR events is then subtracted from the total annual energy savings (301 kWh – 7.40 kWh) to yield the corrected value of 294 kWh.

Table 7-3: DR Event Energy Savings (kWh) per Device, NPC Service Territory

Year	DR Event kWh Energy Savings per Device
2021	17.62
2022	4.49
2023	4.27
2024	3.21
Average	7.40

Table 7-4: Results from NPC Optimization Regressions

Variable Description	Regression Coefficient	Standard Error	T-Stat	PR > T
Intercept	13.52	0.13	103.06	<0.00001
$Post_t$	1.38	0.18	7.49	<0.00001
$Treat_i$	-1.05	0.18	-5.74	<0.00001
$CDDperDay_t$	1.05	0.01	159.59	<0.00001
$HDDperDay_t$	56.23	2.63	21.39	<0.00001
$Post_t * Treat_i$	-1.00	0.26	-3.88	<0.01
$Post_t * CDDperDay_t$	0.07	0.01	7.62	<0.00001
$Treat_i * CDDperDay_t$	0.01	0.01	1.19	0.23
$Post_t * HDDperDay_t$	5.38	3.93	1.37	0.17
$Treat_i * HDDperDay_t$	-8.13	3.57	-2.28	0.02
$Post_t * Treat_i * CDDperDay_t$	-0.04	0.01	-3.35	<0.01

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

$Post_t * Treat_i * HDDperDay_t$	-0.20	5.46	-0.04	0.97

Table 7-5: Numbers of Observations for Each Group

Month	Group	Number of Observations
Combined	Control	8,181
	Treatment	8,584

Table 7-6: Numbers of Cross-Sections for Each Time Periods

Month	Group	Pre	Post
Combined	Control	211,390	211,502
	Treatment	222,826	216,005

Table 7-7 and Table 7-8 detail the daily electricity savings in the SPPC Service Territory. The annual per premise energy savings associated with smart thermostat in the SPPC service territory during space cooling is 132 kWh (122 days x 1.08 kWh). The annual per premise energy savings associated with smart thermostat in SPPC service territory during space heating is 90 kWh (243 days x 0.37 kWh). The total annual energy savings associated with SPPC is 222 kWh (132 kWh + 90 kWh).

Table 7-7: Average Daily Electricity Savings (kWh), SPPC Service Territory, Space Cooling (Jun–Sep)

Treatment Group		Control Group		SPPC Estimated Average per Premise Daily Electricity Savings
Average Daily Post-Installation Period Consumption (kWh)	Average Daily Pre-Installation Period Consumption (kWh)	Average Daily Post-Installation Period Consumption (kWh)	Average Daily Pre-Installation Period Consumption (kWh)	
27.72	24.91	27.91	23.68	1.08

Table 7-8: Average Daily Electricity Savings (kWh), SPPC Service Territory, Space Heating (Oct–May)

Treatment Group		Control Group		SPPC Estimated Average per Premise Daily Electricity Savings
Average Daily Post-Installation Period Consumption (kWh)	Average Daily Pre-Installation Period Consumption (kWh)	Average Daily Post-Installation Period Consumption (kWh)	Average Daily Pre-Installation Period Consumption (kWh)	
18.30	19.16	19.91	20.41	0.37

Monthly consumption data was also used for the analysis of the SPPC energy efficiency optimization savings and therefore DR event days could not be excluded from the analysis. To ensure adequate removal of DR event savings, the Evaluator calculated the average per device weighted average of net energy impacts from the DR events for all SPPC devices: 14.53 kWh (Table 7-9). The energy savings related to the DR events is then subtracted from the total annual

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

energy savings (222 kWh – 14.53 kWh) to yield the corrected value of 208 kWh.

Table 7-9: DR Event Energy Savings (kWh) per Device, SPPC Service Territory

Year	DR Event kWh Energy Savings per Device
2021	21.29
2022	24.16
2023	5.77
2024	6.93
Average	14.53

Table 7-10: Results from SPPC Optimization Regressions in Winter (October – May)

Variable Description	Regression Coefficient	Standard Error	T-Stat	PR > T
Intercept	17.74	0.10	178.65	<0.00001
$Post_t$	0.68	0.13	5.06	<0.00001
$Treat_i$	-1.29	0.13	-9.62	<0.00001
$HDDperDay_t$	0.83	0.03	24.26	<0.00001
$Post_t * Treat_i$	-0.32	0.18	-1.78	0.07
$Post_t * HDDperDay_t$	-0.01	0.05	-0.24	0.81
$Treat_i * HDDperDay_t$	-0.08	0.05	-1.72	0.09
$Post_t * Treat_i * HDDperDay_t$	-0.02	0.06	-0.35	0.73

Table 7-11: Results from SPPC Optimization Regressions in Summer (June – September)

Variable Description	Regression Coefficient	Standard Error	T-Stat	PR > T
Intercept	12.11	0.39	31.30	<0.00001
$Post_t$	-0.29	0.51	-0.57	0.57
$Treat_i$	-1.78	0.52	-3.45	<0.01
$CDDperDay_t$	0.96	0.03	36.04	<0.00001
$Post_t * Treat_i$	0.12	0.68	0.18	0.86
$Post_t * CDDperDay_t$	0.15	0.03	4.36	<0.01
$Treat_i * CDDperDay_t$	0.20	0.04	5.78	<0.00001
$Post_t * Treat_i * CDDperDay_t$	-0.08	0.05	-1.83	0.07

Table 7-12: Numbers of Observations for Each Group

Group	Number of Observations
Control	1,605
Treatment	1,990

Table 7-13: Numbers of Cross-Sections for Winter (October – May)

Month	Number of Cross-Sections	Pre	Post
October – May	Control	24,359	28,898
	Treatment	29,617	35,121

Table 7-14: Numbers of Cross-Sections for Summer (June – September)

Month	Number of Cross-Sections	Pre	Post
June – September	Control	12,588	17,528
	Treatment	15,502	21,116

7.2 Smart Thermostat Energy Optimization Matching

This appendix section details the matching procedures employed to create the matched control group used to estimate smart thermostat energy optimization energy savings.

Propensity score matching is a method by which the control group is “matched” to the treatment group via a propensity score, which is essentially an estimate, derived from observed characteristics, of a customer’s likelihood of participating in the PowerShift program. The logit model below was used to estimate the propensity scores for NPC customers. The categorical variable, *CITY*, is included in the model to control for geographical or locational factors.

$$Participation = \alpha + \beta_1 \cdot [kWhN] + \beta_2 \cdot [CITY] + \varepsilon$$

Equation 13

Where:

- *Participation* is a binary variable that is 1 if the customer is a NV Energy DR program participant and 0 if they are a non-participant;
- *CITY* is a categorical variable that represents the city location of the customer
- *kWhN* is a continuous variable that captures the customer’s pre-thermostat installation, weather normalized (consumption divided by degree days), average daily consumption;
- ε is an error term;
- β is a coefficient showing the changes in propensity to participate in the NV Energy DR program that occurs for a change in the *kWhN* variable;

The logit model below was used to estimate the propensity scores for SPPC customers.

$$Participation = \alpha + \beta \cdot [kWhN] + \varepsilon$$

Equation 14

Where:

- *Participation* is a binary variable that is 1 if the customer is a NV Energy DR program participant and 0 if they are a non-participant;
- *kWhN* is a continuous variable that captures the customer's pre-thermostat installation, weather normalized (consumption divided by degree days), average daily consumption;
- ε is an error term;
- β is a coefficient showing the changes in propensity to participate in the NV Energy DR program that occurs for a change in the *kWhN* variable;

After the propensity scores were estimated, for each treatment premise p , a k -nearest neighbors' algorithm is used to find the $k = 1$ closest propensity score from among the control premises. A ridge-based distance metric is then applied when estimating the propensity scores, helping to stabilize estimates. It should also be noted that in addition to the propensity scores, treatment members and control group members were matched exactly with respect to their rate codes. This procedure was implemented in the R programming language using the "MatchIt" package³¹ and matches were selected with replacement.

As with the subgroup loads, once the control groups are selected and confirmed, they are aggregated to form the subgroup control time series, which we denote by $\overline{L}_g^c(t)$.

In order to ensure the quality of the matching procedure, a Welch's Two Sample t-test was conducted to ensure that the treatment and control groups were statistically similar during the pre-installation period. Because the p-values are greater than 0.05 we fail to reject the null hypothesis and conclude that the true difference in means is not statistically significantly different than zero.

The results for NPC matching are in Table 7-15, those for SPPC are in Table 7-16.

Table 7-15: Welch's Two Sample t-test for NPC

Independent Variable	Treatment		Control		Welch Test T Statistic	Welch Test P-Value
	Pre-Matching Mean	Post-Matching Mean	Pre-Matching Mean	Post-Matching Mean		
Total Average kWh	39,640.29	10,033.87	41,947.06	10,451.83	-0.568	0.57

Table 7-16: Welch's Two Sample t-test for SPPC

Independent Variable	Treatment		Control		Welch Test T Statistic	Welch Test P-Value
	Pre-Matching Mean	Post-Matching Mean	Pre-Matching Mean	Post-Matching Mean		
Total Average kWh	30,191.24	6,926.22	30,457.30	7,060.10	-0.359	0.72

³¹ <https://cran.r-project.org/web/packages/MatchIt/MatchIt.pdf>

8 APPENDIX B: 2025 HOURLY THERMOSTAT IMPACTS

The following tables provide the hourly load impacts (kW) per device group associated with 2025 thermostat DR events by date and DP for all hours of DR event dates. Note that event start times are rounded down by the hour for these tables (i.e., any start time between 16:00 and 16:59 is rounded back to hour 16:00), which smooths the effect of device phasing in these summary tables. Moreover, all demand impact values are calculated without rounded variables (e.g., NRD and device to premise ratios are not rounded prior to hourly impact calculations).

Table 8-1: Total Hourly (kW) Impacts for each NPC Cool Share Device Group per DR Event Date

Date and Hour	Hourly Impact (kW) by DP		System Total Cool Share
	DP1.RM	DP1.RS	
6/9/2025 19:00	0	0	0
6/9/2025 20:00	1,176	9,751	10,927
6/9/2025 21:00	-77	-2,598	-2,675
6/9/2025 22:00	-117	-1,104	-1,221
6/10/2025 19:00	0	0	0
6/10/2025 20:00	1,135	9,931	11,066
6/10/2025 21:00	9	-2,939	-2,930
6/10/2025 22:00	-55	-1,500	-1,556
6/18/2025 18:00	0	0	0
6/18/2025 19:00	1,243	11,176	12,418
6/18/2025 20:00	-53	-3,175	-3,228
6/18/2025 21:00	-217	-2,156	-2,373
6/19/2025 18:00	0	0	0
6/19/2025 19:00	1,283	10,118	11,401
6/19/2025 20:00	-5	-3,359	-3,364
6/19/2025 21:00	-148	-2,115	-2,263
6/30/2025 19:00	0	0	0
6/30/2025 20:00	1,098	10,236	11,334
6/30/2025 21:00	-31	-3,133	-3,164
6/30/2025 22:00	-96	-1,806	-1,902
7/9/2025 19:00	0	0	0
7/9/2025 20:00	1,184	11,112	12,296
7/9/2025 21:00	-133	-2,886	-3,019
7/9/2025 22:00	-209	-1,618	-1,826
7/10/2025 19:00	0	0	0
7/10/2025 20:00	1,093	9,965	11,058

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP		System Total Cool Share
	DP1.RM	DP1.RS	
7/10/2025 21:00	-84	-3,046	-3,130
7/10/2025 22:00	-218	-1,734	-1,952
7/11/2025 19:00	0	0	0
7/11/2025 20:00	1,114	9,992	11,106
7/11/2025 21:00	-266	-3,164	-3,430
7/11/2025 22:00	-303	-2,006	-2,309
7/13/2025 19:00	0	0	0
7/13/2025 20:00	1,268	10,518	11,787
7/13/2025 21:00	84	-2,720	-2,636
7/13/2025 22:00	5	-1,454	-1,449
7/14/2025 19:00	0	0	0
7/14/2025 20:00	1,138	10,721	11,859
7/14/2025 21:00	13	-2,808	-2,795
7/14/2025 22:00	-25	-1,950	-1,975
7/15/2025 19:00	0	0	0
7/15/2025 20:00	1,155	10,270	11,425
7/15/2025 21:00	-55	-2,948	-3,002
7/15/2025 22:00	-86	-1,749	-1,835
7/28/2025 19:00	0	0	0
7/28/2025 20:00	1,101	8,989	10,089
7/28/2025 21:00	-89	-2,625	-2,715
7/28/2025 22:00	-4	-996	-1,000
7/29/2025 19:00	0	0	0
7/29/2025 20:00	1,118	8,975	10,093
7/29/2025 21:00	-256	-2,718	-2,975
7/29/2025 22:00	-255	-1,283	-1,538
7/31/2025 19:00	0	0	0
7/31/2025 20:00	1,129	8,700	9,829
7/31/2025 21:00	9	-2,631	-2,622
7/31/2025 22:00	-74	-1,086	-1,161
8/1/2025 19:00	0	0	0
8/1/2025 20:00	1,044	8,543	9,587
8/1/2025 21:00	-12	-2,959	-2,971
8/1/2025 22:00	31	-1,399	-1,369
8/4/2025 19:00	0	0	0
8/4/2025 20:00	1,175	8,202	9,377

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP		System Total Cool Share
	DP1.RM	DP1.RS	
8/4/2025 21:00	183	-2,520	-2,336
8/4/2025 22:00	122	-1,041	-919
8/6/2025 19:00	0	0	0
8/6/2025 20:00	1,141	9,463	10,604
8/6/2025 21:00	-1	-2,757	-2,757
8/6/2025 22:00	-27	-1,212	-1,239
8/7/2025 19:00	0	0	0
8/7/2025 20:00	997	9,508	10,504
8/7/2025 21:00	44	-2,786	-2,743
8/7/2025 22:00	-37	-1,281	-1,318
8/8/2025 19:00	0	0	0
8/8/2025 20:00	1,078	10,322	11,400
8/8/2025 21:00	67	-2,449	-2,382
8/8/2025 22:00	-60	-1,243	-1,304
8/11/2025 19:00	0	0	0
8/11/2025 20:00	1,170	9,836	11,006
8/11/2025 21:00	0	-2,745	-2,745
8/11/2025 22:00	48	-1,580	-1,532
8/12/2025 19:00	0	0	0
8/12/2025 20:00	1,166	10,131	11,297
8/12/2025 21:00	-38	-2,680	-2,719
8/12/2025 22:00	-34	-2,044	-2,078
8/13/2025 19:00	0	0	0
8/13/2025 20:00	1,069	9,775	10,844
8/13/2025 21:00	4	-2,650	-2,646
8/13/2025 22:00	-21	-1,660	-1,680
8/21/2025 19:00	0	0	0
8/21/2025 20:00	1,075	10,205	11,280
8/21/2025 21:00	-16	-2,645	-2,661
8/21/2025 22:00	-60	-1,797	-1,857
8/22/2025 19:00	0	0	0
8/22/2025 20:00	1,176	9,175	10,351
8/22/2025 21:00	100	-2,439	-2,339
8/22/2025 22:00	-65	-883	-948

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 8-2: Total Hourly (kW) Impacts for each NPC Service Territory PowerShift Device Group per DR Event Date

Date and Hour	Hourly Impact (kW) by DP								System Total Power-Shift
	DP11M.RM	DP11M.RS	DP23B.RM	DP23B.RS	DP23M.RM	DP23M.RS	DP47M.RM	DP47M.RS	
6/9/2025 19:00	238	4,711	443	1,933	4,315	41,867	206	3,341	57,053
6/9/2025 20:00	21	-3,826	-137	-1,480	-1,333	-32,065	-82	-3,914	-42,816
6/9/2025 21:00	66	-3,075	-70	-941	-682	-20,379	-48	-2,444	-27,572
6/9/2025 22:00	0	0	0	0	0	0	0	0	0
6/10/2025 19:00	218	4,303	460	1,970	4,468	42,538	207	3,385	57,549
6/10/2025 20:00	-33	-4,481	-125	-1,571	-1,218	-33,909	-124	-3,774	-45,234
6/10/2025 21:00	28	-3,381	-44	-1,013	-425	-21,874	-30	-1,940	-28,679
6/10/2025 22:00	0	0	0	0	0	0	0	0	0
6/18/2025 18:00	222	5,417	533	2,654	5,057	56,094	285	3,498	73,759
6/18/2025 19:00	-51	-5,276	-182	-1,820	-1,723	-38,459	-150	-4,533	-52,193
6/18/2025 20:00	-26	-4,469	-72	-1,092	-678	-23,072	-97	-3,617	-33,121
6/18/2025 21:00	0	0	0	0	0	0	0	0	0
6/19/2025 18:00	184	4,730	529	2,514	4,991	52,856	289	3,184	69,278
6/19/2025 19:00	-38	-5,404	-123	-1,619	-1,157	-34,042	-86	-4,452	-46,920
6/19/2025 20:00	27	-4,355	-34	-925	-323	-19,445	-1	-3,345	-28,400
6/19/2025 21:00	0	0	0	0	0	0	0	0	0
6/30/2025 19:00	220	4,591	531	2,330	4,852	47,414	265	3,034	63,238
6/30/2025 20:00	-46	-4,641	-144	-1,768	-1,317	-35,983	-80	-3,795	-47,774
6/30/2025 21:00	-30	-3,167	-62	-1,143	-568	-23,273	-7	-2,411	-30,661
6/30/2025 22:00	0	0	0	0	0	0	0	0	0
7/9/2025 19:00	194	4,789	563	2,425	4,916	47,878	239	3,352	64,357
7/9/2025 20:00	-49	-4,076	-133	-1,763	-1,160	-34,809	-121	-3,305	-45,417
7/9/2025 21:00	-24	-3,115	-54	-1,158	-473	-22,869	-49	-1,895	-29,637
7/9/2025 22:00	0	0	0	0	0	0	0	0	0
7/10/2025 19:00	181	4,566	559	2,336	4,836	45,877	279	2,954	61,586
7/10/2025 20:00	-24	-4,407	-145	-1,783	-1,257	-35,019	-68	-3,782	-46,485
7/10/2025 21:00	24	-3,393	-65	-1,199	-559	-23,553	0	-2,415	-31,161
7/10/2025 22:00	0	0	0	0	0	0	0	0	0
7/11/2025 19:00	213	4,830	550	2,419	4,723	47,208	235	3,626	63,804
7/11/2025 20:00	-35	-4,109	-160	-1,779	-1,373	-34,721	-136	-3,345	-45,658
7/11/2025 21:00	-25	-3,000	-75	-1,176	-645	-22,948	-26	-2,072	-29,967
7/11/2025 22:00	0	0	0	0	0	0	0	0	0
7/13/2025 19:00	202	5,121	544	2,847	4,680	55,135	248	3,608	72,384
7/13/2025 20:00	-65	-4,299	-200	-1,754	-1,721	-33,969	-142	-3,718	-45,868
7/13/2025 21:00	-34	-3,131	-72	-944	-622	-18,273	-4	-2,372	-25,452

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP								System Total Power-Shift
	DP11M.RM	DP11M.RS	DP23B.RM	DP23B.RS	DP23M.RM	DP23M.RS	DP47M.RM	DP47M.RS	
7/13/2025 22:00	0	0	0	0	0	0	0	0	0
7/14/2025 19:00	179	4,961	562	2,556	4,828	49,486	265	3,564	66,400
7/14/2025 20:00	-23	-3,959	-152	-1,784	-1,303	-34,538	-167	-3,508	-45,434
7/14/2025 21:00	-12	-3,014	-69	-1,239	-597	-23,990	-69	-2,186	-31,177
7/14/2025 22:00	0	0	0	0	0	0	0	0	0
7/15/2025 19:00	205	4,524	519	2,373	4,461	45,708	270	3,021	61,080
7/15/2025 20:00	-50	-4,105	-198	-1,814	-1,702	-34,938	-53	-3,224	-46,084
7/15/2025 21:00	-30	-3,067	-100	-1,168	-862	-22,486	1	-2,184	-29,896
7/15/2025 22:00	0	0	0	0	0	0	0	0	0
7/28/2025 19:00	154	3,613	542	2,293	4,327	41,907	186	2,649	55,671
7/28/2025 20:00	-63	-3,842	-203	-1,904	-1,620	-34,804	-136	-3,188	-45,761
7/28/2025 21:00	-31	-2,911	-105	-1,221	-836	-22,315	-105	-1,921	-29,443
7/28/2025 22:00	0	0	0	0	0	0	0	0	0
7/29/2025 19:00	144	3,610	533	2,204	4,249	40,215	177	2,612	53,744
7/29/2025 20:00	-20	-3,907	-184	-1,902	-1,469	-34,705	-56	-2,914	-45,158
7/29/2025 21:00	46	-2,862	-103	-1,223	-818	-22,320	-34	-1,974	-29,288
7/29/2025 22:00	0	0	0	0	0	0	0	0	0
7/31/2025 19:00	151	3,261	513	2,098	4,068	37,888	226	2,278	50,484
7/31/2025 20:00	-39	-3,882	-179	-1,894	-1,421	-34,196	-115	-3,155	-44,881
7/31/2025 21:00	-1	-2,803	-79	-1,175	-630	-21,209	-86	-2,132	-28,115
7/31/2025 22:00	0	0	0	0	0	0	0	0	0
8/1/2025 19:00	163	3,803	532	2,161	4,179	38,912	214	2,701	52,666
8/1/2025 20:00	-38	-3,950	-191	-1,899	-1,496	-34,194	-58	-2,896	-44,721
8/1/2025 21:00	12	-2,834	-86	-1,198	-678	-21,569	-2	-1,686	-28,041
8/1/2025 22:00	0	0	0	0	0	0	0	0	0
8/4/2025 19:00	120	3,348	515	2,020	3,989	35,985	162	2,290	48,430
8/4/2025 20:00	-81	-3,450	-176	-1,782	-1,361	-31,748	-85	-2,645	-41,329
8/4/2025 21:00	-9	-2,454	-70	-1,096	-545	-19,520	-55	-1,868	-25,617
8/4/2025 22:00	0	0	0	0	0	0	0	0	0
8/6/2025 19:00	180	4,213	577	2,446	4,401	43,159	247	2,845	58,067
8/6/2025 20:00	-8	-3,417	-197	-1,880	-1,505	-33,182	-77	-2,699	-42,965
8/6/2025 21:00	46	-2,368	-107	-1,210	-817	-21,355	-28	-1,618	-27,457
8/6/2025 22:00	0	0	0	0	0	0	0	0	0
8/7/2025 19:00	199	4,311	594	2,557	4,515	44,938	177	2,789	60,081
8/7/2025 20:00	-13	-3,369	-194	-1,911	-1,475	-33,590	-52	-2,942	-43,546
8/7/2025 21:00	45	-2,221	-85	-1,216	-645	-21,373	-67	-2,016	-27,578
8/7/2025 22:00	0	0	0	0	0	0	0	0	0

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP								System Total Power-Shift
	DP11M.RM	DP11M.RS	DP23B.RM	DP23B.RS	DP23M.RM	DP23M.RS	DP47M.RM	DP47M.RS	
8/8/2025 19:00	170	4,364	576	2,832	4,368	49,571	247	3,233	65,360
8/8/2025 20:00	-17	-3,973	-241	-1,905	-1,825	-33,335	-54	-2,652	-44,001
8/8/2025 21:00	26	-2,804	-93	-932	-704	-16,313	-11	-1,715	-22,546
8/8/2025 22:00	0	0	0	0	0	0	0	0	0
8/11/2025 19:00	194	4,334	596	2,977	4,452	51,805	205	3,221	67,784
8/11/2025 20:00	8	-3,791	-244	-1,849	-1,825	-32,172	-63	-3,041	-42,978
8/11/2025 21:00	55	-2,901	-88	-1,002	-661	-17,441	-3	-2,046	-24,088
8/11/2025 22:00	0	0	0	0	0	0	0	0	0
8/12/2025 19:00	172	4,532	618	3,115	4,607	54,016	245	3,085	70,391
8/12/2025 20:00	-50	-3,652	-217	-1,858	-1,614	-32,216	-107	-3,294	-43,007
8/12/2025 21:00	-12	-2,898	-101	-1,026	-753	-17,790	-15	-2,206	-24,800
8/12/2025 22:00	0	0	0	0	0	0	0	0	0
8/13/2025 19:00	162	4,177	588	2,957	4,365	50,976	197	3,079	66,500
8/13/2025 20:00	-60	-3,591	-229	-1,919	-1,699	-33,076	-100	-2,888	-43,560
8/13/2025 21:00	-35	-2,623	-83	-1,009	-619	-17,387	-65	-2,067	-23,890
8/13/2025 22:00	0	0	0	0	0	0	0	0	0
8/21/2025 19:00	186	4,997	630	3,181	4,499	53,449	194	3,461	70,597
8/21/2025 20:00	-58	-3,294	-261	-1,929	-1,866	-32,411	-94	-2,698	-42,612
8/21/2025 21:00	-4	-2,296	-112	-972	-803	-16,333	-2	-1,531	-22,054
8/21/2025 22:00	0	0	0	0	0	0	0	0	0
8/22/2025 19:00	167	4,308	538	2,647	3,827	44,299	152	2,856	58,794
8/22/2025 20:00	-36	-2,493	-259	-1,728	-1,842	-28,927	-104	-2,262	-37,650
8/22/2025 21:00	-16	-1,747	-98	-702	-695	-11,742	-33	-1,077	-16,110
8/22/2025 22:00	0	0	0	0	0	0	0	0	0

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 8-3: Total Hourly (kW) Impacts for each NPC Service Territory Bring Your Own
Thermostat (BYOT) Device Group per DR Event Date

Date and Hour	Hourly Impact (kW) by DP								System Total BYOT
	DP49B.RM	DP49B.RS	DP49M.RM	DP49M.RS	DP51B.RM	DP51B.RS	DP51M.RM	DP51M.RS	
6/9/2025 19:00	44	742	243	3,690	463	4,410	1,474	18,338	29,406
6/9/2025 20:00	-54	-1,467	-296	-7,293	-134	-2,489	-426	-10,350	-22,510
6/9/2025 21:00	-36	-1,004	-199	-4,993	-79	-1,634	-250	-6,794	-14,988
6/9/2025 22:00	0	0	0	0	0	0	0	0	0
6/10/2025 19:00	48	801	267	3,984	529	4,462	1,680	18,553	30,322
6/10/2025 20:00	-56	-1,527	-312	-7,591	-118	-2,787	-374	-11,590	-24,355
6/10/2025 21:00	-37	-1,008	-205	-5,010	-111	-1,924	-354	-8,000	-16,648
6/10/2025 22:00	0	0	0	0	0	0	0	0	0
6/18/2025 18:00	70	1,233	389	6,162	562	5,223	1,758	20,613	36,009
6/18/2025 19:00	-47	-1,747	-264	-8,732	-143	-3,736	-447	-14,745	-29,862
6/18/2025 20:00	-31	-1,246	-174	-6,230	-85	-2,944	-266	-11,617	-22,593
6/18/2025 21:00	0	0	0	0	0	0	0	0	0
6/19/2025 18:00	60	914	336	4,572	497	4,635	1,555	18,282	30,852
6/19/2025 19:00	-38	-1,563	-213	-7,814	-158	-3,817	-493	-15,055	-29,150
6/19/2025 20:00	-40	-1,462	-225	-7,312	-84	-2,912	-262	-11,484	-23,781
6/19/2025 21:00	0	0	0	0	0	0	0	0	0
6/30/2025 19:00	52	877	293	4,386	586	4,768	1,446	18,020	30,428
6/30/2025 20:00	-51	-1,569	-289	-7,846	-134	-3,041	-332	-11,493	-24,754
6/30/2025 21:00	-35	-1,104	-200	-5,523	-91	-2,192	-225	-8,286	-17,657
6/30/2025 22:00	0	0	0	0	0	0	0	0	0
7/9/2025 19:00	53	972	296	4,873	691	5,251	1,711	19,846	33,693
7/9/2025 20:00	-52	-1,498	-291	-7,507	-203	-3,126	-503	-11,816	-24,996
7/9/2025 21:00	-39	-1,041	-220	-5,220	-120	-2,279	-298	-8,614	-17,831
7/9/2025 22:00	0	0	0	0	0	0	0	0	0
7/10/2025 19:00	31	563	173	2,824	643	4,993	1,593	18,873	29,693
7/10/2025 20:00	-46	-1,347	-256	-6,751	-241	-3,241	-596	-12,252	-24,729
7/10/2025 21:00	-41	-1,025	-229	-5,140	-145	-2,404	-359	-9,087	-18,430
7/10/2025 22:00	0	0	0	0	0	0	0	0	0
7/11/2025 19:00	49	972	275	4,869	622	5,182	1,536	19,588	33,092
7/11/2025 20:00	-53	-1,476	-297	-7,395	-233	-3,150	-575	-11,906	-25,084
7/11/2025 21:00	-42	-999	-238	-5,006	-149	-2,302	-367	-8,700	-17,803
7/11/2025 22:00	0	0	0	0	0	0	0	0	0

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP								System Total BYOT
	DP49B.RM	DP49B.RS	DP49M.RM	DP49M.RS	DP51B.RM	DP51B.RS	DP51M.RM	DP51M.RS	
7/13/2025 19:00	72	1,167	406	5,862	679	5,468	1,677	20,686	36,017
7/13/2025 20:00	-52	-1,472	-294	-7,395	-216	-3,207	-534	-12,133	-25,305
7/13/2025 21:00	-33	-936	-188	-4,700	-152	-2,379	-375	-9,000	-17,764
7/13/2025 22:00	0	0	0	0	0	0	0	0	0
7/14/2025 19:00	60	975	340	4,895	681	5,542	1,682	20,965	35,141
7/14/2025 20:00	-51	-1,569	-286	-7,878	-207	-3,077	-512	-11,640	-25,219
7/14/2025 21:00	-33	-1,102	-186	-5,531	-117	-2,357	-290	-8,919	-18,534
7/14/2025 22:00	0	0	0	0	0	0	0	0	0
7/15/2025 19:00	31	499	173	2,515	651	5,119	1,610	19,379	29,978
7/15/2025 20:00	-41	-1,135	-231	-5,717	-181	-2,933	-448	-11,104	-21,791
7/15/2025 21:00	-40	-853	-225	-4,297	-132	-2,061	-326	-7,802	-15,735
7/15/2025 22:00	0	0	0	0	0	0	0	0	0
7/28/2025 19:00	47	832	255	3,685	583	4,904	1,425	17,143	28,873
7/28/2025 20:00	-45	-1,656	-244	-7,338	-216	-3,334	-529	-11,656	-25,017
7/28/2025 21:00	-39	-1,134	-209	-5,025	-117	-2,230	-286	-7,794	-16,834
7/28/2025 22:00	0	0	0	0	0	0	0	0	0
7/29/2025 19:00	46	830	249	3,674	559	4,764	1,367	16,649	28,138
7/29/2025 20:00	-59	-1,571	-317	-6,952	-219	-3,360	-536	-11,744	-24,758
7/29/2025 21:00	-33	-1,082	-177	-4,789	-157	-2,297	-383	-8,027	-16,944
7/29/2025 22:00	0	0	0	0	0	0	0	0	0
7/31/2025 19:00	44	779	237	3,449	599	4,520	1,471	15,811	26,911
7/31/2025 20:00	-52	-1,529	-277	-6,766	-177	-3,357	-436	-11,744	-24,337
7/31/2025 21:00	-41	-1,054	-221	-4,667	-98	-2,159	-239	-7,551	-16,030
7/31/2025 22:00	0	0	0	0	0	0	0	0	0
8/1/2025 19:00	43	812	233	3,601	545	4,713	1,337	16,493	27,777
8/1/2025 20:00	-60	-1,558	-322	-6,910	-210	-3,393	-515	-11,875	-24,841
8/1/2025 21:00	-36	-1,106	-196	-4,905	-127	-2,235	-312	-7,822	-16,740
8/1/2025 22:00	0	0	0	0	0	0	0	0	0
8/4/2025 19:00	37	743	197	3,295	512	4,193	1,254	14,669	24,900
8/4/2025 20:00	-52	-1,483	-276	-6,574	-209	-3,144	-512	-11,000	-23,251
8/4/2025 21:00	-42	-1,024	-222	-4,539	-130	-1,978	-317	-6,918	-15,169
8/4/2025 22:00	0	0	0	0	0	0	0	0	0
8/6/2025 19:00	53	867	280	3,847	628	5,127	1,536	17,939	30,276
8/6/2025 20:00	-57	-1,706	-301	-7,569	-173	-3,131	-422	-10,956	-24,315

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP								System Total BYOT
	DP49B.RM	DP49B.RS	DP49M.RM	DP49M.RS	DP51B.RM	DP51B.RS	DP51M.RM	DP51M.RS	
8/6/2025 21:00	-42	-1,191	-222	-5,285	-108	-2,170	-264	-7,594	-16,877
8/6/2025 22:00	0	0	0	0	0	0	0	0	0
8/7/2025 19:00	58	958	227	4,224	641	5,239	1,567	18,334	31,248
8/7/2025 20:00	-98	-1,714	-379	-7,560	-194	-3,160	-474	-11,059	-24,639
8/7/2025 21:00	-75	-1,222	-292	-5,390	-104	-2,098	-254	-7,344	-16,780
8/7/2025 22:00	0	0	0	0	0	0	0	0	0
8/8/2025 19:00	87	1,358	338	5,989	628	5,438	1,532	19,037	34,407
8/8/2025 20:00	-70	-1,501	-271	-6,620	-198	-3,152	-482	-11,033	-23,326
8/8/2025 21:00	-41	-976	-159	-4,302	-123	-2,357	-299	-8,250	-16,507
8/8/2025 22:00	0	0	0	0	0	0	0	0	0
8/11/2025 19:00	80	1,315	312	5,805	651	5,681	1,596	19,897	35,337
8/11/2025 20:00	-68	-1,555	-263	-6,865	-188	-3,110	-460	-10,893	-23,403
8/11/2025 21:00	-65	-1,036	-251	-4,571	-105	-2,215	-257	-7,758	-16,256
8/11/2025 22:00	0	0	0	0	0	0	0	0	0
8/12/2025 19:00	89	1,401	347	6,194	647	5,597	1,585	19,612	35,473
8/12/2025 20:00	-80	-1,563	-313	-6,912	-222	-3,469	-543	-12,155	-25,258
8/12/2025 21:00	-60	-1,069	-233	-4,725	-180	-2,695	-440	-9,443	-18,844
8/12/2025 22:00	0	0	0	0	0	0	0	0	0
8/13/2025 19:00	98	1,260	381	5,573	674	5,904	1,606	19,110	34,605
8/13/2025 20:00	-60	-1,557	-232	-6,889	-180	-3,449	-430	-11,165	-23,961
8/13/2025 21:00	-41	-1,041	-161	-4,606	-98	-2,396	-234	-7,755	-16,333
8/13/2025 22:00	0	0	0	0	0	0	0	0	0
8/21/2025 19:00	80	900	340	6,832	469	4,340	1,797	22,510	37,268
8/21/2025 20:00	-74	-998	-312	-7,578	-138	-2,290	-528	-11,879	-23,797
8/21/2025 21:00	-59	-645	-248	-4,897	-85	-1,720	-326	-8,921	-16,900
8/21/2025 22:00	0	0	0	0	0	0	0	0	0
8/22/2025 19:00	70	733	296	5,563	422	3,739	1,616	19,392	31,831
8/22/2025 20:00	-60	-854	-254	-6,486	-110	-1,835	-423	-9,516	-19,538
8/22/2025 21:00	-44	-513	-185	-3,898	-78	-1,220	-299	-6,328	-12,565
8/22/2025 22:00	0	0	0	0	0	0	0	0	0

*Residential Demand Response: Program Year 2025 – NV Energy**M&V Report**March 2026**Table 8-4: Total Hourly (kW) Impacts for All NPC Service Territory DR Program Devices per
DR Event Hours*

Date and Hour	Total Impact (kW) Cool Share, PowerShift, and BYOT
6/9/2025 19:00	86,459
6/9/2025 20:00	-54,400
6/9/2025 21:00	-45,236
6/9/2025 22:00	-1,221
6/10/2025 19:00	87,871
6/10/2025 20:00	-58,524
6/10/2025 21:00	-48,257
6/10/2025 22:00	-1,556
6/18/2025 18:00	109,768
6/18/2025 19:00	-69,637
6/18/2025 20:00	-58,942
6/18/2025 21:00	-2,373
6/19/2025 18:00	100,130
6/19/2025 19:00	-64,670
6/19/2025 20:00	-55,545
6/19/2025 21:00	-2,263
6/30/2025 19:00	93,666
6/30/2025 20:00	-61,194
6/30/2025 21:00	-51,483
6/30/2025 22:00	-1,902
7/9/2025 19:00	98,050
7/9/2025 20:00	-58,116
7/9/2025 21:00	-50,487
7/9/2025 22:00	-1,826
7/10/2025 19:00	91,279
7/10/2025 20:00	-60,156
7/10/2025 21:00	-52,721
7/10/2025 22:00	-1,952
7/11/2025 19:00	96,896
7/11/2025 20:00	-59,636
7/11/2025 21:00	-51,200
7/11/2025 22:00	-2,309
7/13/2025 19:00	108,401
7/13/2025 20:00	-59,386
7/13/2025 21:00	-45,851

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Total Impact (kW) Cool Share, PowerShift, and BYOT
7/13/2025 22:00	-1,449
7/14/2025 19:00	101,541
7/14/2025 20:00	-58,794
7/14/2025 21:00	-52,506
7/14/2025 22:00	-1,975
7/15/2025 19:00	91,057
7/15/2025 20:00	-56,450
7/15/2025 21:00	-48,633
7/15/2025 22:00	-1,835
7/28/2025 19:00	84,544
7/28/2025 20:00	-60,689
7/28/2025 21:00	-48,992
7/28/2025 22:00	-1,000
7/29/2025 19:00	81,882
7/29/2025 20:00	-59,823
7/29/2025 21:00	-49,207
7/29/2025 22:00	-1,538
7/31/2025 19:00	77,395
7/31/2025 20:00	-59,389
7/31/2025 21:00	-46,768
7/31/2025 22:00	-1,161
8/1/2025 19:00	80,443
8/1/2025 20:00	-59,975
8/1/2025 21:00	-47,752
8/1/2025 22:00	-1,369
8/4/2025 19:00	73,330
8/4/2025 20:00	-55,204
8/4/2025 21:00	-43,122
8/4/2025 22:00	-919
8/6/2025 19:00	88,343
8/6/2025 20:00	-56,676
8/6/2025 21:00	-47,092
8/6/2025 22:00	-1,239
8/7/2025 19:00	91,328
8/7/2025 20:00	-57,680
8/7/2025 21:00	-47,100
8/7/2025 22:00	-1,318

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Total Impact (kW) Cool Share, PowerShift, and BYOT
8/8/2025 19:00	99,767
8/8/2025 20:00	-55,927
8/8/2025 21:00	-41,435
8/8/2025 22:00	-1,304
8/11/2025 19:00	103,121
8/11/2025 20:00	-55,375
8/11/2025 21:00	-43,090
8/11/2025 22:00	-1,532
8/12/2025 19:00	105,864
8/12/2025 20:00	-56,967
8/12/2025 21:00	-46,363
8/12/2025 22:00	-2,078
8/13/2025 19:00	101,106
8/13/2025 20:00	-56,678
8/13/2025 21:00	-42,868
8/13/2025 22:00	-1,680
8/21/2025 19:00	107,865
8/21/2025 20:00	-55,129
8/21/2025 21:00	-41,615
8/21/2025 22:00	-1,857
8/22/2025 19:00	90,625
8/22/2025 20:00	-46,837
8/22/2025 21:00	-31,014
8/22/2025 22:00	-948

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 8-5: Total Hourly (kW) Impacts for SPPC PowerShift Devices per DR Event Hours

Date and Hour	Hourly Impact (kW) by DP								System Total Power-Shift
	DP12M.D1	DP12M.DM1	DP24B.D1	DP24B.DM1	DP24M.D1	DP24M.DM1	DP46M.D1	DP46M.DM1	
6/9/2025 18:00	1,153	34	239	30	6,164	354	1,059	10	9,043
6/9/2025 19:00	613	33	137	19	3,532	226	536	-5	5,092
6/9/2025 20:00	-284	8	-129	-11	-3,326	-130	-593	-28	-4,492
6/9/2025 21:00	-40	10	-67	-6	-1,719	-66	-474	-22	-2,384
6/10/2025 18:00	1,108	26	222	32	5,706	373	1,015	26	8,508
6/10/2025 19:00	546	16	117	23	3,013	272	382	26	4,396
6/10/2025 20:00	-370	5	-151	-10	-3,890	-121	-625	7	-5,155
6/10/2025 21:00	-135	10	-93	-4	-2,386	-48	-502	15	-3,143
6/18/2025 18:00	1,057	20	261	32	6,649	365	1,173	43	9,599
6/18/2025 19:00	399	14	142	22	3,631	252	484	37	4,981
6/18/2025 20:00	-544	-3	-158	-12	-4,021	-140	-757	24	-5,611
6/18/2025 21:00	-303	-7	-73	-5	-1,849	-60	-574	38	-2,832
7/13/2025 19:00	1,321	47	321	42	7,696	424	1,577	40	11,469
7/13/2025 20:00	683	41	166	28	3,983	279	717	39	5,938
7/13/2025 21:00	-273	6	-166	-16	-3,970	-158	-525	2	-5,098
7/13/2025 22:00	46	13	-80	-6	-1,917	-59	-203	8	-2,197
7/14/2025 19:00	1,180	30	269	34	6,432	343	1,404	39	9,732
7/14/2025 20:00	586	28	124	16	2,978	155	483	24	4,395
7/14/2025 21:00	-236	6	-182	-22	-4,349	-223	-799	0	-5,805
7/14/2025 22:00	-3	5	-89	-14	-2,137	-138	-433	-14	-2,823
7/15/2025 19:00	1,138	22	225	33	5,396	332	1,119	38	8,304
7/15/2025 20:00	600	19	100	20	2,402	199	306	7	3,653
7/15/2025 21:00	-235	14	-174	-13	-4,172	-132	-693	-15	-5,420
7/15/2025 22:00	69	-5	-68	-8	-1,638	-80	-183	-12	-1,925
8/11/2025 18:00	1,216	47	367	48	7,910	418	1,275	24	11,304
8/11/2025 19:00	469	32	190	31	4,104	272	411	18	5,526
8/11/2025 20:00	-206	15	-184	-10	-3,979	-87	-621	-19	-5,092
8/11/2025 21:00	-31	22	-97	2	-2,086	17	-442	-19	-2,632
8/12/2025 18:00	1,129	54	332	44	7,065	387	1,198	56	10,266
8/12/2025 19:00	645	39	165	29	3,501	254	454	48	5,134
8/12/2025 20:00	-337	22	-204	-16	-4,345	-143	-564	5	-5,582
8/12/2025 21:00	-34	17	-103	-4	-2,195	-34	-389	14	-2,728
8/13/2025 18:00	1,012	45	320	40	6,725	347	1,127	41	9,658
8/13/2025 19:00	385	35	165	30	3,468	261	443	30	4,818
8/13/2025 20:00	-367	23	-197	-17	-4,151	-146	-563	-5	-5,423
8/13/2025 21:00	-218	31	-100	1	-2,094	7	-262	-2	-2,636

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP								System Total Power-Shift
	DP12M.D1	DP12M.DM1	DP24B.D1	DP24B.DM1	DP24M.D1	DP24M.DM1	DP46M.D1	DP46M.DM1	
8/21/2025 18:00	1,084	23	333	43	6,563	344	1,114	25	9,529
8/21/2025 19:00	483	19	177	26	3,495	206	488	29	4,924
8/21/2025 20:00	-294	-3	-207	-22	-4,078	-173	-502	-21	-5,300
8/21/2025 21:00	24	3	-98	0	-1,941	3	-223	1	-2,231
8/22/2025 18:00	1,144	32	362	52	7,127	416	1,310	42	10,484
8/22/2025 19:00	747	19	229	34	4,503	276	843	10	6,661
8/22/2025 20:00	-172	1	-187	-18	-3,694	-146	-344	-40	-4,600
8/22/2025 21:00	2	-2	-76	-2	-1,505	-19	-122	-30	-1,756

Table 8-6: Total Hourly (kW) Impacts for SPPC Bring Your Own Thermostat (BYOT) Devices per DR Event Hours

Date and Hour	Hourly Impact (kW) by DP								System Total BYOT
	DP48B.D1	DP48B.DM1	DP48M.D1	DP48M.DM1	DP50B.D1	DP50B.DM1	DP50M.D1	DP50M.DM1	
6/9/2025 18:00	543	24	2,620	87	1,093	73	3,496	168	8,105
6/9/2025 19:00	265	16	1,278	56	615	43	1,969	98	4,340
6/9/2025 20:00	-412	-10	-1,989	-37	-669	-33	-2,140	-75	-5,366
6/9/2025 21:00	-282	-15	-1,359	-52	-393	-12	-1,258	-27	-3,396
6/10/2025 18:00	483	23	2,330	83	1,060	83	3,391	190	7,644
6/10/2025 19:00	187	16	901	58	576	70	1,843	159	3,810
6/10/2025 20:00	-456	-9	-2,198	-32	-694	-30	-2,219	-69	-5,707
6/10/2025 21:00	-344	-12	-1,657	-44	-443	-18	-1,417	-41	-3,976
6/18/2025 18:00	577	21	2,785	76	1,288	101	3,873	221	8,941
6/18/2025 19:00	256	14	1,235	49	759	68	2,282	149	4,811
6/18/2025 20:00	-456	-13	-2,203	-45	-681	-27	-2,047	-59	-5,531
6/18/2025 21:00	-299	-11	-1,443	-40	-421	-4	-1,266	-9	-3,493
7/13/2025 19:00	694	30	3,367	105	1,545	107	4,507	234	10,590
7/13/2025 20:00	303	22	1,471	78	770	61	2,246	133	5,083
7/13/2025 21:00	-387	-9	-1,877	-32	-727	-32	-2,120	-69	-5,253
7/13/2025 22:00	-235	-8	-1,140	-27	-432	-16	-1,260	-35	-3,153
7/14/2025 19:00	557	18	2,706	64	1,506	108	4,395	236	9,590
7/14/2025 20:00	190	4	921	14	721	74	2,105	161	4,190
7/14/2025 21:00	-492	-26	-2,388	-93	-694	-29	-2,023	-62	-5,807
7/14/2025 22:00	-314	-25	-1,524	-90	-368	-9	-1,073	-20	-3,423

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Hourly Impact (kW) by DP								System Total BYOT
	DP48B.D1	DP48B.DM1	DP48M.D1	DP48M.DM1	DP50B.D1	DP50B.DM1	DP50M.D1	DP50M.DM1	
7/15/2025 19:00	468	15	2,272	53	1,295	99	3,778	215	8,195
7/15/2025 20:00	174	8	844	28	628	67	1,833	145	3,727
7/15/2025 21:00	-472	-20	-2,292	-71	-739	-23	-2,156	-49	-5,822
7/15/2025 22:00	-263	-17	-1,275	-62	-386	-7	-1,127	-15	-3,153
8/11/2025 18:00	802	30	3,405	98	1,700	109	4,663	230	11,038
8/11/2025 19:00	350	23	1,487	73	874	75	2,397	157	5,436
8/11/2025 20:00	-506	-10	-2,149	-32	-766	-19	-2,101	-39	-5,622
8/11/2025 21:00	-336	3	-1,426	9	-567	-8	-1,555	-16	-3,895
8/12/2025 18:00	708	31	3,012	99	1,697	102	4,657	214	10,521
8/12/2025 19:00	293	17	1,246	55	951	75	2,610	159	5,407
8/12/2025 20:00	-542	-21	-2,303	-68	-767	-35	-2,103	-74	-5,913
8/12/2025 21:00	-371	-12	-1,576	-39	-515	-12	-1,414	-26	-3,964
8/13/2025 18:00	624	22	2,652	69	1,603	99	4,099	203	9,371
8/13/2025 19:00	278	14	1,180	46	803	78	2,054	159	4,612
8/13/2025 20:00	-520	-14	-2,210	-44	-1,011	-33	-2,586	-68	-6,485
8/13/2025 21:00	-313	-10	-1,331	-33	-696	-6	-1,780	-13	-4,182
8/21/2025 18:00	411	17	3,342	97	1,198	68	4,561	229	9,922
8/21/2025 19:00	202	12	1,638	70	690	53	2,628	180	5,472
8/21/2025 20:00	-318	-9	-2,583	-51	-548	-10	-2,086	-35	-5,639
8/21/2025 21:00	-195	-3	-1,585	-17	-433	-1	-1,649	-4	-3,887
8/22/2025 18:00	440	19	3,572	111	1,270	73	4,834	246	10,564
8/22/2025 19:00	245	13	1,989	74	778	45	2,962	151	6,257
8/22/2025 20:00	-271	-8	-2,201	-47	-553	-28	-2,106	-94	-5,307
8/22/2025 21:00	-163	0	-1,327	1	-435	-18	-1,655	-61	-3,658

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

*Table 8-7: Total Hourly (kW) Impacts for All SPPC Service Territory DR Program Devices per
DR Event Hours*

Date and Hour	Total Impact (kW) PowerShift, and BYOT
6/9/2025 18:00	17,148
6/9/2025 19:00	9,432
6/9/2025 20:00	-9,858
6/9/2025 21:00	-5,780
6/10/2025 18:00	16,152
6/10/2025 19:00	8,205
6/10/2025 20:00	-10,862
6/10/2025 21:00	-7,119
6/18/2025 18:00	18,540
6/18/2025 19:00	9,792
6/18/2025 20:00	-11,142
6/18/2025 21:00	-6,326
7/13/2025 19:00	22,059
7/13/2025 20:00	11,021
7/13/2025 21:00	-10,352
7/13/2025 22:00	-5,350
7/14/2025 19:00	19,322
7/14/2025 20:00	8,585
7/14/2025 21:00	-11,612
7/14/2025 22:00	-6,246
7/15/2025 19:00	16,499
7/15/2025 20:00	7,379
7/15/2025 21:00	-11,243
7/15/2025 22:00	-5,078
8/11/2025 18:00	22,342
8/11/2025 19:00	10,963
8/11/2025 20:00	-10,714
8/11/2025 21:00	-6,528
8/12/2025 18:00	20,787
8/12/2025 19:00	10,541
8/12/2025 20:00	-11,495
8/12/2025 21:00	-6,692
8/13/2025 18:00	19,030
8/13/2025 19:00	9,430
8/13/2025 20:00	-11,908
8/13/2025 21:00	-6,818

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Date and Hour	Total Impact (kW) PowerShift, and BYOT
8/21/2025 18:00	19,451
8/21/2025 19:00	10,396
8/21/2025 20:00	-10,939
8/21/2025 21:00	-6,118
8/22/2025 18:00	21,047
8/22/2025 19:00	12,918
8/22/2025 20:00	-9,907
8/22/2025 21:00	-5,414

9 APPENDIX C: NON-EVENT DAY CONTROL GROUP FITS

The figures below depict the load curves of the various device populations and the DR-event matched control groups during non-event days.

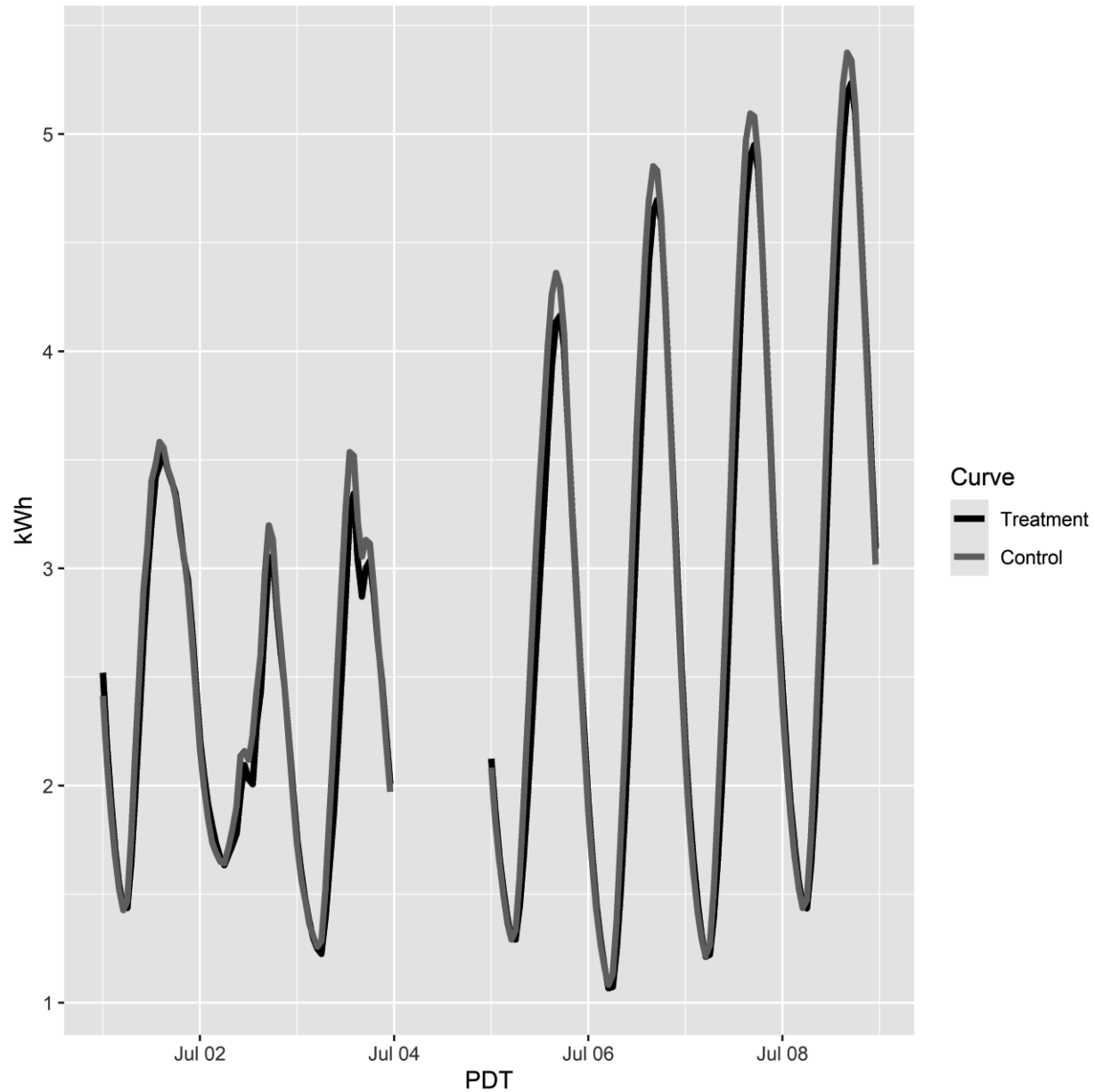


Figure 9-1: DPI.RS Non-Event Day Load Shapes

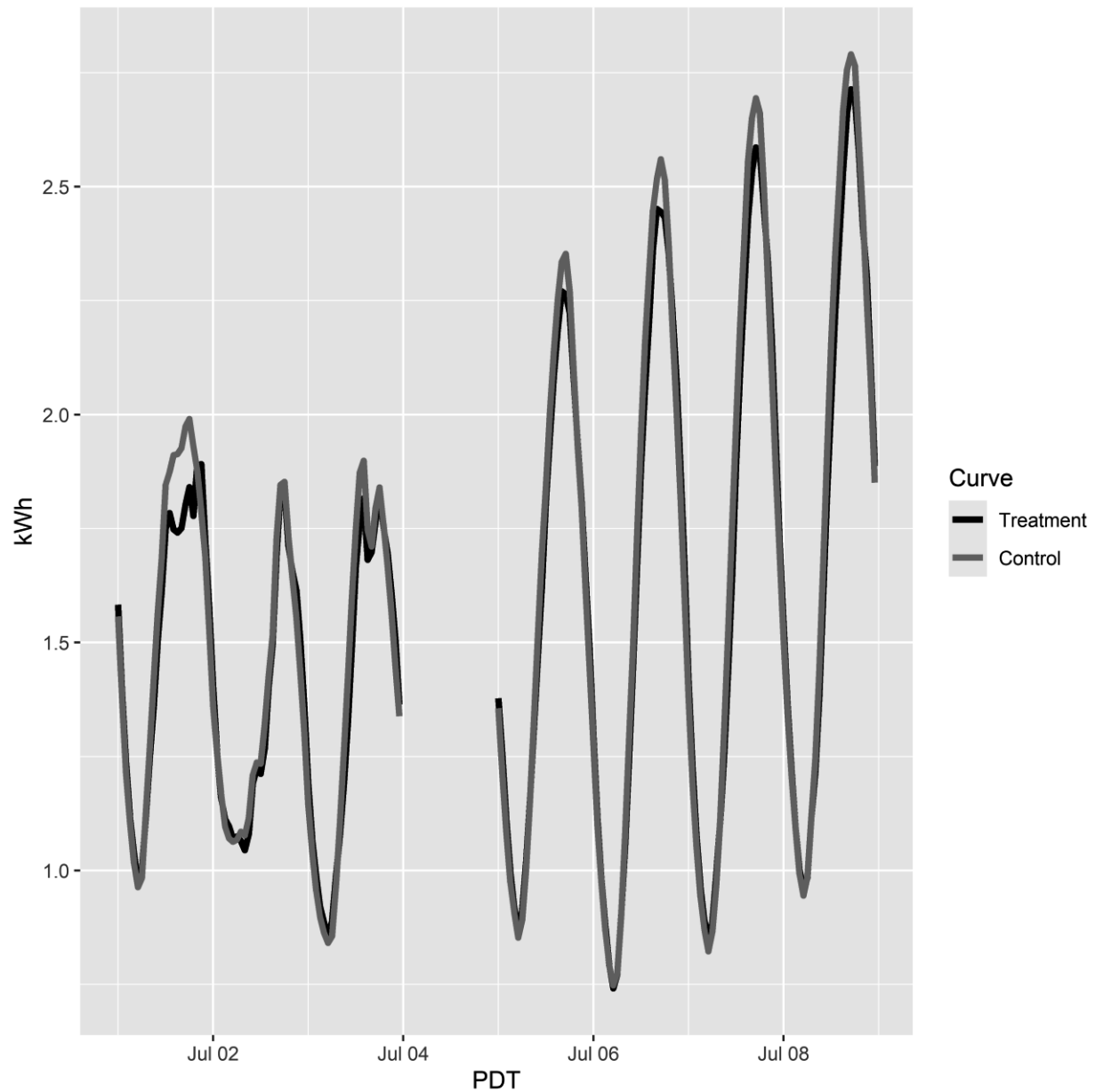


Figure 9-2: DP1.RM Non-Event Day Load Shapes

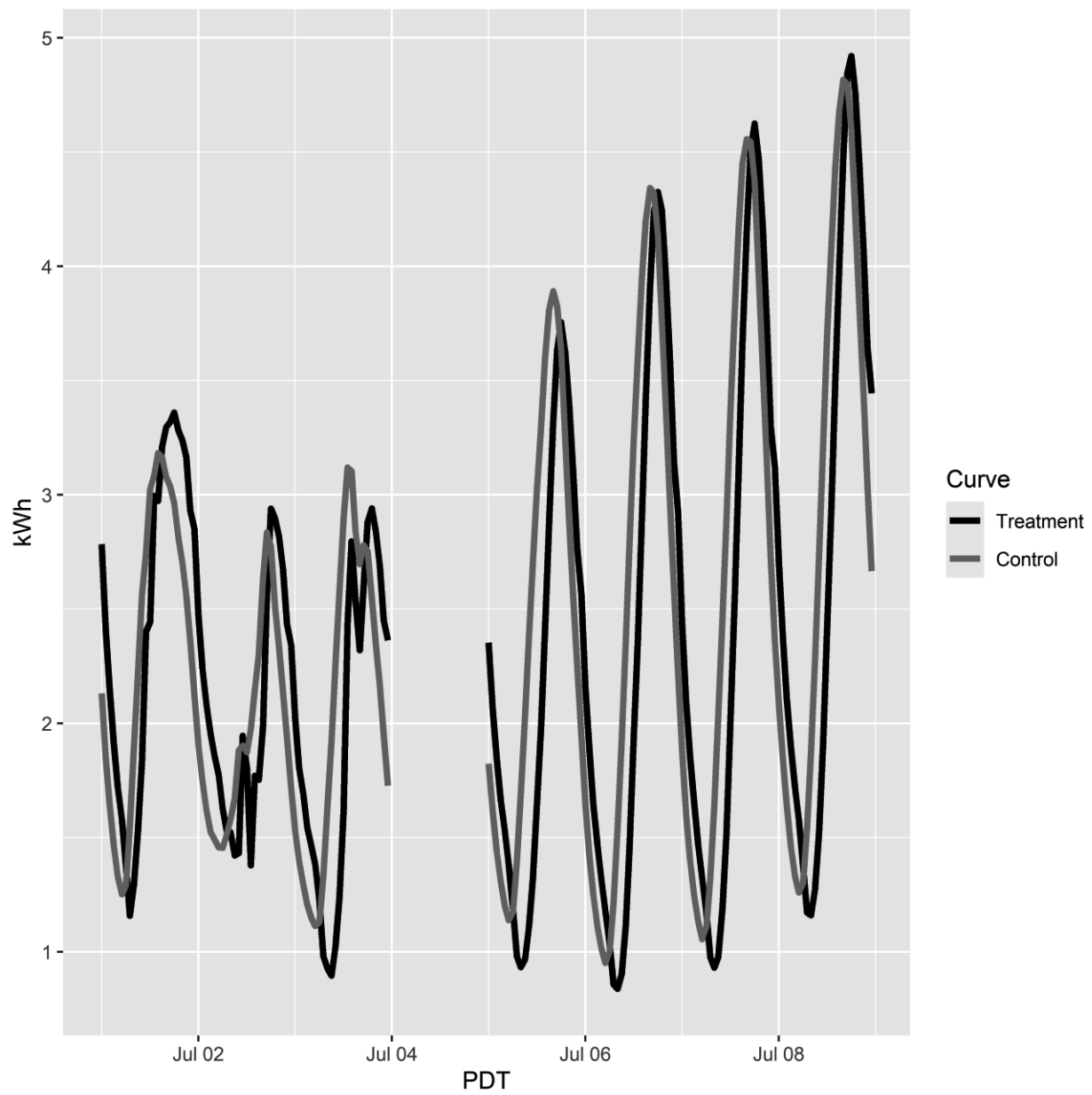


Figure 9-3: DP11.RS Non-Event Day Load Shapes

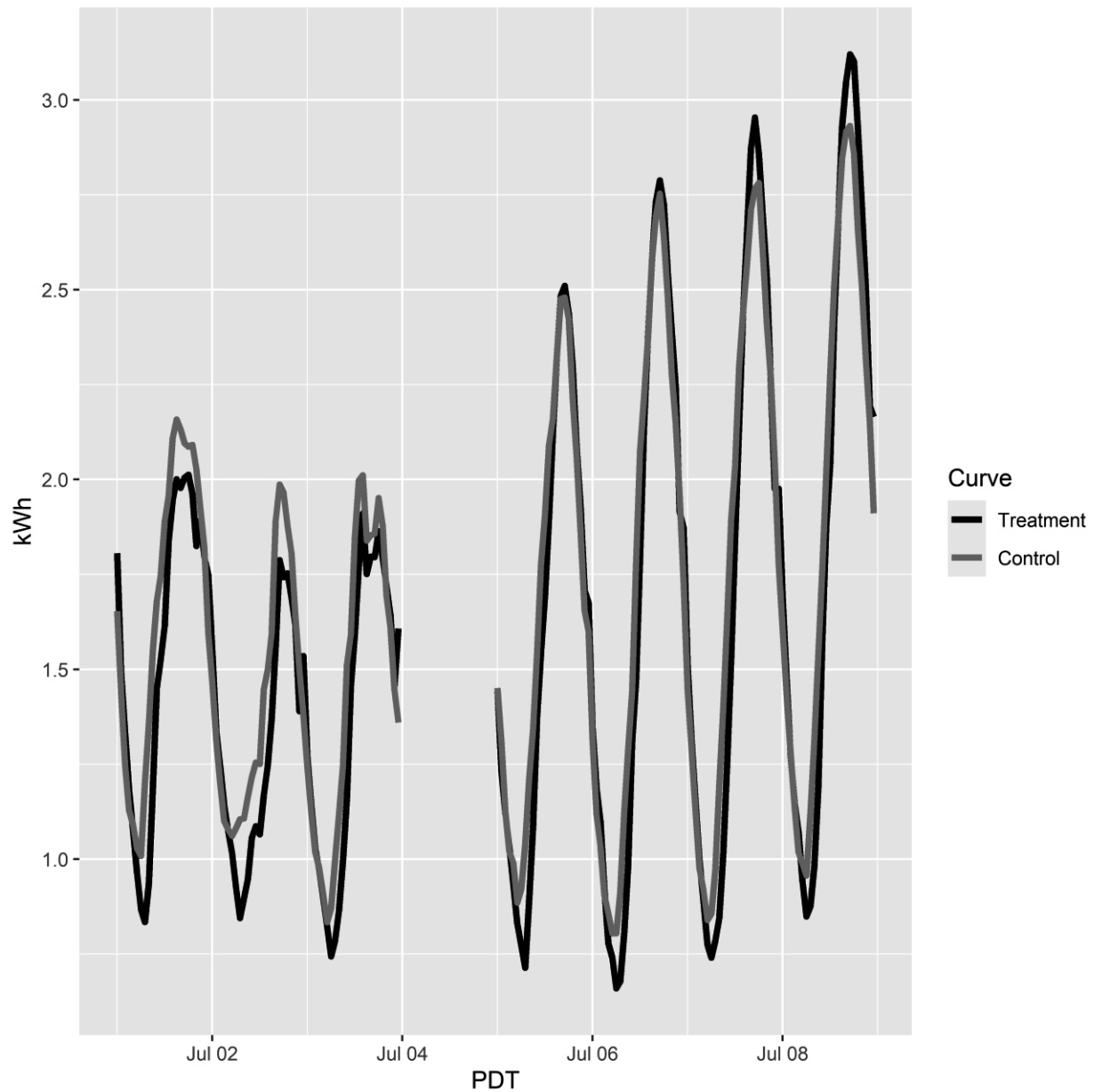
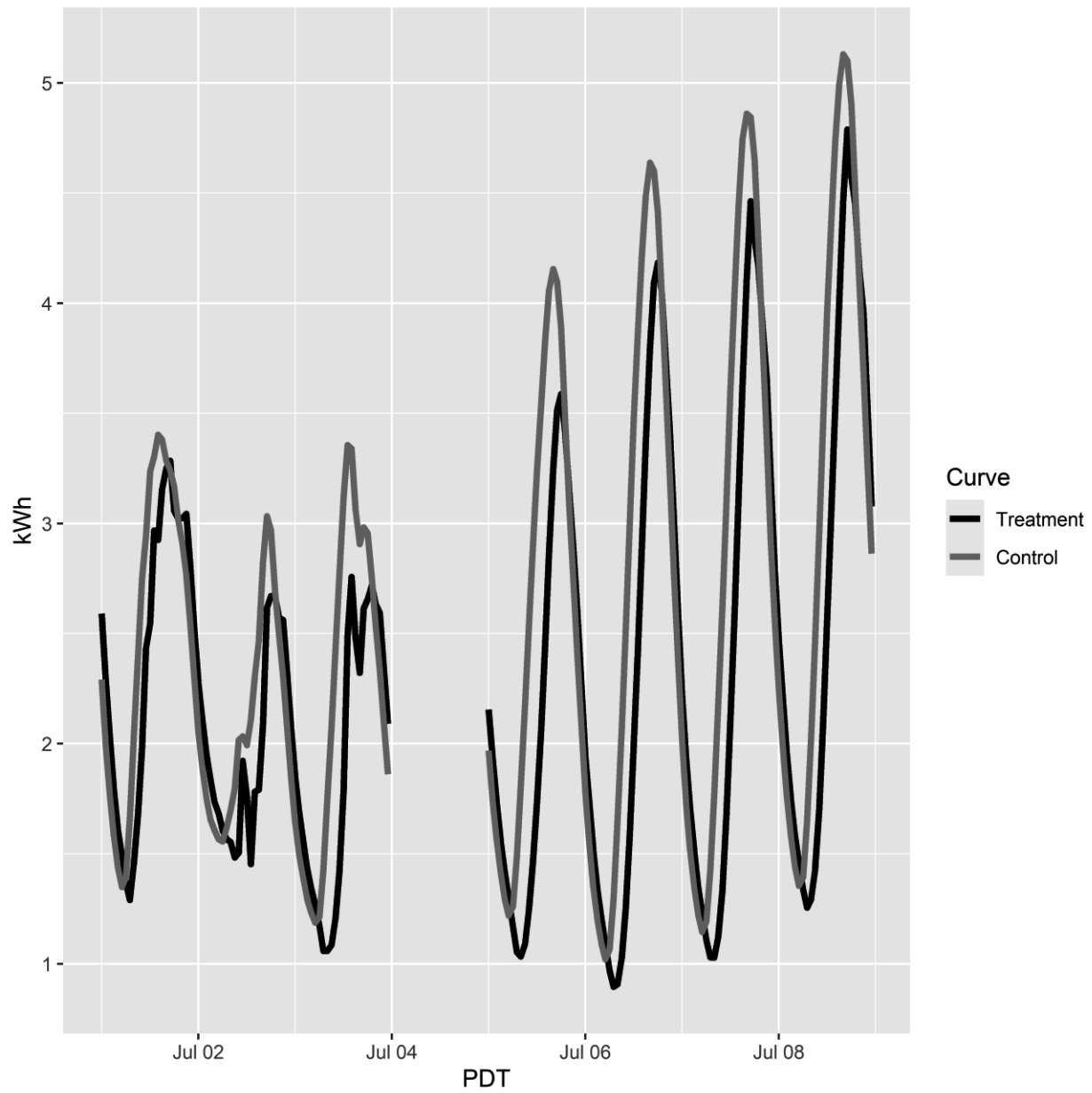


Figure 9-4: DP11.RM Non-Event Day Load Shapes



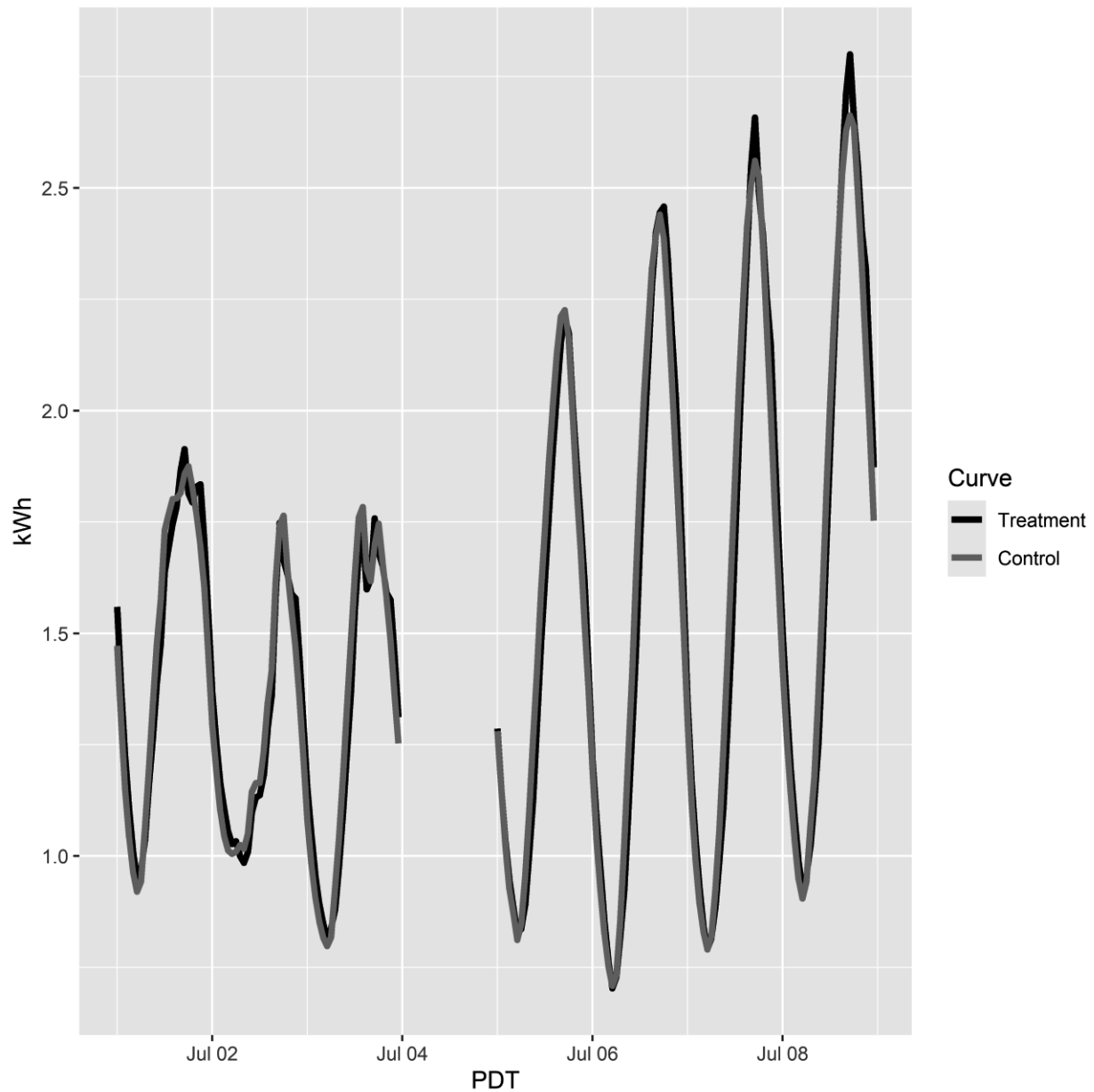


Figure 9-6: DP23.RM Non-Event Day Load Shapes

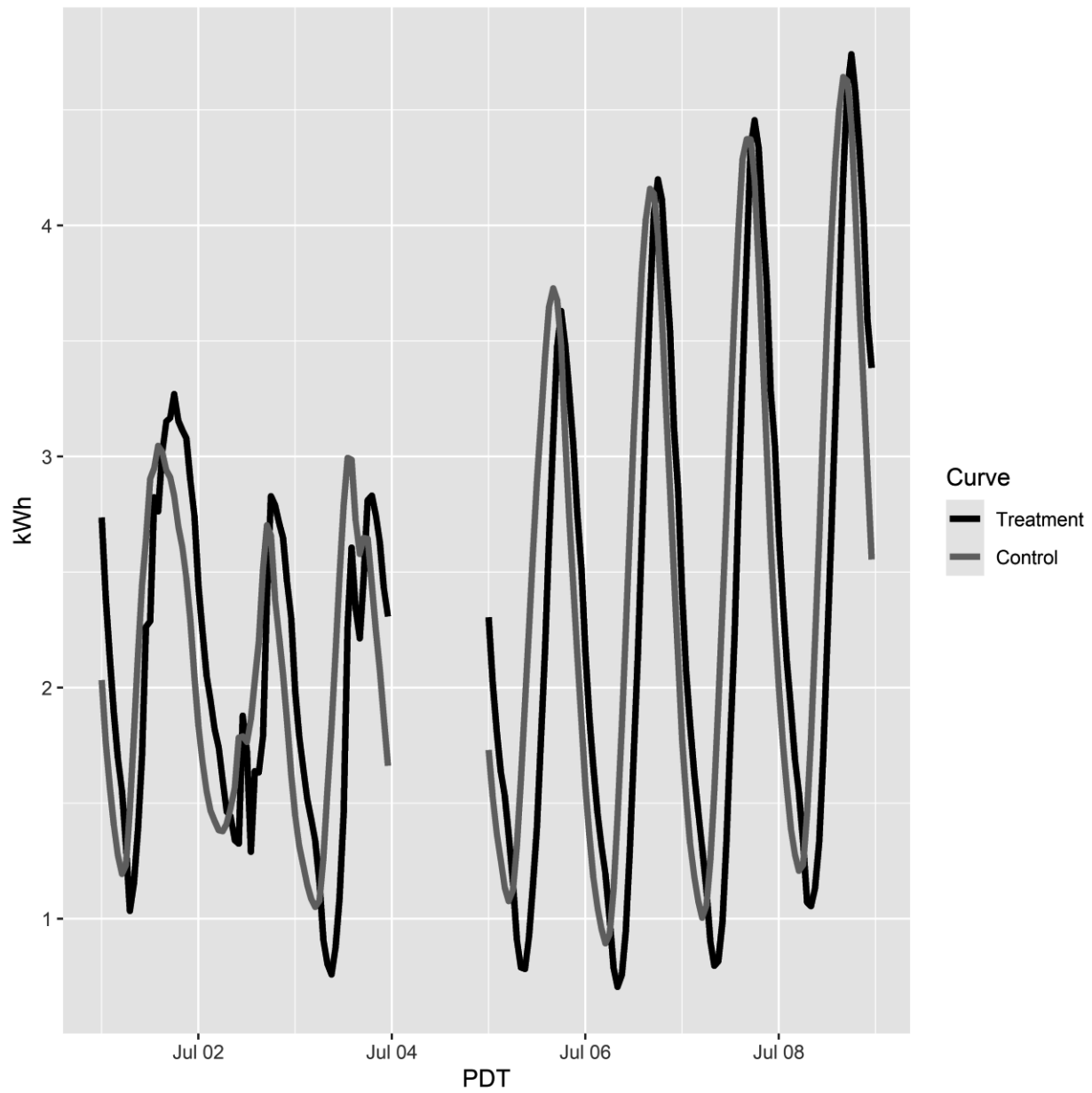


Figure 9-7: DP47.RS Non-Event Day Load Shapes

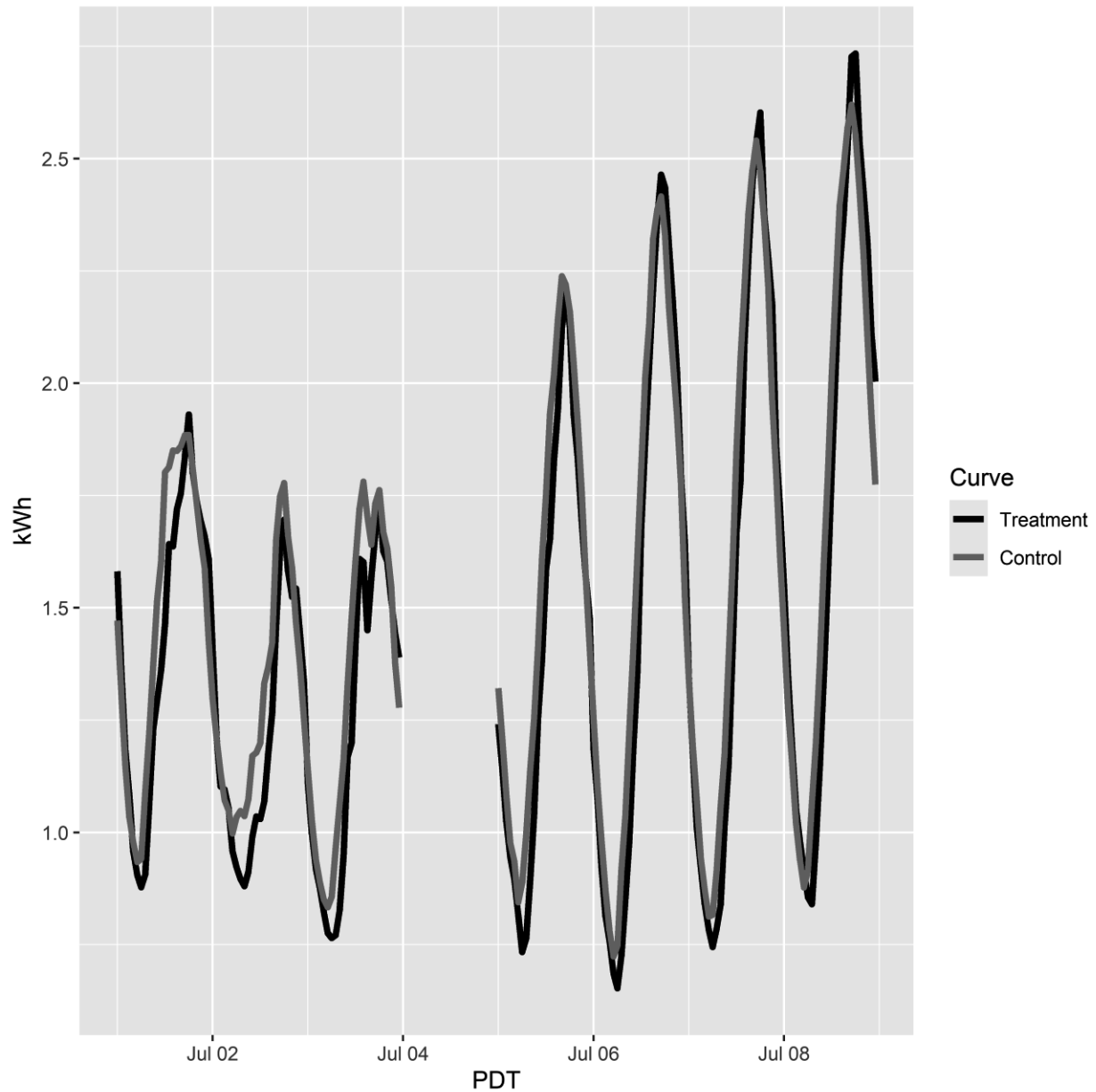


Figure 9-8: DP47.RM Non-Event Day Load Shapes

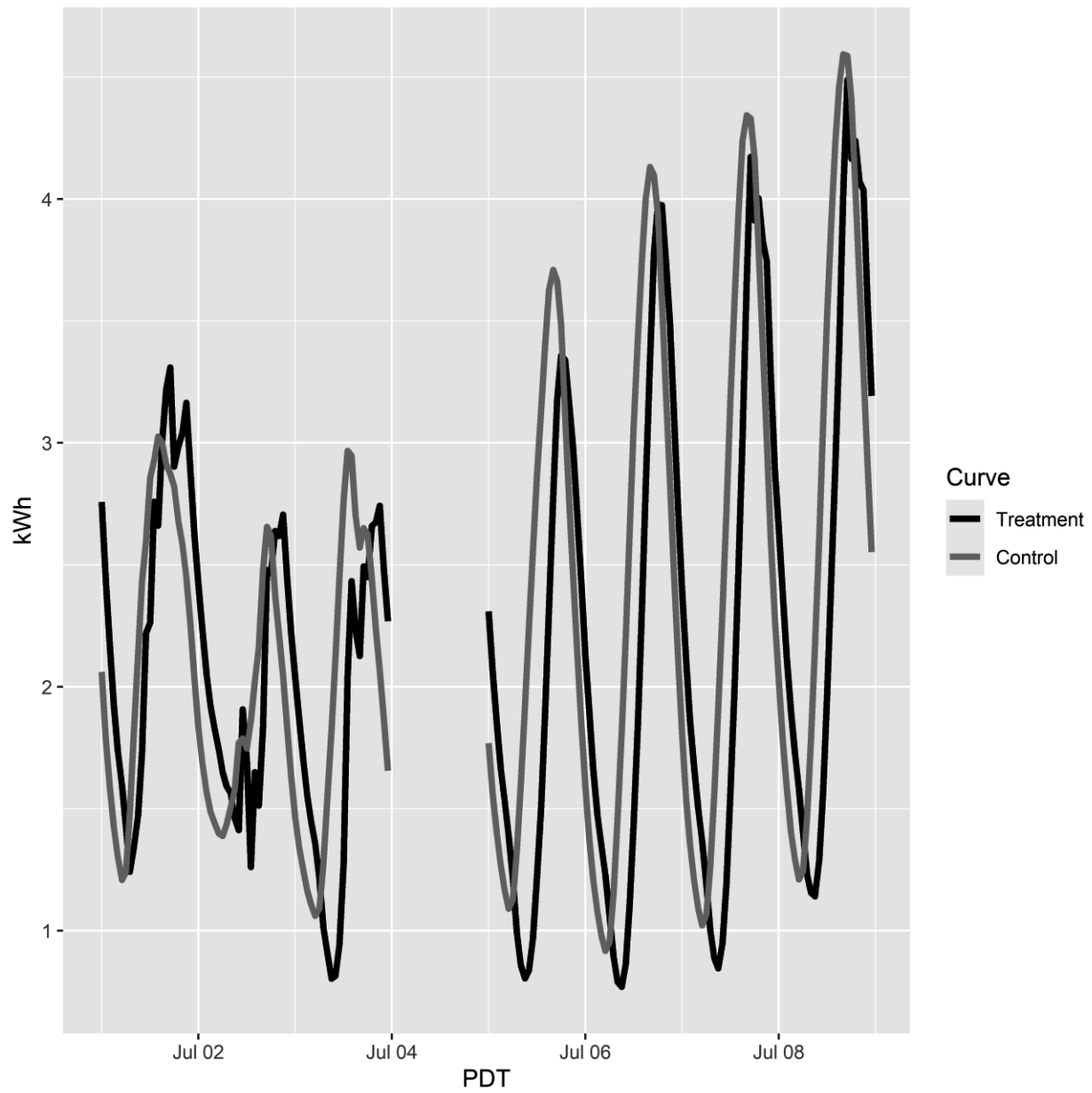


Figure 9-9: DP49.RS Non-Event Day Load Shapes

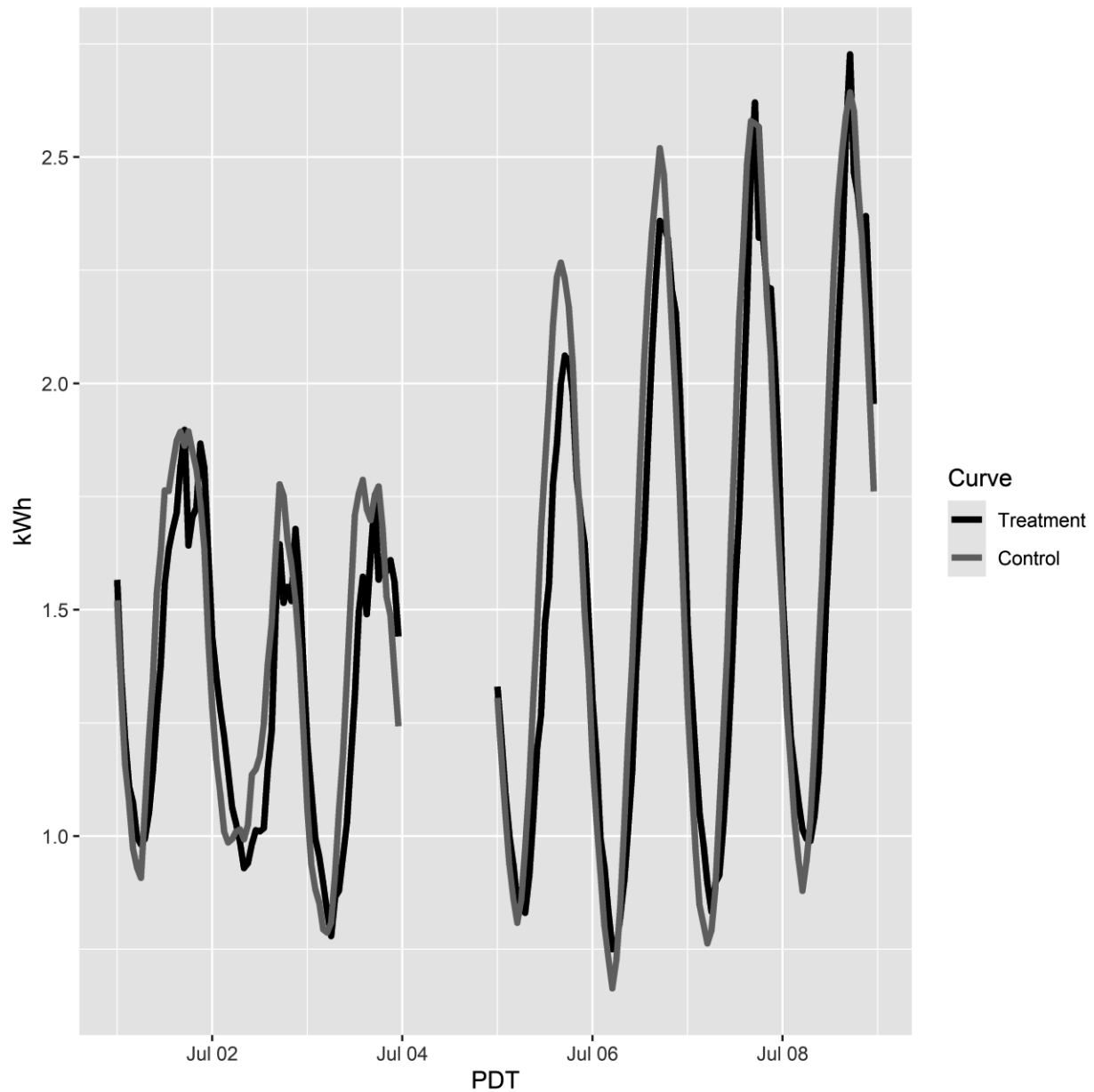


Figure 9-10: DP49.RM Non-Event Day Load Shapes

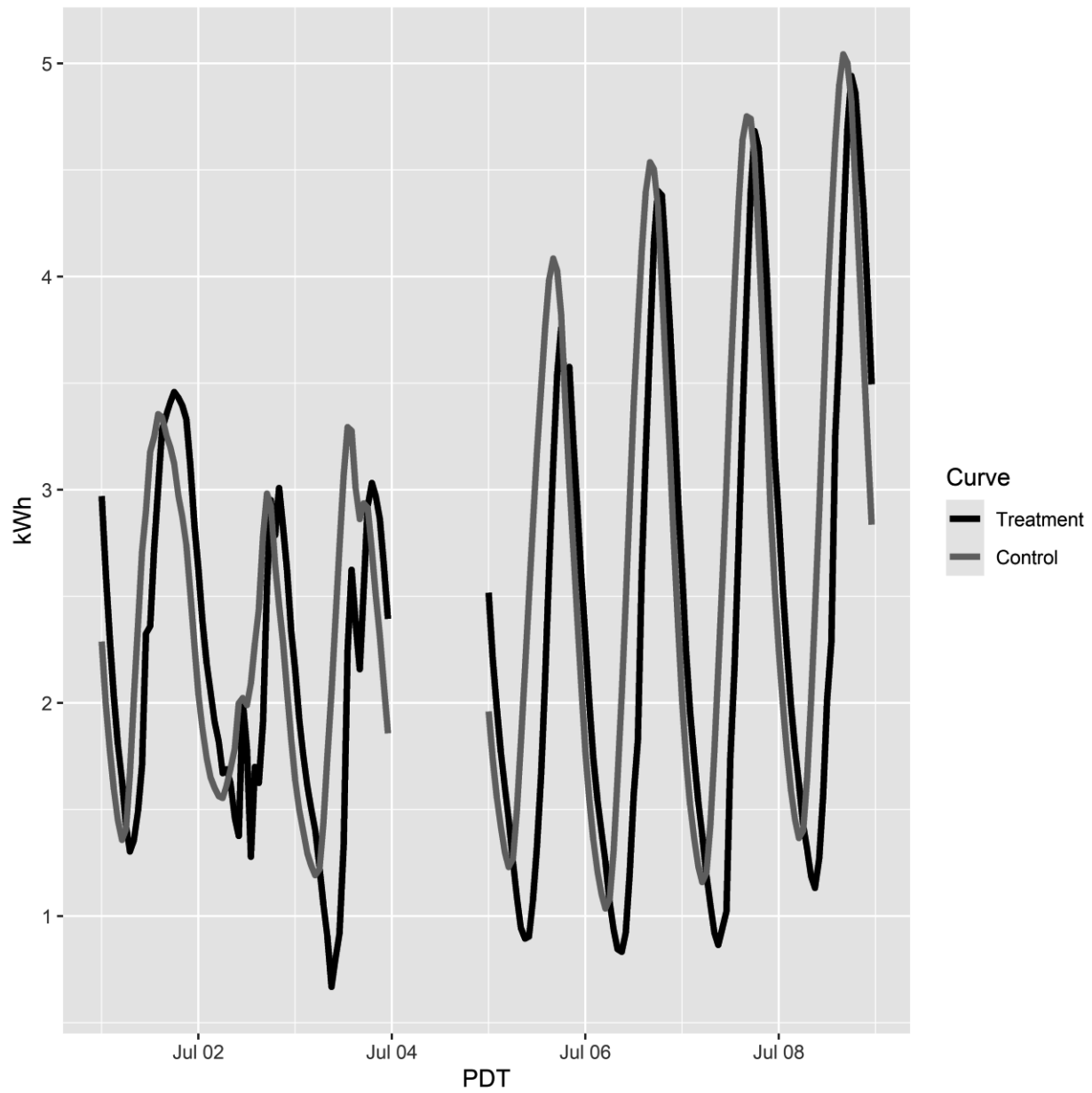


Figure 9-11: DP51.RS Non-Event Day Load Shapes

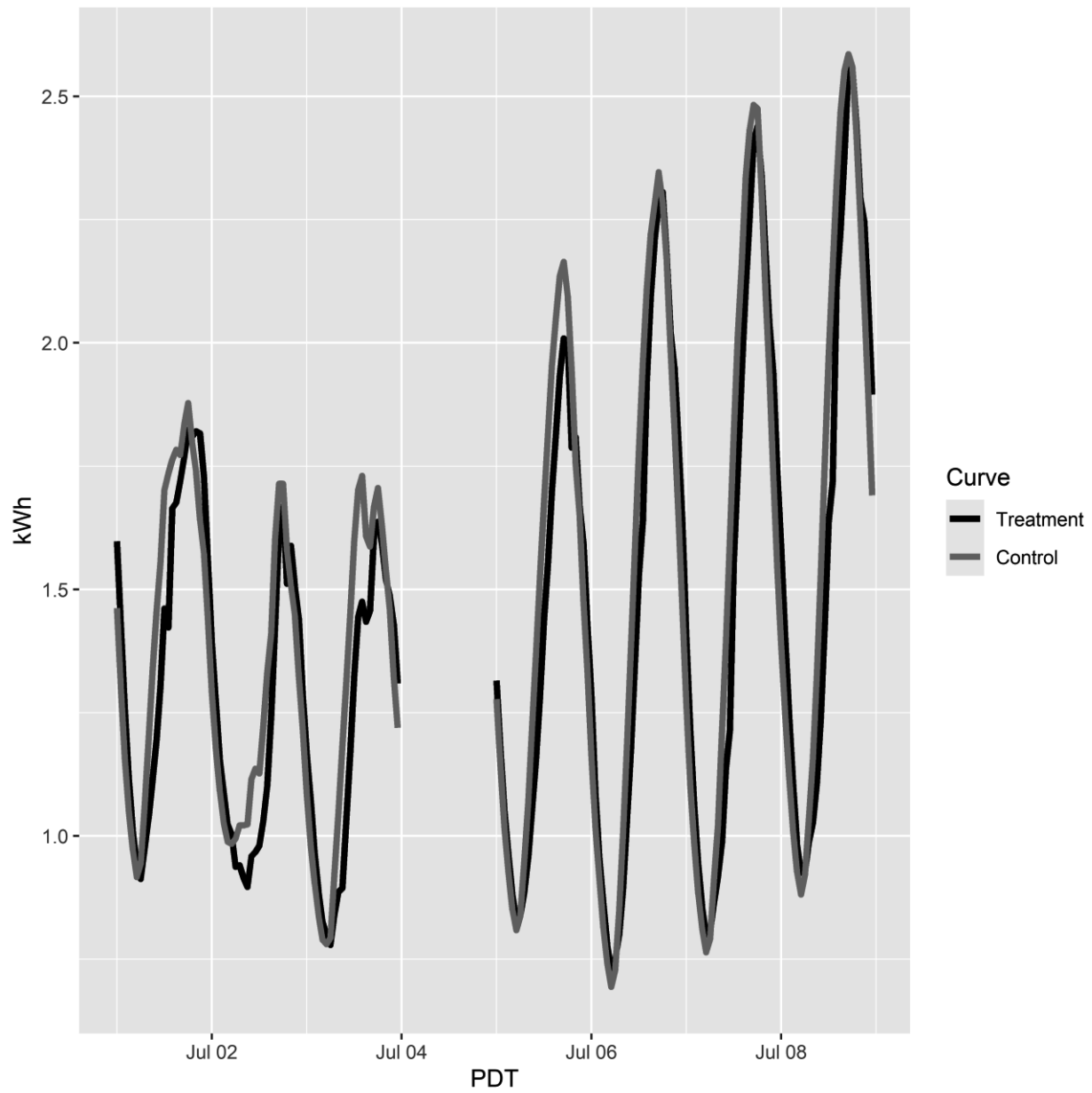


Figure 9-12: DP51.RM Non-Event Day Load Shapes

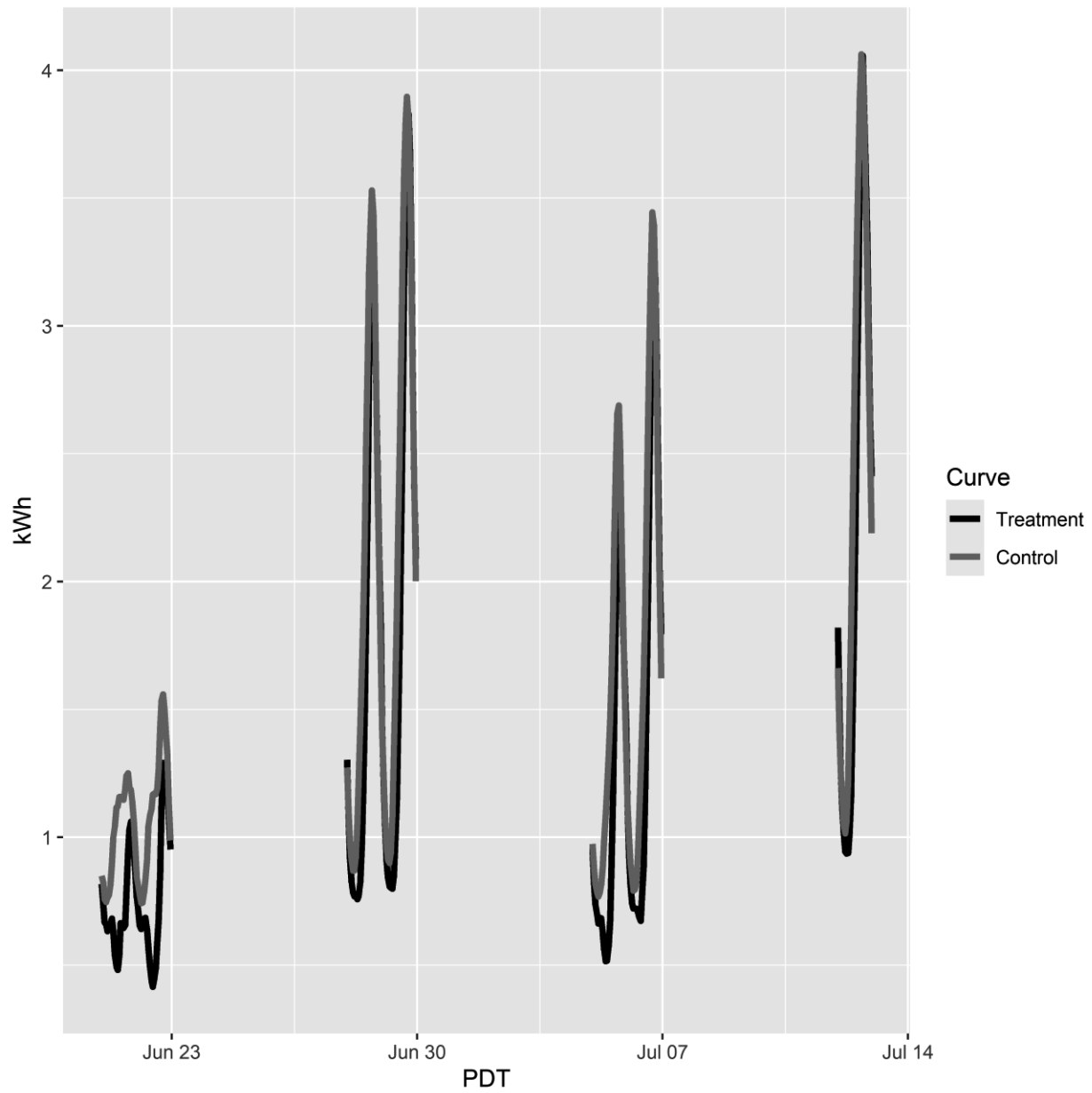


Figure 9-13: DP12.D1 Non-Event Day Load Shapes

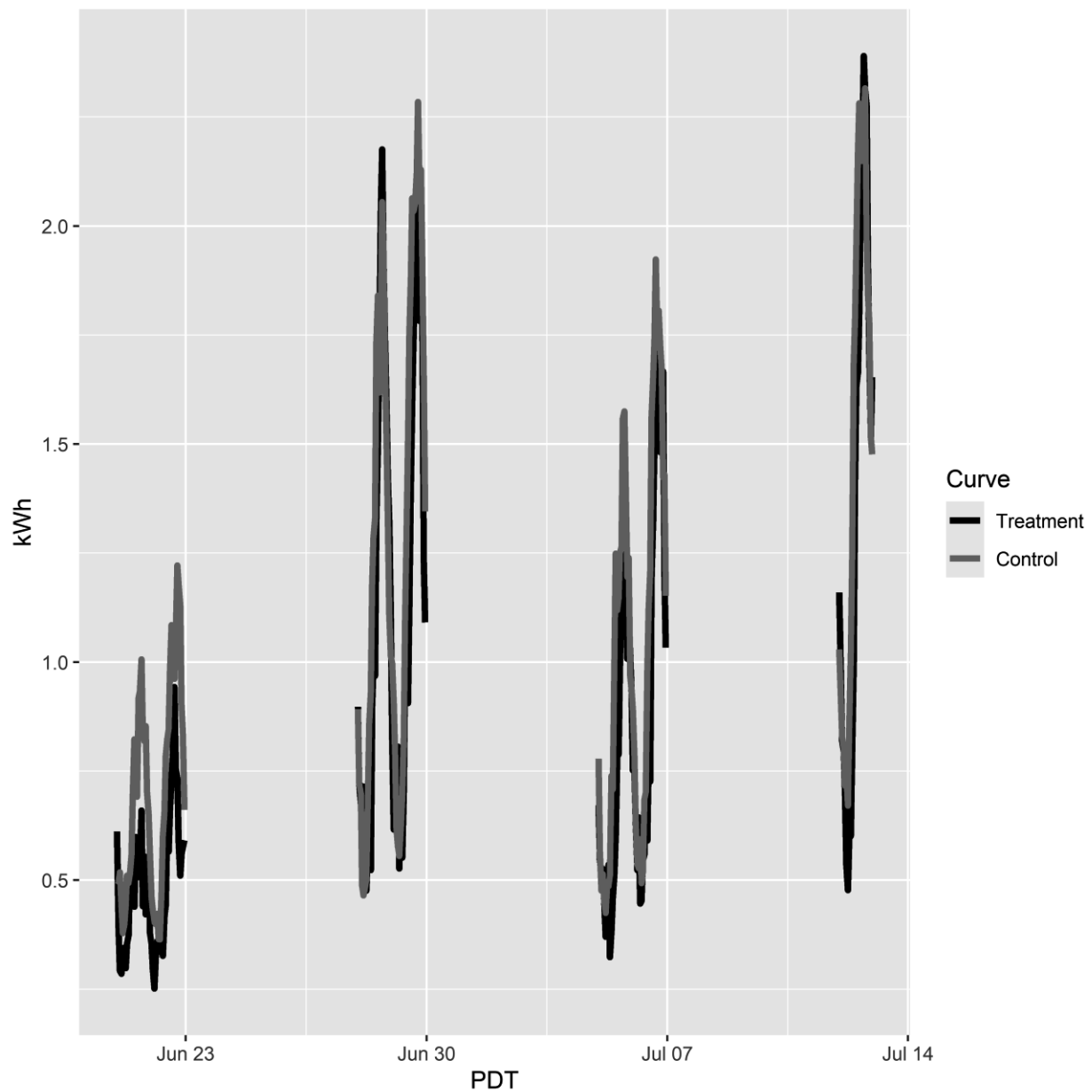


Figure 9-14: DP12.DM1 Non-Event Day Load Shapes

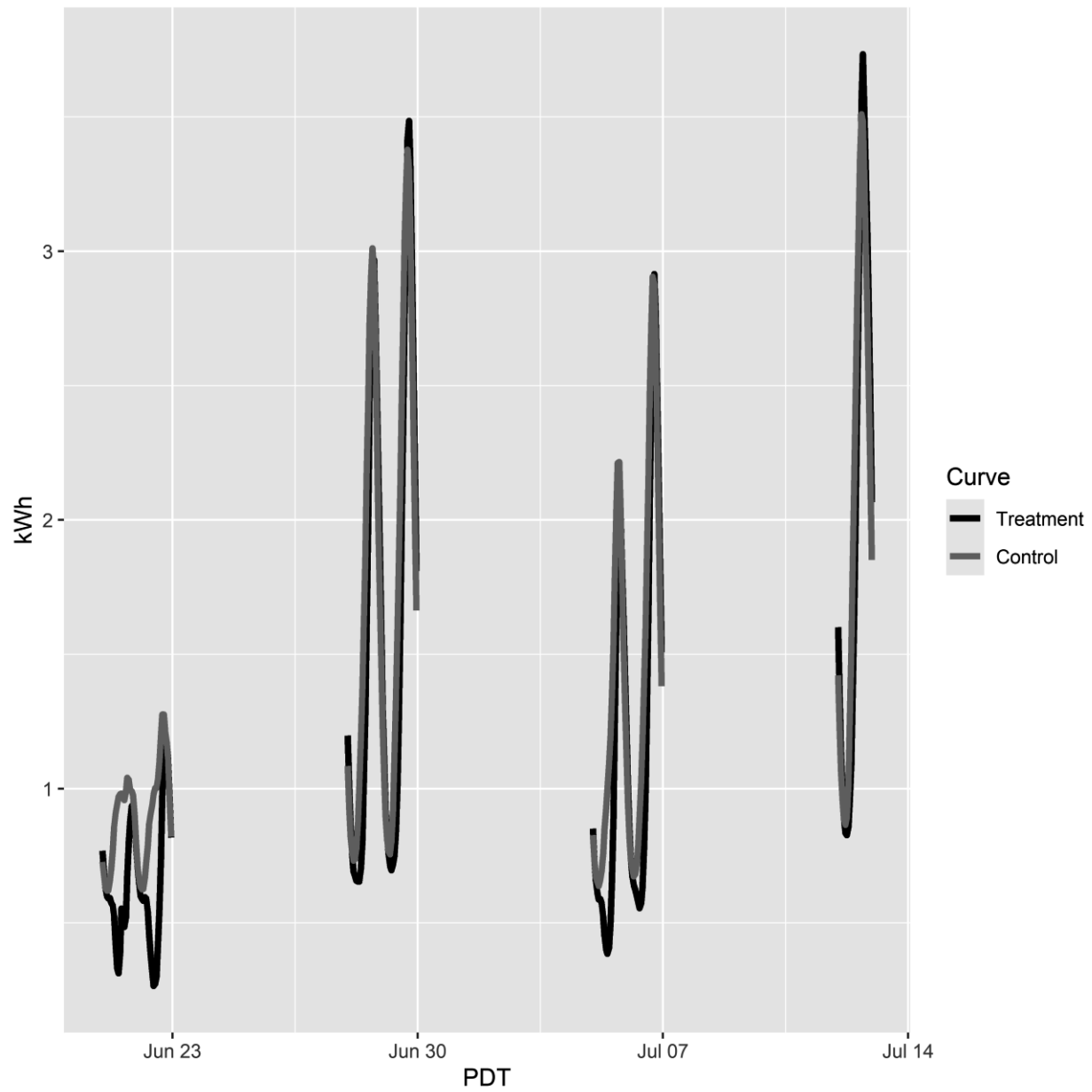


Figure 9-15: DP24.D1 Non-Event Day Load Shapes

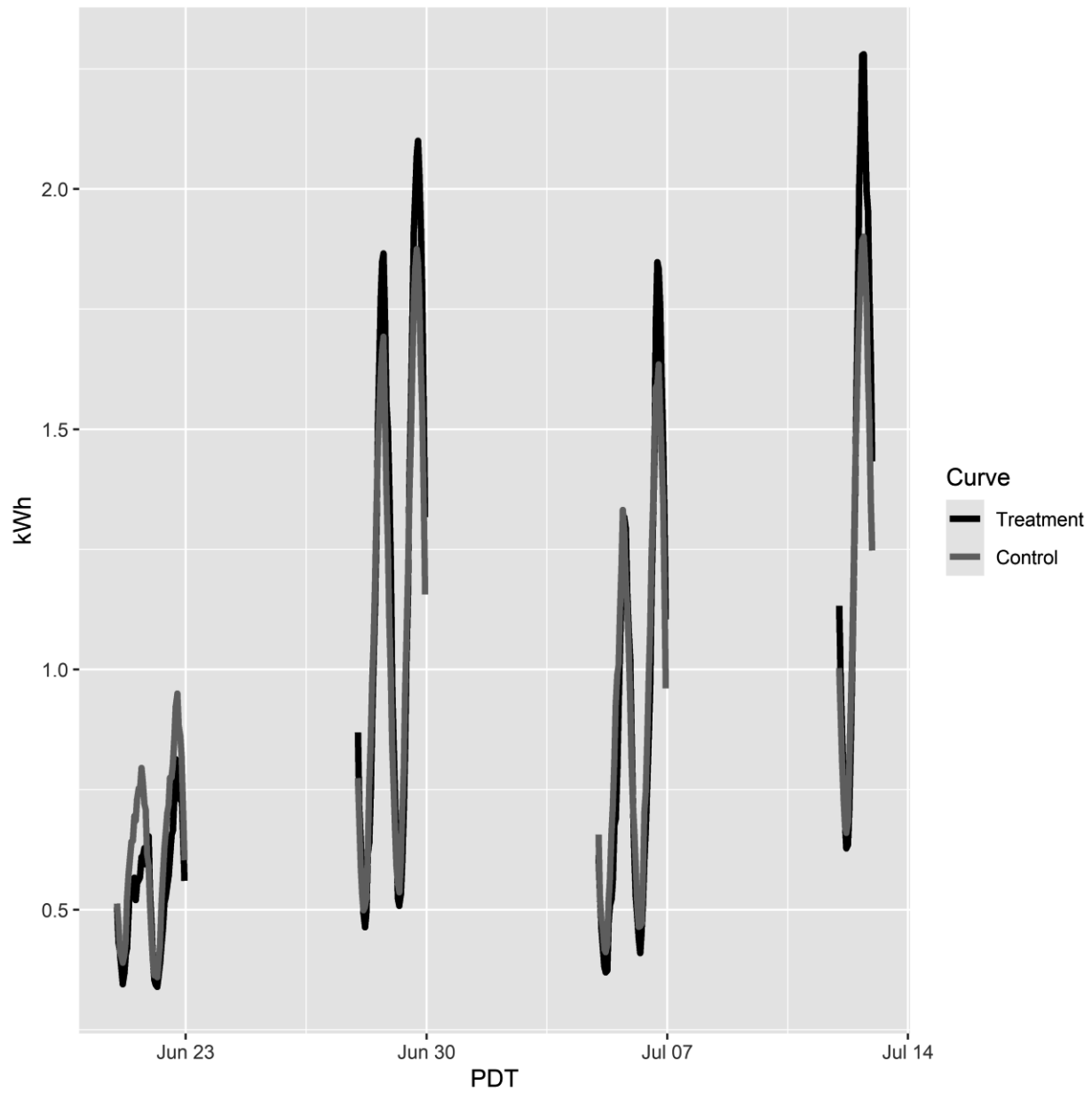


Figure 9-16: DP24.DM1 Non-Event Day Load Shapes

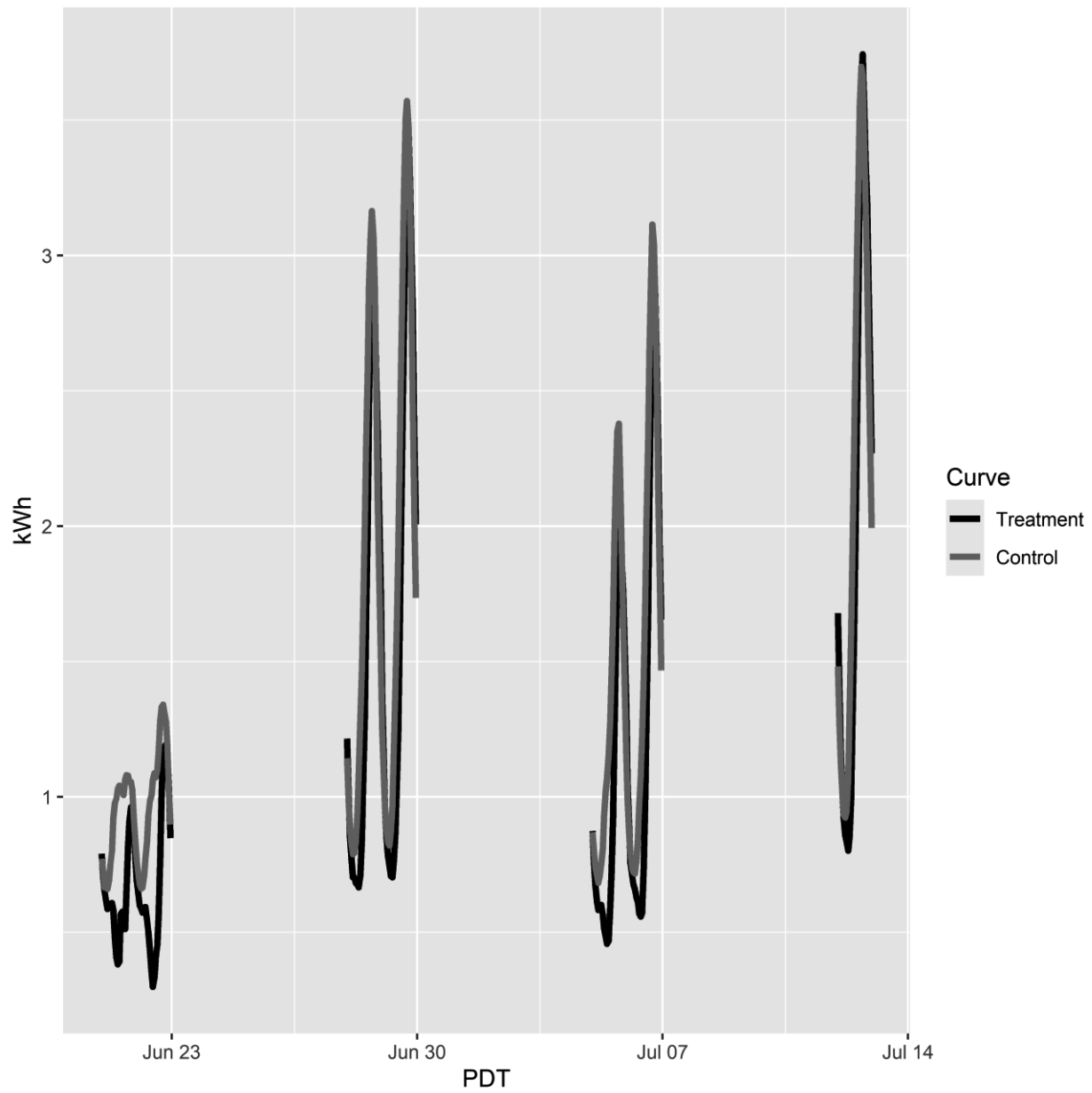


Figure 9-17: DP46.D1 Non-Event Day Load Shapes

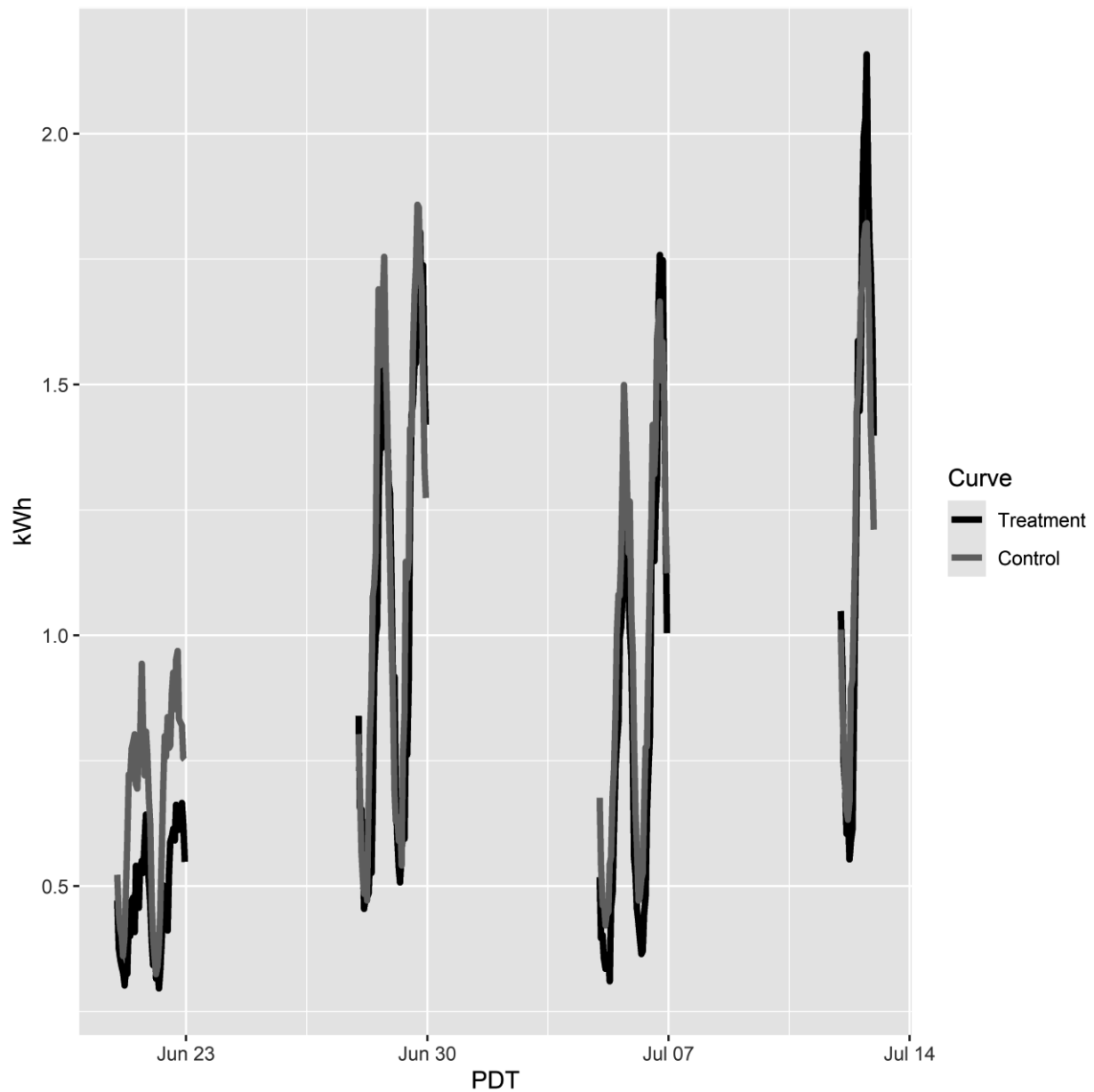


Figure 9-18: DP46.DM1 Non-Event Day Load Shapes

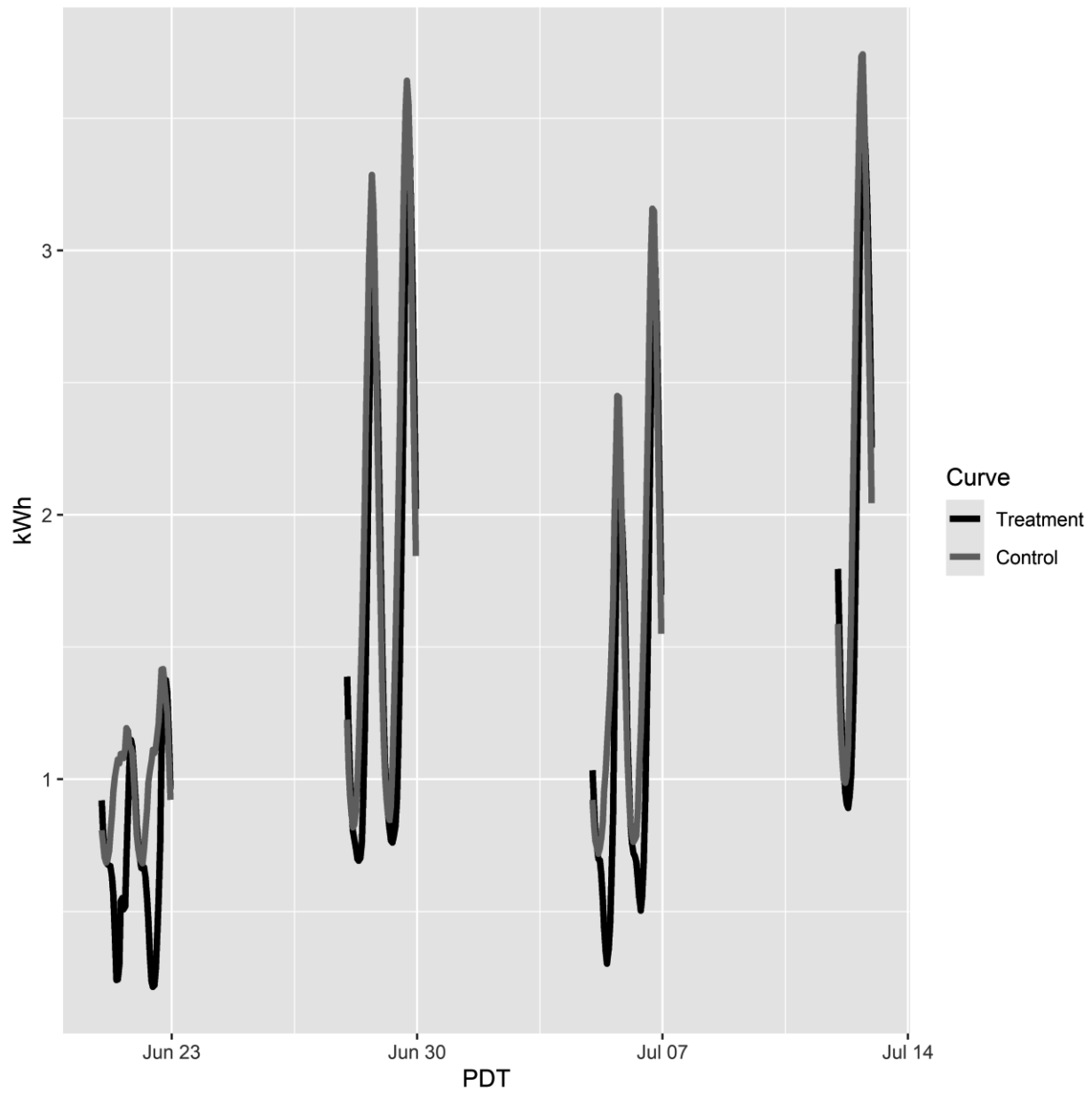


Figure 9-19: DP48.D1 Non-Event Day Load Shapes

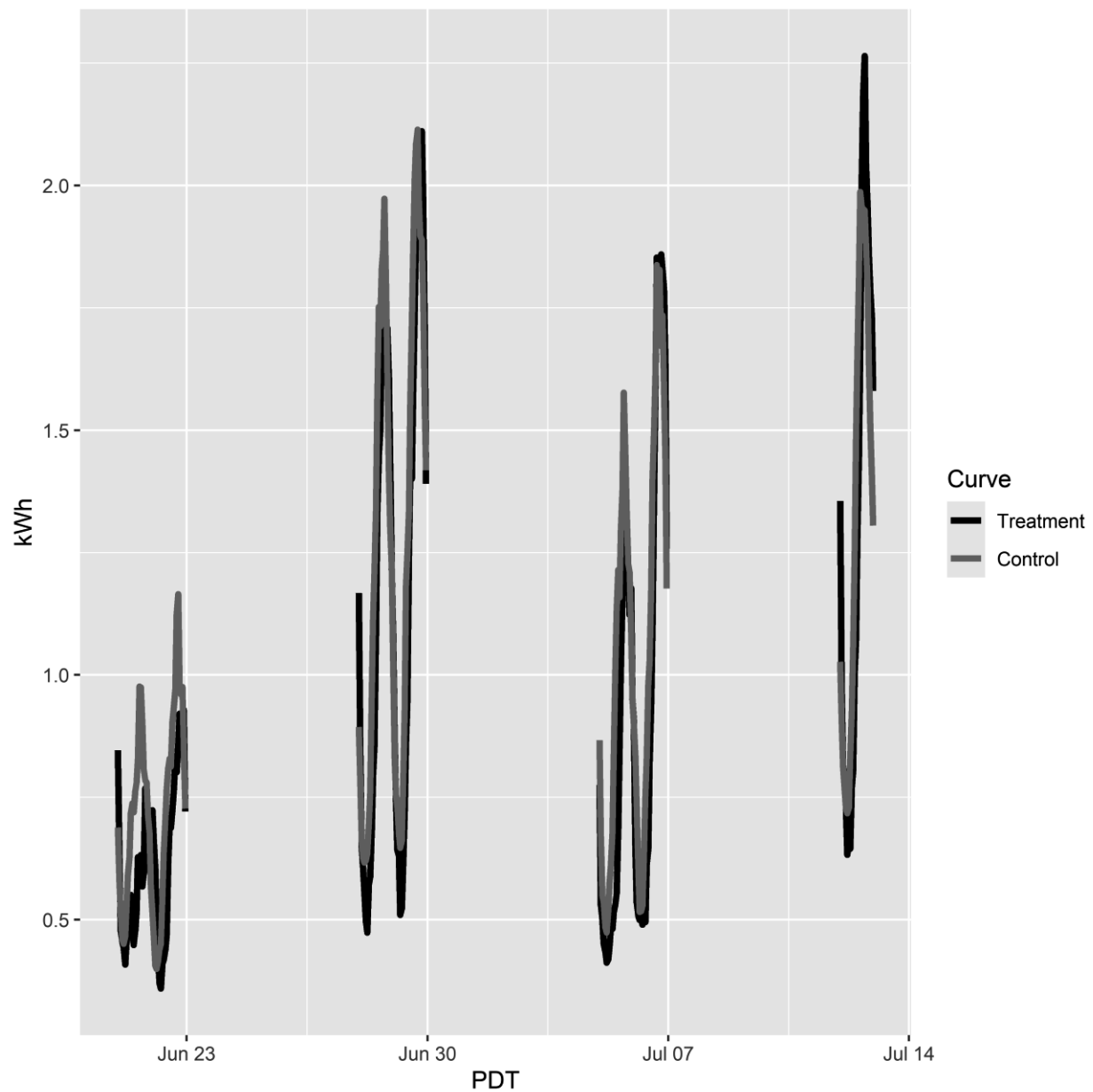


Figure 9-20: DP48.DM1 Non-Event Day Load Shapes

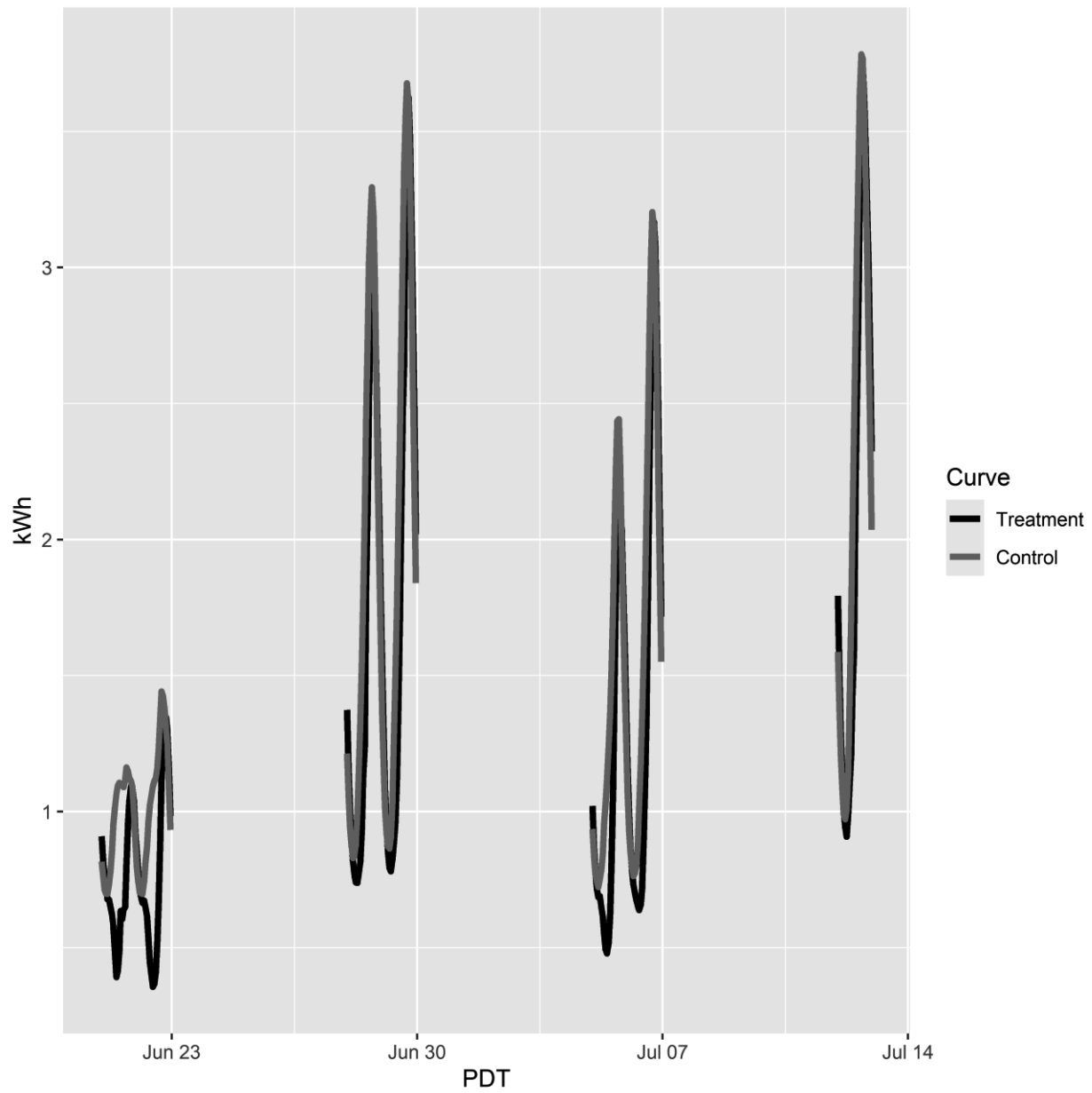


Figure 9-21: DP50.D1 Non-Event Day Load Shapes

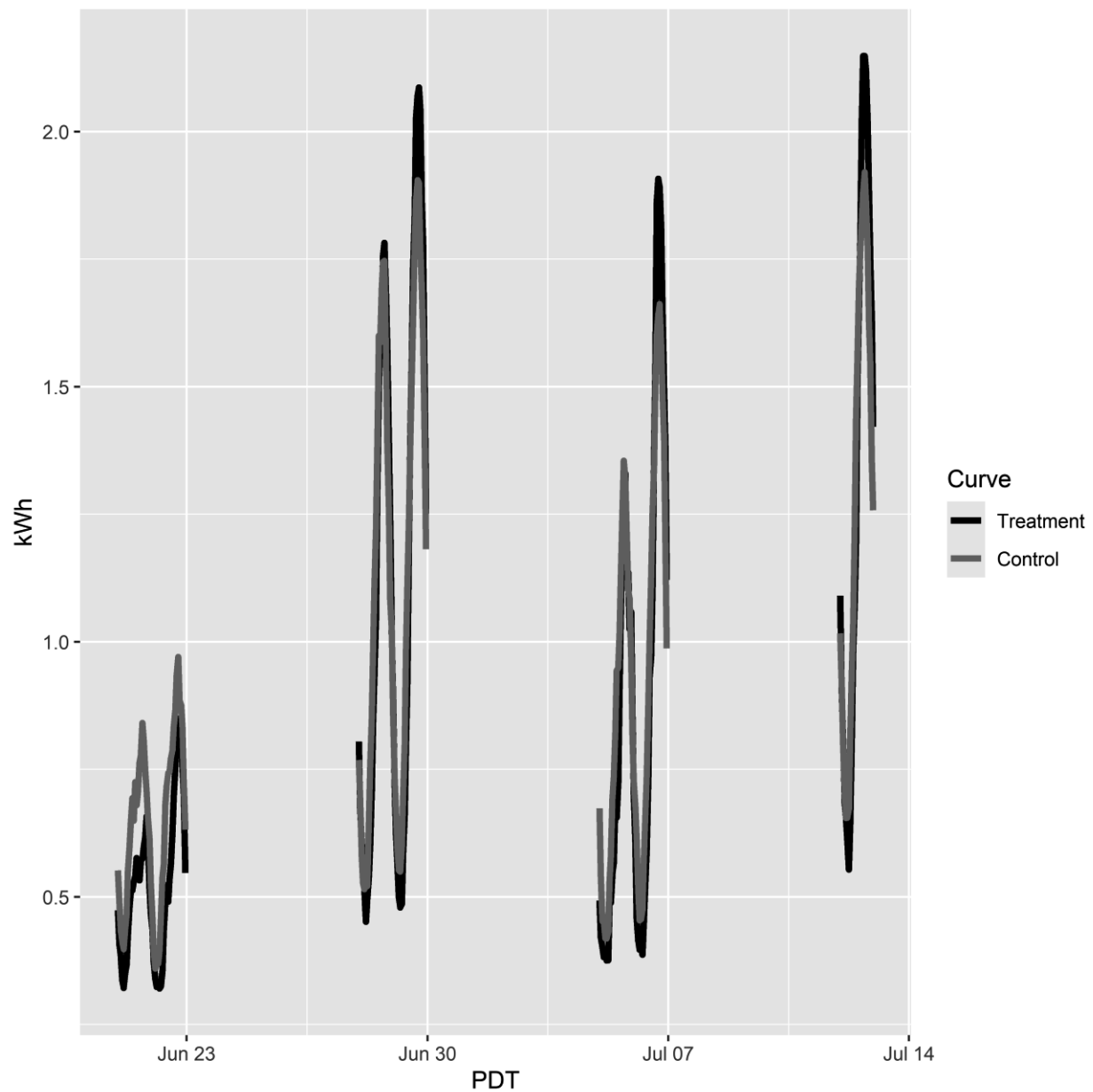


Figure 9-22: DP50.DM1 Non-Event Day Load Shapes

10 APPENDIX D: POTENTIAL PROGRAM SAVINGS

The values provided in Table 10-1 for the NPC service territory and Table 10-2 for the SPPC service territory do not represent verified savings for 2025 and do not represent verified savings for any future year.³² The following table provides an estimate of potential annual energy savings from the program if all the following hypothetical conditions were achieved:

- If all the devices had been installed before the program year.
- If no devices were to leave the program during the program year.
- If all devices were to function optimally during the program year.

³² During any given program year, the Evaluator evaluates the whole population of DR devices, including DR devices which were installed prior to the current program year and DR devices which have been installed during the program year.

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 10-1: NPC DR Potential Annual Energy Savings

Program Component	DP	kWh Factor	Available Devices	kWh Savings DR	kWh Savings EE	kWh Savings Total	Max VDR (kW)
Cool Share (Manage)	DP1.RM	7.15	4,195	29,994	-	175,803	1,552.15
	DP1.RS	7.34	19,865	145,809			12,316.30
PowerShift (Manage)	DP11M.RM	11.11	225	2,500	493,038	449,724	159.75
	DP11M.RS	-4.88	9,388	-45,813			4,036.84
	DP23M.RM	11.91	5,217	62,134	18,414,984	18,266,372	5,582.19
	DP23M.RS	-3.67	57,424	-210,746			66,037.60
	DP47M.RM	4.37	304	1,328	1,625,820	1,592,448	161.12
	DP47M.RS	-6.64	5,226	-34,701			2,299.44
BYOT (Manage)	DP49M.RM	-8.62	722	-6,224	2,576,028	2,350,956	490.96
	DP49M.RS	-27.22	8,040	-218,849			7,316.40
	DP51M.RM	11.41	2,205	25,159	4,924,206	4,910,969	2,469.60
	DP51M.RS	-2.64	14,544	-38,396			25,306.56
PowerShift (Build)	DP23B.RM	11.91	964	11,481	1,581,132	1,576,414	1,031.48
	DP23B.RS	-3.67	4,414	-16,199			5,076.10
BYOT (Build)	DP49B.RM	-8.62	167	-1,440	408,954	374,197	113.56
	DP49B.RS	-27.22	1,224	-33,317			1,113.84
	DP51B.RM	11.41	778	8,877	1,157,478	1,158,015	871.36
	DP51B.RS	-2.64	3,159	-8,340			5,496.66
Non-Thermostat DR (Manage)	Battery Storage	195.33	27	5,274	-	5,274	241.92
	Pool Pumps	3.91	44	172	-	172	36.08
	Water Heaters	45.10	34	1,533	-	1,533	81.60
Non-Thermostat DR (Build)	Battery Storage	195.33	3	586	-	586	26.88
	Pool Pumps	3.91	8	31	-	31	6.56
	Water Heaters	45.10	124	5,592	-	5,592	297.60
Total			138,301	-313,552	31,181,640	30,868,086	142,122.55

Residential Demand Response: Program Year 2025 – NV Energy

M&V Report

March 2026

Table 10-2: SPPC DR Potential Annual Energy Savings

Program Component	DP	kWh Factor	Available Devices	kWh Savings DR	kWh Savings EE	kWh Savings Total	Max VDR (kW)
PowerShift (Manage)	DP12M.D1	8.78	1,481	13,003	259,584	273,362	1,140.37
	DP12M.DM1	25.83	30	775			49.20
	DP24M.D1	7.34	7,959	58,419	1,440,192	1,504,579	9,948.75
	DP24M.DM1	10.91	547	5,968			547.00
	DP46M.D1	5.13	1,313	6,736	237,328	244,506	1,168.57
	DP46M.DM1	7.38	60	443			45.60
BYOT (Manage)	DP48M.D1	2.68	2,776	7,440	593,632	601,875	4,247.28
	DP48M.DM1	6.53	123	803			138.99
	DP50M.D1	11.46	3,665	42,001	819,104	865,840	6,303.80
	DP50M.DM1	14.22	333	4,735			372.96
PowerShift (Build)	DP24B.D1	7.34	537	3,942	110,656	115,765	671.25
	DP24B.DM1	10.91	107	1,167			107.00
BYOT (Build)	DP48B.D1	2.68	378	1,013	83,824	85,000	578.34
	DP48B.DM1	6.53	25	163			28.25
	DP50B.D1	11.46	1,075	12,320	249,600	263,711	1,849.00
	DP50B.DM1	14.22	126	1,792			141.12
Non-Thermostat DR (Manage)	Battery Storage	115.19	16	1,843	-	1,843	143.04
	Water Heaters	-6.64	17	-113	-	-113	38.08
Non-Thermostat DR (Build)	Battery Storage	115.19	2	230.38	-	230.38	17.88
Total			20,570	162,679	3,793,920	3,956,598	27,536.48

DSM-17

***Energy Smart Schools Program
NV Energy
Program Year 2025***

***Measurement and Verification Report
March 24, 2026***

Prepared for:



Prepared by:

QUALUS

***100 Colonial Center Parkway
Suite 400
Lake Mary, FL 327463***

TABLE OF CONTENTS

1	Executive Summary	1
1.1	Overview of Program	1
1.2	Overview of M&V Approaches	2
1.3	Summary of Program-Level Energy Savings Impacts for PY2025	2
1.4	M&V Recommendations:	3
2	Program Background	5
3	M&V Methodology	7
3.1	Sampling Plan	7
3.2	Review of Documentation	9
3.3	Verification Procedures	9
3.4	Methodologies for Calculating kWh Savings	10
3.5	Determining Energy Savings Curves	20
3.6	Determining First-Year Electric (kWh) Savings	29
3.7	Determining Critical Peak Demand (kW) Savings	29
3.8	Determining Effective Useful Life and Lifetime Savings	31
4	Energy Impact Results	33
4.1	Results of Ex-Post Verified Electric (kWh) Savings Calculations	33
4.2	Review of Variances	34
4.3	Ex-Post Verified Demand Reduction (kW)	37
4.4	Effective Useful Life and Lifetime Energy (kWh) Savings	37
5	Findings and Recommendations	39
5.1	Findings	39
5.2	Status of 2024 Recommendations	40
5.3	Recommendations Resulting from M&V Findings for PY2025	41
6	Appendix A: Savings Per Month and Per Rate Class	43
6.1	NPC Savings per Month by Rate Class	43
6.2	SPPC Savings per Month by Rate Class	44
7	Appendix B: Schools Removed from the Ex-Post CEI and SEM Models	45
8	Appendix C: Statistical Validation of Linear Mixed Effects Models	47
8.1	Model Statistics for Program Year 2025	47
8.2	Analysis of Variance Tests for Linear Mixed Effects Models	48
8.3	Statistical Tests for the Carson School District Generalized Linear Models	53
9	Appendix D: “Measurement and Verification Report Continuous Energy Improvement (CEI)” prepared by the implementer for Clark County School District	59
10	Appendix E: “Measurement and Verification Report Strategic Energy Management (SEM)” prepared by the Implementer for Washoe County School District	98
11	Appendix F: “Measurement And Verification Report Strategic Energy Management (SEM)” Prepared By the Implementer For Carson City School District	118

1 EXECUTIVE SUMMARY

This Measurement and Verification (“M&V”) report provides verified ex-post energy and demand impacts achieved by the Energy Smart Schools (“ESS”) Program that NV Energy offered to Sierra Pacific Power Company and Nevada Power Company (“SPPC” and, collectively with “NPC,” “NV Energy”) customers during 2025. This M&V report is provided by the Evaluator, Qualus LLC (formerly ADM Associates, Inc., which was acquired by Qualus LLC in July 2025), an independent, third-party contractor that provides evaluation and M&V services and reports for numerous electric and gas utility clients.

1.1 Overview of Program

The 2025 Program targeted public K-12, charter schools, and higher educational institutions and facilities throughout the NPC and SPPC service territories. In this M&V report, “NPC Program” will be used to denote the NPC component of the state-wide Program; similarly, “SPPC Program” will denote the SPPC component of the state-wide Program.

For the NPC and SPPC service territories, the 2025 Program had two different delivery channels: (1) behavioral projects and (2) capital improvement projects.

Behavioral projects provided performance-based incentives to the participating schools for achieving energy savings through low-cost or no-cost customer actions and behavioral changes.

- For the NPC service territory, behavioral projects are called Continuous Energy Improvement (“CEI”).¹ CEI was introduced at 12 schools in the Clark County School District (“CCSD”) during program year 2019 (“PY2019”). Despite the COVID-19 pandemic, the PY2019 pilot program was expanded to 290 schools during PY2020.
- For the SPPC service territory, behavioral projects are called Strategic Energy Management (“SEM”), which was introduced in Washoe County School District (“WCSD”) in the last quarter of 2020. In PY2022, the SEM program continued in WCSD² and was expanded to the Carson City School District (“Carson SD”).³

Capital improvement projects implemented in 2025 included prescriptive lighting retrofits, mid-stream lighting retrofits, heating, ventilation, and cooling (“HVAC”), monitoring based commissioning, and new construction projects.

¹ NV Energy CCSD CEI Final Report 2025, attached as Appendix D.

² NV Energy WCSD SEM Final Report 2025, attached as Appendix E.

³ NV Energy Carson SD SEM Final Report 2025, attached as Appendix F.

1.2 Overview of M&V Approaches

1.2.1 M&V Sampling

The M&V analyses for the PY2025 Program are required to achieve a sampling precision of ± 10 percent at the 90 percent confidence level (also called 90/10 confidence). Given that the Program implementation was not uniform across NPC and SPPC service territories, and various measures are weather sensitive, the 90/10 confidence requirement applies individually to NPC and SPPC service territories. For the NPC Program, the Evaluator executed a sampling plan that achieved relative precision of ± 5.1 percent at the 90 percent confidence level. For the SPPC Program, the Evaluator executed a sampling plan that achieved relative precision of ± 2.1 percent at the 90 percent confidence level.

1.2.2 M&V Analysis for Behavioral Projects

Ex-ante analyses of savings for CEI and SEM behavioral projects used whole building pre- and post-regression models that incorporated facility meter data, local weather, school calendars, and information on any changes to the facility, such as new additions, extended hours, and other energy efficiency projects. The Evaluator's ex-post analyses for CEI and SEM projects included a thorough review of the ex-ante regression models and participant data. The Evaluator's analyses also ensured that savings claimed through capital improvement projects were not being double counted in the regression models.

1.2.3 M&V Analysis for Capital Improvement Projects

The M&V analyses for capital improvement projects included desk reviews to verify measure installation and engineering analyses to calculate ex-post energy savings. The Evaluator used documentation provided by the program implementation contractor to determine measure operating parameters, ex-post verified energy (kilowatt-hours, "kWh") savings, and critical peak demand (kilowatt, "kW") savings. On-site inspections on a sub sample of projects were also conducted under both the NPC and SPPC territories to verify the project related information.

1.3 Summary of Program-Level Energy Savings Impacts for PY2025

For the PY2025 NPC Program, ex-post verified energy impacts are provided in Table 1-1. Ex-post verified energy impacts include 18,299,383 kWh of first-year savings (i.e., savings achieved during the 2025 calendar year). Ex-post annual savings are 20,308,676 kWh, representing a 101 percent realization rate ("RR"). Ex-post summer critical peak demand savings are 4,114 kW.

The Evaluator verified that there was no double-counting of savings for the NPC Program in PY2025.

Table 1-1. NPC Summary of Energy Impacts

Delivery Channel	First-Year Ex-Post Energy Savings (kWh)	Project Count	Annual Ex-Ante Estimated Energy Savings (kWh)	Annual Ex-Post Verified Energy Savings (kWh)	Realization Rate, (Ex-Post kWh / Ex-Ante kWh)	Ex-Post Summer Critical Peak Demand Savings (kW)	EUL (years)	Lifetime Energy Savings (kWh)
CEI (Behavioral)	12,314,349	3	12,585,139	12,314,349	98%	2,756	1	12,314,349
Capital Improvement Projects	5,985,034	30	7,509,241	7,994,327	106%	1,358	9.13	72,994,700
Total	18,299,383	33	20,094,380	20,308,676	101%	4,114	4.20	85,309,049

For the PY2025 SPPC Program, ex-post verified energy impacts are provided in Table 1-2 below. Ex-post verified energy impacts include 5,442,991 kWh first-year savings and annual savings of 5,996,246 kWh, which equate to a 106 percent RR. Ex-post summer critical peak demand savings are 1,291 kW.

The Evaluator verified that there was no double-counting of savings for the SPPC Program in PY2025.

Table 1-2. SPPC Summary of Energy Impacts

Delivery Channel	First-Year (2025) Ex-Post Energy Savings (kWh)	Project Count	Annual Ex-Ante Estimated Energy Savings (kWh)	Annual Ex-Post Verified Energy Savings (kWh)	Realization Rate, (Ex-Post kWh / Ex-Ante kWh)	Ex-Post Summer Critical Peak Demand Savings (kW)	EUL (years)	Lifetime Energy Savings (kWh)
SEM (Behavioral)	5,109,714	5	4,800,695	5,109,714	106%	963	1	5,109,714
Capital improvement projects	333,277	15	853,516	886,532	104%	328	13.55	12,010,466
Total	5,442,991	20	5,654,211	5,996,246	106%	1,291	2.86	17,120,180

1.4 M&V Recommendations:

Based on the M&V findings, the Evaluator provides recommendations that are designed to reduce the uncertainty associated with ex-ante savings calculations. M&V recommendations are intended to help improve alignment between ex-ante and ex-post savings, increase the accuracy of measure-level findings – e.g., ex-post savings and effective useful life (“EUL”) – and improve the efficiency of Program evaluation. The Evaluators’ recommendations are summarized below and detailed in Chapter 5 of this M&V report.

- 1) Perform a root cause analysis (“RCA”) when negative savings are found for a given school type (or individual site, where applicable), along with aligning the ex-ante and ex-post approaches for adjusting negative savings in future program years.
- 2) Pursue a more thorough quality assurance and quality control (“QA/QC”) process with respect to advanced metering infrastructure (“AMI”) data completion. A complete dataset for each evaluated site will lead to more accurate ex-ante and ex-post savings estimates.
- 3) Provide monthly documented progress updates on Phase 1 and Phase 2 CEI and SEM operations for PY2026. These updates will keep the Evaluator informed as to the Phase 2 rollout progress and will help both the implementer and the Evaluator achieve their analysis timeline goals.
- 4) For the Capital Improvement projects, revise the lighting calculator to apply location-specific hours of use (“HOU”) and heating and cooling interactive effects (“HCIFs”) associated with different territories and facility types.
- 5) For the Capital Improvement variable frequency drive (“VFD”) projects, revise ex-ante calculations to apply location-specific deemed values associated with each territory and facility type.
- 6) Review QA/QC processes for ex-ante calculations of energy savings.
- 7) Strengthen coordination efforts between the implementer and the Evaluator for scheduling on-site inspections. This coordination will assist in facilitating data collection activities in a timely manner to improve efficiency and accuracy of the results.
- 8) Provide custom calculations for the sampled Capital Improvement Projects to enhance alignment on inputs and assumptions used to estimate ex-ante claimed savings.

2 PROGRAM BACKGROUND

This chapter provides an overview description of the structure of the Program.

The Program is designed to facilitate energy efficiency improvements and peak demand reductions in Nevada’s public schools, educational institutions, and related facilities. The Program’s approach is to identify existing barriers to energy reduction in the participating school districts and recommend and implement solutions to overcome those barriers. Services provided by the Program include:

- Energy benchmarking school performance;
- Conducting workshops to develop master plans;
- Providing training and technical assistance to identify efficiency improvements in existing buildings;
- Disseminating best practices from highly energy-efficient school districts; and
- Designing and building energy-efficient schools through both new construction and retrofit projects.

The CEI behavioral channel offers walk-through energy assessments, energy benchmarking, and energy efficiency training to participating schools. CEI was initially implemented at 12 CCSD sites during PY2019, then expanded to over 200 CCSD sites between PY2020 and PY2025. CEI training focuses on low-cost or no-cost improvements to the facilities’ energy usage and energy management systems, while also assisting facility staff in identifying capital projects that can lead to long-term energy efficiency improvements.

In PY2025 in the NPC service territory, CEI behavioral treatment was implemented at 283 CCSD school facilities, which were consolidated into three projects. The Program claimed ex-ante CEI savings of 12,585,139 kWh. As indicated in Table 2-1, approximately 63 percent of the Program’s ex-ante claimed savings in the NPC service territory were associated with CEI projects. In addition, 30 capital improvement projects were implemented, which included lighting, HVAC, monitoring based commissioning (“MBCx”), and new construction. Total ex-ante savings in the NPC service territory were 20,094,380 kWh.

Table 2-1. NPC Program Ex-Ante Expected Savings

Measure Category	Project Count	Ex-Ante Annual Savings (kWh)	Percent of Total Ex-Ante Savings
CEI	3	12,585,139	62.6%
HVAC	2	235,466	1.2%
MBCx	1	321,563	1.6%
New Construction	7	1,362,113	6.8%
Prescriptive Lighting	20	5,590,099	27.8%
Total	33	20,094,380	100.0%

The Program expanded its behavioral channel to the SPPC service territory in the fourth quarter of 2020. Although an energy service company (“ESCO”) contractor was engaged in similar activities for WCSD, the Program asserts that it provided behavioral treatment expertise to support the ESCO’s activities. The Program calls the SPPC behavioral offering SEM to differentiate it from the CEI behavioral offering in the NPC service territory.

In PY2025, SEM savings were claimed for 113 WCSD sites—consolidated into five projects—and for 15 capital improvement projects, which included lighting, HVAC, midstream and new construction. For the 20 projects that the Program implemented in PY2025 in the SPPC service territory, ex-ante claimed savings were 5,654,211 kWh. As indicated in Table 2-2, approximately 85 percent of the Program’s ex-ante claimed savings in SPPC were associated with SEM projects.

Table 2-2. SPPC Program Ex-Ante Expected Savings

Measure Category	Project Count	Ex-Ante Annual Savings (kWh)	Percent of Total Ex-Ante Savings
SEM	5	4,800,695	84.9%
HVAC	9	92,182	1.6%
Midstream	1	43,080	0.8%
New Construction	3	415,625	7.4%
Prescriptive Lighting	2	302,629	5.4%
Total	20	5,654,211	100.0%

3 M&V METHODOLOGY

The objective of the impact evaluation for the PY2025 Program was to determine the energy savings (kWh) and summer critical peak demand (kW) reductions resulting from activities during PY2025 for the NPC and SPPC service territories. This chapter describes the methods that the Evaluators used to determine ex-post verified annual energy (kWh) savings and summer critical peak demand (kW) savings resulting from measures that the PY2025 Program implemented in the participating educational institutions and facilities.

3.1 Sampling Plan

Data used to calculate the gross savings achieved by the Program were collected for a sample of sites at which projects were completed during 2025. Program data indicated that a total of 33 projects were completed in the NPC service territory, providing ex-ante estimated annual savings of 20,094,380 kWh. In the SPPC service territory, a total of 20 projects were completed, providing ex-ante estimated annual savings of 5,654,211 kWh.

The Evaluator's sample design for selecting projects for M&V analyses utilized the Dalenius-Hodges stratified random sampling method to ensure that ex-post verified savings were determined with ± 10 percent relative precision (or better) at the 90 percent confidence level. Sampling was performed at the project level, with projects grouped into the sampling strata indicated in Table 3-1 and Table 3-2. The NPC sample achieves relative precision of ± 5.1 percent, while the SPPC sample achieves relative precision of ± 2.1 percent. For sites included in the M&V sample, every project implemented at the site was included in the M&V impact analysis.

For capital improvement projects, M&V sampling and data collection were concurrent with Program implementation. The Evaluator used a near real-time process whereby a portion of the sample was selected periodically as projects were completed. The timing of sample selection was contingent upon the timing of the completion of the projects.

Projects incentivized through the Program are assigned to strata based on their ex-ante estimated energy (kWh) savings or specific project type.

Table 3-1. NPC Population Statistics and Sampling Plan

Sampling Criteria	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Stratum 5	Total
Strata Max	154,311	225,818	382,653	683,390	12,585,139	n/a
Number of Projects	10	5	10	5	3	33
Total Ex-Ante Savings (kWh)	894,998	870,851	2,994,320	2,749,072	12,585,139	20,094,380
Average Ex-Ante Savings (kWh)	89,500	174,170	299,432	549,814	12,585,139	13,698,055
Standard Deviation of Ex-Ante Savings (kWh)	48,951	37,891	57,503	81,204	n/a	n/a
Coefficient of Variation	0.55	0.22	0.19	0.15	n/a	3.43
Sample n	2	1	2	1	3	9
Statistical Precision of kWh Savings Estimation at the 90% Confidence Level:						±5.1%

Table 3-2 provides statistical characteristics for the SPPC sampling plan. The SPPC sampling plan assigns SEM projects to stratum 5. Capital improvement projects were assigned to strata 1 through 4.

Table 3-2. SPPC Population Statistics and Sampling Plan

Sampling Criteria	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Stratum 5	Total
Strata Max	12,273	47,219	188,628	207,711	4,800,695	n/a
Number of Projects	7	4	3	1	5	20
Total Ex-Ante Savings (kWh)	49,489	132,992	463,324	207,711	4,800,695	5,654,211
Average Ex-Ante Savings (kWh)	7,070	33,248	154,441	207,711	4,800,695	5,203,165
Standard Deviation of Ex-Ante Savings (kWh)	3,720	14,497	37,704	n/a	n/a	n/a
Coefficient of Variation	0.53	0.44	0.24	n/a	n/a	0.00
Sample n	1	1	2	1	5	10
Statistical Precision of kWh Savings Estimation at the 90% Confidence Level:						±2.1%

The Evaluators selected an M&V sample of six NPC capital improvement projects and ten SPPC capital improvement projects. The Evaluator requested data for a census of all CEI and SEM sites. The Evaluator reviewed all available documentation (e.g., audit reports, savings calculation work papers, and site-specific energy usage data) for M&V sample sites, with attention to procedures and documentation of savings calculations. Detailed descriptions of M&V methodologies are provided in the following sections.

3.2 Review of Documentation

After the sample was selected, the implementation contractor provided documentation pertaining to the sampled projects. The first step in the evaluation effort was to review this documentation and other Program materials that were relevant to the evaluation effort.

For each project, the available documentation (e.g., audit reports, savings calculations, and work papers) for each rebated measure was reviewed, with close attention to procedures and documentation pertaining to ex-ante calculated savings. Documentation reviewed for all projects in the sample included Program forms, databases, reports, billing system data, weather data, and any other potentially useful data. Each project was reviewed to determine whether the following types of information was provided:

- Documentation for the pre-existing equipment, including descriptions, schematics, performance data, and other supporting information.
- Documentation for the new energy-efficient equipment, including descriptions, schematics, performance data, and other supporting information.
- Information about the savings calculation methodology, including assumptions, specifications, sources for specifications, and correctness of calculations.
- For CEI and SEM projects, the implementation contractor provided documentation outlining the changes in energy consumption, actions taken by the Program to ensure optimization of energy savings, excluded sites, and other behavioral changes relevant to the energy models.

Where there was uncertainty regarding Program project specifications or incomplete project documentation, the Evaluator analysts communicated with the implementation contractor staff. The Evaluators provided the implementation contractor with various data requests for additional information and clarification. The Evaluator and the implementation contractor communicated and collaborated throughout all the M&V activities related to the PY2025 Program.

3.3 Verification Procedures

When sites were selected for the M&V sample, The Evaluator notified NV Energy Program management and concurrently provided the implementation contractor with a list of projects for which the Evaluators needed documents. The Evaluator utilized engineering desk reviews of Program-level and project-level data. During 2025, the Evaluator determined that appropriate M&V rigor could be achieved without conducting in-person visits to all sampled projects. Nevertheless, the Evaluators performed site visits of a sub-sample of program participants to verify project information.

3.4 Methodologies for Calculating kWh Savings

The Evaluators use measure-specific methodologies to analyze and determine gross savings per project. Table 3-3 provides a summary of the M&V methodologies used for determining energy savings.

Table 3-3. Typical M&V Methodologies for Determining Energy Savings

Type of Measure	Method to Determine Savings
Retrofit Lighting	Evaluator's custom-designed Lighting Evaluation calculator, which uses data on wattages before and after installation of measures and fixture hours-of-use ("HOU").
HVAC Equipment Replacement	Equivalent full load hours ("EFLH") method for determining savings from HVAC measures; EFLH were determined using EnergyPlus models that used the corresponding Typical Meteorological Year extended (TMYx) weather files.
HVAC Fan and Pump Motor variable frequency drive ("VFD")	Evaluator used deemed savings that were determined using EnergyPlus models and corresponding weather files and normalized by equipment capacity (kWh/HP).
MBCx	Pre and post energy consumption regression analysis.
CEI/SEM	Pre and post energy consumption regression analysis.

Energy savings realization rates were calculated for each project. The realization rate is the ratio of ex-post verified energy savings to ex-ante expected energy savings. At the project level, ex-post verified energy savings are the achieved savings that have been measured and verified for each M&V site. Ex-ante expected energy savings were provided by the Program.

After determining ex-post energy savings for the sampled sites, the Evaluator calculated program-level electric savings by applying the realization rate ratio for the M&V sample sites to the stratified population of Program participants.

The following discussion describes procedures used for calculating savings from various measure types. Site-specific savings and realization rate explanations are provided in the following chapter.

3.4.1 Analyzing Savings from Lighting Measures

Lighting measures that were examined included retrofits of existing fixtures and lamps and/or ballasts with energy-efficient fixtures. These lighting measures reduce demand, while not affecting hours of use. Lighting control strategies that might include the addition of energy-conserving control technologies such as motion sensors or daylighting controls were also examined. These measures typically involve a reduction in hours of use ("HOU") and/or dimming which causes a reduction in power usage by the fixtures.

Annual lighting HOU were determined by a comprehensive lighting study performed by the Evaluator in PY2011. That study has been described in detail in several previous M&V reports for the Program.

For projects that include the installation of occupancy sensor controls, the post-installation HOU was reduced by 30 percent. The combination of occupancy and daylight sensors reduces the HOU by 34 percent. These are based on engineering calculations that are consistent with industry literature.^{4,5,6}

During PY2015, the Evaluator initiated a study to determine annual lighting HOU for colleges and universities by territory and by space type. The Evaluator had planned to continue this study; however, the continued study was deferred due to the COVID-19 pandemic. After revisiting the situation, The Evaluator realizes that over the years things have significantly changed and now most of the higher education facilities either use advanced lighting controls or some sort of building energy management system (BEMS), where HOU are pretty well known. Therefore, this study will not add any further value and consequently, the Evaluator has decided to discontinue this study.

Analyzing the savings from lighting measures requires data for retrofitted fixtures on (a) wattages before and after retrofit and (b) HOU before and after the retrofit. the Evaluator uses per-fixture baseline demand, retrofit demand, and appropriate post-retrofit HOU to calculate annual energy savings for sampled fixtures of each usage type. Annual energy savings for each sample fixture are calculated using the following formula:

$$\text{Annual Energy Savings} = kWh_{pre} - kWh_{post}$$

Equation 3-1

Where:

kWh_{pre} = amount of kWh used by preexisting fixtures

kWh_{post} = amount of kWh used by post-installation fixtures

To calculate total savings attributable to lighting measures, including impacts on HVAC operation, savings from lighting measures in conditioned spaces are adjusted by region-specific and building type-specific heating and cooling interaction factors.

⁴ Study referenced for lighting occupancy sensor hours reduction of 30 percent: Levine, M., Geller, H., Koomey, J., Nadel S., Price, L., “Electricity Energy Use Efficiency: Experience with Technologies, Markets and Policies” ACEEE, 1992. Lighting control savings fraction of 30 percent is consistent with current programs offered by National Grid, Northeast Utilities, Long Island Power Authority, NYSEERDA, and Energy Efficiency Vermont.

⁵ Technical reference manual used for lighting occupancy and lighting sensors decreasing hours of use by 34 percent: “California Municipal Utilities Association Savings Estimation Technical Reference Manual 2017 Third Edition” CMUA, 2017.

⁶ 2019 California Building Energy Efficiency Standards for Residential and Nonresidential Buildings; Lighting Power Adjustment Factors, page 227.

3.4.2 Heating and Cooling Interaction Factor

Installing energy-efficient lighting in air-conditioned spaces saves electricity in two ways: first, by reducing lighting electrical loads; and second, by introducing less heat in conditioned spaces, hence incrementally decreasing space cooling loads. The low heat output from energy-efficient lighting also increases space heating loads. Space heating and cooling impacts of energy-efficient lighting are described using a ratio that is known as the heating and cooling interaction factor (“HCIF”). The HCIF was included in the calculations to determine energy savings (kWh) associated with the facility’s HVAC equipment. HCIF was incorporated into the energy impact analysis for each M&V sample site. The Evaluator uses a bin analysis method to calculate the HCIF for each site based on the TMYx data. The bin analysis accounts for the average hourly temperature, coefficient of performance for both heating and cooling equipment, and percent air leakage for the space.

The HCIF value represents the ratio of (a) total post-retrofit kWh savings and (b) lighting-only electric savings. For example, if HCIF = 1.01, then post-retrofit kWh usage for heating and cooling decreased overall, thus improving, by one percent, the overall electric savings provided by the energy-efficient lighting measure. Conversely, if HCIF = 0.99, then post-retrofit kWh usage for heating and cooling increased overall, thus reducing, by one percent, the overall electric savings provided by the energy-efficient lighting measure. HCIF for the Program was developed in tandem with the energy savings curves; the development of both methods is explained in Section 3.5 below.

3.4.3 Analyzing Savings from HVAC Equipment Replacement Measures

Savings for HVAC equipment replacement measures installed at a facility are derived by using equivalent full load hours (“EFLH”) developed through EnergyPlus simulations using TMYx data. DOE-2 is an industry-standard building energy analysis and load simulation software program that combines a description of the building layout, construction, usage, and conditioning systems with hourly weather data to perform an hourly simulation of building energy use. The EnergyPlus simulations also allow the calculation of the primary and secondary effects of lighting measures on energy use. Each simulation calculates HVAC energy and demand usage to be expected under different assumptions about equipment and/or construction conditions.

HVAC equipment replacement measures use the following algorithm for determining ex-post cooling energy savings:

$$kWh_{savings\_c} = CAP_C \times \frac{1kW}{1,000W} \times EFLH_C \times \left(\frac{1}{EER_{base}} - \frac{1}{EER_{post}} \right)$$

Equation 3-2

Where:

CAP_C = Rated equipment cooling capacity of the new unit (BTU/hr.)

$EFLH_c$	= Equivalent full-load hours for cooling
EER_{base}	= Full Load baseline energy efficiency rating of the baseline cooling equipment
EER_{post}	= Full Load nameplate energy efficiency rating of the installed cooling equipment

3.4.4 Analyzing HVAC Fan and Pump Motor VFD Measures

The Evaluator used deemed savings that were determined using EnergyPlus models and corresponding weather files and normalized by equipment capacity (kWh/HP).

3.4.5 Analyzing Monitoring based Recommissioning Measures

The Evaluators used the pre and post hourly utility data along with local weather to create two linear regressions. The pre implementation regression was based on the calculated Cooling Degree Hours (“CDH”) with a base temperature of 50°F (CDH50) and the post implementation used CDH50 along with an occupancy flag. The calculated regression coefficients were then applied to TMYx (2009-2023) weather data to estimate savings for a typical year.

3.4.6 Analyzing Savings from CEI and SEM Measures

During the M&V process, the Evaluator first reviewed the ex-ante regression models provided by the implementer for the CEI and SEM savings estimates. To verify savings, the Evaluator developed International Performance Measurement and Verification Protocol Option C analysis models using interval billing data, school schedules, at-home learning schedules, and weather data.

The Evaluators used hourly billing data provided by the implementer for each school in the Program. The Evaluators estimated cooling degree days (“CDD”) and heating degree days (“HDD”) to account for the impact of temperature on school energy consumption. Using available resources, The Evaluator also accounted for student and staff schedules, in-person learning days, and school closures.

The documentation provided by the implementer noted that CCSO had the summer HVAC operational schedule listed in Table 3-4 and the HVAC operational schedule for the rest of the year listed in Table 3-5. The Evaluator included additional dummy variables to the CCSO models to account for these operational changes.

Table 3-4. CCSO Summer (May 31 – Jul 22) HVAC Operations

HVAC Type	Monday – Friday Operations	Saturday and Sunday Operations
Water/Ground Source Heat Pumps and DX Units	Normal Operations: 4:00 – 14:59 Set Back Mode: 15:00 – 3:59	Off 24 hours per day
Chillers	Normal Operations: 4:00 – 14:59 Set Back Mode: 15:00 – 3:59	Set Back Mode 24 hours per day

Table 3-5. CCSD Spring, Fall, and Winter HVAC Operations

HVAC Type	Monday – Friday Operations	Saturday and Sunday Operations
Water/Ground Source Heat Pumps and DX Units	Normal Operations: 5:00 – 14:59 Set Back Mode: 15:00 – 22:00	Off 24 hours per day
Chillers	Normal Operations: 5:00 – 14:59 Set Back Mode: 15:00 – 22:00	Off 24 hours per day

For CEI and SEM participants, the Evaluator evaluated savings using two savings periods, the baseline and PY2025. The baseline and measurement periods used are shown in Table 3-6.

Table 3-6. CEI and SEM Baseline and Measurement Periods

Territory	Cohort	Baseline Period	PY2025 Measurement Period
NPC	CCSD Alumni Participants	6/4/2018 – 6/2/2019	1/1/2025 – 12/31/2025
NPC	CCSD Non-Alumni Participants	1/7/2019 – 1/5/2020	1/1/2025 – 12/31/2025
SPPC	Carson SD Non-Alumni Participants	4/15/2019 – 4/4/2021	1/1/2025 – 12/31/2025
SPPC	WCSD Non-Alumni Participants	7/1/2019 – 11/1/2020	1/1/2025 – 12/31/2025

Several sites in the NPC and SPPC service territories were removed from the ex-post models due to having data range or quality issues. These sites were included in the facility count that is used as a multiplier for the ex-post savings calculations because they were treated in PY2025. The percentage of sites that were removed—and the reasons for removal from the ex-post models—are listed in Table 3-7. A full list of schools that were removed from the ex-post models can be found in Appendix B: Schools Removed from the Ex-Post CEI and SEM Models.

Table 3-7. Sites Removed from the Ex-Post Models that were in the Ex-Ante Models

Territory	District	Cohort	Reason	Percent Removed
NPC	CCSD	Alumni Elementary School	Insufficient Post-Period Data	9%
NPC	CCSD	Non-Alumni Elementary School	Insufficient Post-Period Data	10%
NPC	CCSD	Non-Alumni Elementary School	Average kWh was >3 SD away from the average kWh for its school type	<1%
NPC	CCSD	Non-Alumni High School	Insufficient Post-Period Data	6%
NPC	CCSD	Non-Alumni Middle School	Insufficient Post-Period Data	36%
NPC	CCSD	Alumni Other	Insufficient Post-Period Data	100%
NPC	CCSD	Non-Alumni Other	Insufficient Post-Period Data	11%
NPC	CCSD	Non-Alumni Other	Average kWh was >3 SD away from the average kWh for its school type	4%
SPPC	WCSD	Non-Alumni Elementary School	Insufficient Post-Period Data	2%
SPPC	WCSD	Non-Alumni High School	Insufficient Post-Period Data	15%
SPPC	WCSD	Non-Alumni Middle School	Insufficient Post-Period Data	6%
SPPC	WCSD	Non-Alumni Other	Insufficient Post-Period Data	7%

Weather data from the McCarran International Airport, Las Vegas (“KLAS”) and Reno/Tahoe International Airport, Reno (“KRNO”) weather stations were used to normalize The Evaluator’ ex-post regression models.

For the Carson SD and WCSD regression modeling, CDD and HDD values were optimized by comparing the root mean square error (“RMSE”) between measured kWh and predicted kWh produced using the linear model depicted in Equation 3-3. Each linear model was produced using base CDD values ranging from 50°F to 80°F and base HDD values ranging from 40°F to 70°F with increments of 5°F. The CDD and HDD bases that resulted in the lowest RMSE scores are shown in Table 3-8.

$$kWh_i = \beta_1(CDD) + \beta_2(HDD) + \beta_3(WDAY) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k)$$

Equation 3-3: M&V Regression Equation used to predict kWh for CDD and HDD optimization for Carson SD and WCSD.

Where:

kWh = Predicted daily kWh consumption
CDD = Predicted cooling degree days for a given day and hour
HDD = Predicted heating degree days for a given day and hour
WDAY = Day of the week as a categorical numerical value (1=Sunday through 7=Saturday)
HourOfTheDay = An adjustment factor for varying consumption during different hours of the day.

Table 3-8. CDD and HDD Base Values used for Carson SD and WCSD Ex-ante and Ex-post Models

School District	Cohort/School	School Type	Ex-Ante		Ex-Post	
			CDD Base (°F)	HDD Base (°F)	CDD Base (°F)	HDD Base (°F)
Carson SD	Empire	Elementary School	70	60	70	65
Carson SD	Fritsch	Elementary School	70	45	70	45
Carson SD	Gleason-Training Facility	Other	75	55	75	55
Carson SD	Mark Twain	Elementary School	75	65	75	70
Carson SD	Transportation	Other	75	70	75	70
WCSD	Non-Alumni	Elementary School	75	50	70	55
WCSD	Non-Alumni	High School	75	55	75	55
WCSD	Non-Alumni	Middle School	75	55	70	55
WCSD	Non-Alumni	Other	70	45	70	45

For CCSD, a base CDD of 60°F was used, as was the case in program years 2021-2024.⁷

In addition to weather variables, dummy variables were also included to represent changes to Carson SD and WCSD school occupancy due to the COVID-19 pandemic and HVAC operational changes for CCSD. Regression equations that the Evaluator used to determine CEI and SEM ex-post verified energy savings are provided in Equation 3-4 through Equation 3-13. Table 3-9 shows key differences between the model equations and the equation used for the “Elementary School” cohort (Equation 3-9 for the CEI Alumni and Non-Alumni cohorts and Equation 3-13 for the SEM cohort).

Table 3-9. Differences Between CCSD and WCSD LMEM with the “Elementary School” Model

Territory	Cohort	School Type	Difference(s) Between This Model and the “Elementary School” Model for its Territory and Cohort
NPC	CCSD Non-Alumni	Other	The “Student Day” variable and “Student Day”*“Summer” intersectional variables are both excluded, as this cohort contains mostly administrative buildings. The “Summer Chillers” variable is excluded as it was found to be colinear with other variables.
NPC	CCSD Non-Alumni	Middle School	The “Student Day”*“Summer” intersectional variable is excluded as it was found to be colinear with other variables. The “Summer Chillers” variable was not colinear with other variables and therefore is included.
NPC	CCSD Non-Alumni	High School	The “Summer Chillers” variable was not colinear with other variables and therefore is included.
SPPC	WCSD Non-Alumni	Other	The “Student Day” variable and “Student Day * Student at Home”) intersectional variable are both excluded, as this cohort contains mostly administrative buildings.

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StudentDay) + \beta_5(Oct25) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k)$$

Equation 3-4: M&V Regression Equation used to Evaluate Mark Twain Elementary School (Carson SD)

⁷ For CCSD, only CDD were used in the analysis because average daytime temperatures, even in the winter, are above 50°F.

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(HDD) + \beta_3(StudentDay) + \beta_4(COVID Shutdown) \\ + \beta_5(Summer) + \beta_6(Oct25) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k)$$

*Equation 3-5: M&V Regression Equation used to Evaluate the Transportation Building
(Carson SD)*

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StaffDay) + \beta_5(COVID Shutdown) \\ + \beta_6(Oct25) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k)$$

*Equation 3-6: M&V Regression Equation used to Evaluate All other Buildings in the
“Other” Category (Carson SD)*

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StudentDay) \\ + \beta_5(COVID Shutdown) + \beta_6(Oct25) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k)$$

Equation 3-7: M&V Regression Equation used to Evaluate all other Carson SD Buildings

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(StaffDay) \\ + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

*Equation 3-8: M&V LMEM Regression Equation used
to Evaluate CCSD Facilities in the “Other” Category*

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(StudentDay) + \beta_4(StaffDay) \\ + \beta_5(StudentDay * Summer) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

*Equation 3-9: M&V LMEM Regression Equation used
to Evaluate CCSD Elementary Schools*

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(StudentDay) + \beta_4(StaffDay) + \beta_5(SummerChillers) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-10: M&V LMEM Regression Equation used to Evaluate CCSD Middle Schools

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(StudentDay) + \beta_4(StaffDay) + \beta_5(StudentDay * Summer) + \beta_6(SummerChillers) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-11: M&V LMEM Regression Equation used to Evaluate CCSD High Schools

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StudentHoliday) + \beta_5(StaffDay) + \beta_6(StudentAtHome * StudentDay) + \beta_7(COVID Shutdown) + \beta_8(Oct25) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-12: M&V Regression Equation used to Evaluate WCSD Facilities in the “Other” Category

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StudentHoliday) + \beta_5(StudentDay) + \beta_6(StaffDay) + \beta_7(StudentAtHome * StudentDay) + \beta_8(COVID Shutdown) + \beta_9(TeacherAtHome * Staff Day) + \beta_{10}(Oct25) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-13: M&V Regression Equation used to Evaluate all other WCSD Schools

Where:

kWh = Hourly kWh consumption

$Post$ = A dummy variable that represents if the data point is in the baseline period (post = zero) or the PY2025 reporting period (post = one). The intervals for these variables are in Table 3-6.

<i>CDD</i>	= Cooling degree days for a given day and hour calculated using a base temperature of 60°F for CCSD; values for Carson SD and WCSD are depicted in Table 3-8.
<i>HDD</i>	= Heating degree days for a given day and hour. Values for Carson SD and WCSD are depicted in Table 3-8.
<i>StudentHoliday</i>	= A dummy variable that is one on holidays in the WCSD calendar and zero otherwise.
<i>StudentDay</i>	= A dummy variable that is either zero if the data point indicates a time interval during which students do not attend school (virtual or otherwise) or one otherwise.
<i>StudentAtHome</i>	= A dummy variable that is either one if the data point indicates a time interval during which students were conducting virtual learning or zero otherwise.
<i>StaffDay</i>	= A dummy variable that is either one if the data point indicates a time interval during which staff are working or zero otherwise.
<i>TeacherAtHome</i>	= A dummy variable that is either one if the data point indicates a time interval during which staff worked from home or zero otherwise.
<i>SummerChillers</i>	= A dummy variable that represents that chillers were on during summer (May 31 – Jul 22) weekends in PY2025 and off on weekends during the rest of the school year. It is one during summer weekends in 2025 and zero otherwise.
<i>COVID Shutdown</i>	= A dummy variable added to the Carson SD and WCSD models that represents low building occupancy from 3/30/2020 – 8/1/2020 in WCSD and from 3/30/2020 – 7/28/2020 in Carson SD. It is one during those intervals and zero otherwise.
<i>Oct25</i>	= A dummy variable added to the Carson SD and WCSD models that is one between 10/1/2025 – 10/31/2025 and zero otherwise
<i>HourOfTheDay</i>	= An adjustment factor for varying consumption during different hours of the day.
<i>(I School)</i>	= A variable representing the “randomness” caused by correlations between variables across each site in the cohort that is being modeled. For the GLM models, this variable was not included.

Models for PY2025 (both GLM and LMEM) were created with a time range beginning at the start of the baseline (see Table 3-6) through October 31, 2025. The models were annualized by multiplying the post-period coefficient by the number of hours in the PY2025 reporting year (i.e., 8760 hours).

3.5 Determining Energy Savings Curves

The Evaluator utilized energy savings curves to determine program-level energy savings per month per rate class and program-level critical peak demand savings per month per rate class that were derived from energy consumption LMEM using PY2022 and PY2023 CCSD and WCSD hourly billing data for the post-period. The baseline periods are in Table 3-10.

Table 3-10. Baseline and Measurement Periods for LMEM used to Derive Energy Savings Curves

Territory	Cohort	Baseline Period	Post Period
NPC	CCSD Alumni Participants	6/4/2018 – 6/2/2019	1/1/2022 – 12/27/2023
NPC	CCSD Non-Alumni Participants	1/7/2019 – 1/5/2020	1/1/2022 – 12/27/2023
SPPC	WCSD Non-Alumni Participants	7/1/2019 – 11/1/2020	1/1/2022 – 12/27/2023

The Evaluator also used this method for higher education facilities.

3.5.1 Linear Mixed Effects Models Used

Three LMEM were used to derive energy consumption curves, one for the NPC service territory with CCSD PY2022-PY2023 post-period data (Equation 3-14) and two for the SPPC service territory with WCSD PY2022-PY2023 post-period data (Equation 3-11 and Equation 3-12).

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-14: M&V Regression Equation used to Evaluate CCSD Facilities for deriving Energy Consumption Curves

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StudentAtHome * StudentDay) + \beta_5(COVID Shutdown) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-15: M&V Regression Equation used to Evaluate WCSD Facilities in the “Other” Category for deriving Energy Consumption Curves

$$kWh_i = \alpha_{ij} + \beta_1(Post) + \beta_2(CDD) + \beta_3(HDD) + \beta_4(StudentAtHome * StudentDay) + \beta_5(COVID Shutdown) + \beta_6(TeacherAtHome * COVID Shutdown) + \sum_{k=0}^{23} \gamma_k(HourOfTheDay_k) + (1|School)$$

Equation 3-16: M&V Regression Equation used to Evaluate all other WCSD Facilities for deriving Energy Consumption Curves

Where:

<i>kWh</i>	= Hourly kWh consumption
<i>Post</i>	= A dummy variable that represents if the data point is in the baseline period (post = zero) or the PY2022-PY2023 reporting periods (post = one). The intervals for these variables are in Table 3-10.
<i>CDD</i>	= Cooling degree days for a given day and hour calculated using a base temperature of 60°F for CCSD; values for WCSD were reported in Table 3-9 of the PY2024 ESS Report. ⁸
<i>HDD</i>	= Heating degree days for a given day and hour. Values for WCSD were reported in Table 3-9 of the PY2024 ESS Report.
<i>StudentDay</i>	= A dummy variable that is either zero if the data point indicates a time interval during which students do not attend school ⁹ (virtual or otherwise) or one otherwise.
<i>StudentAtHome</i>	= A dummy variable that is either one if the data point indicates a time interval during which students were conducting virtual learning or zero otherwise. Students were conducting virtual learning during the WCSD baseline only (Table 3-10).
<i>TeacherAtHome</i>	= A dummy variable that is either one if the data point indicates a time interval during which staff worked from home or zero otherwise. Staff were working from home during the WCSD baseline only (Table 3-10).

⁸ Energy Smart Schools Program NV Energy Program Year 2024 Measurement and Verification Report. March 31, 2025

⁹ During the CCSD summer calendar, this variable was set to “1” seven days per week in PY2023 to reflect operational changes documented by the implementer in PY2024.

COVID Shutdown = A dummy variable for WCSSD that represents low building occupancy from 3/30/2020 – 8/1/2020. It is one during that interval and zero otherwise. This variable only applies to the WCSSD baseline period (Table 3-10).

HourOfTheDay = An adjustment factor for varying consumption during different hours of the day.

(I|School) = A variable representing the “randomness” caused by correlations between variables across each site in the cohort that is being modeled.

3.5.2 Using Linear Mixed-Effects Model Coefficients to Estimate Base and HVAC Consumption Loads

After creating LMEM for each CCSD and WCSSD cohort and facility type, the post-period model coefficients for each site and hour were used to determine HVAC and Base loads using the following equations:

$$\overline{L_{HVAC}}(t) = \beta_2(CDD)$$

Equation 3-17: The Modeled HVAC Dependent Consumption Load for a Given Hourly Timestep and Site in the NPC Service Territory

$$\overline{L_{HVAC}}(t) = (\beta_2(CDD) + \beta_3(HDD)) * 0.2$$

Equation 3-18: The Modeled HVAC Dependent Consumption Load for a Given Hourly Timestep and Site in the SPPC Service Territory for hours in November - March¹⁰

$$\overline{L_{HVAC}}(t) = \beta_2(CDD) + \beta_3(HDD)$$

Equation 3-19: The Modeled HVAC Dependent Consumption Load for a Given Hourly Timestep and Site for all other hours in the SPPC Service Territory

$$\overline{L_{Base}}(t) = kWh_i - \alpha_{ij} - \beta_1(Post) - \overline{L_{HVAC}}(t)$$

Equation 3-20: The Modeled Base Consumption Load for a Given Hourly Timestep And Site in the NPC and SPPC Service Territories

Where:

$\overline{L_{HVAC}}(t)$ = Estimated HVAC dependent consumption load at time “t”

¹⁰ HVAC dependent consumption was adjusted in the winter by the fraction of electric to natural gas heating in commercial and industrial sites in the SPPC service territory

$\overline{L_{Base}}(t)$	= Estimated Base consumption load (i.e., the consumption load that is independent of HVAC and CEI/SEM savings) at time “ t ”
kWh	= Hourly kWh consumption
α_{ij}	= Model intercept; varies by site for LMEM
$\beta_1(Post)$	= The estimated change in modeled consumption because of post-period CEI/SEM savings.
$\beta_2(CDD)$	= The estimated change in modeled consumption because of cooling degree days. CDD values are calculated using a base temperature of 60°F for CCSD; values for WCSD were reported in Table 3-9 of the PY2024 ESS Report.
$\beta_3(HDD)$	= The estimated change in modeled consumption because of heating degree days. HDD for a given day and hour. Values for WCSD were reported in Table 3-9 of the PY2024 ESS Report.

The hourly HVAC and Base load estimates for each site were then aggregated to average hourly Base and HVAC load estimates for each service territory. These estimates were converted to hourly fractions to create HVAC and base load shapes.

3.5.3 Estimating the New Construction Consumption Loads

New construction loads were modeled as estimated whole-building loads, i.e., the combined effect of HVAC and Base loads for each hour in the annual time series.¹¹ These estimates were derived using the following equation:

$$\overline{L_{NC}}(t) = \left(\frac{\overline{L_{Base}}(t)}{\overline{L_{Base}}(t) + \overline{L_{HVAC}}(t)} + \frac{\overline{L_{Base}}(t)}{\overline{L_{Base}}(t) + \overline{L_{HVAC}}(t)} \right)$$

Equation 3-21: The Modeled New Construction Consumption Load for a Given Hourly Timestep (NPC and SPPC Service Territories)

Where:

$\overline{L_{HVAC}}(t)$	= Estimated HVAC dependent consumption load at time “ t ,” defined in Equation 3-17 for the NPC service territory and Equation 3-18/Equation 3-19 for the SPPC service territory, depending on the month corresponding to time “ t ”

¹¹ Monitoring based recommissioning loads were also estimated as whole-building loads and therefore estimated using the “New Construction” curve.

$\overline{L_{Base}}(t)$ = Estimated Base consumption load (i.e., the consumption load that is independent of HVAC and CEI/SEM consumption loads) at time “ t ,” defined in Equation 3-20 for the NPC and SPPC service territories.

3.5.4 Estimating Savings Fractions with Model-Derived Savings Curves

HVAC, Base, and New Construction consumption loads were converted to energy savings through converting the hourly energy consumption (kWh) to savings fractions. This conversion was done using the following equation:

$$Savings = \frac{kWh_t}{\sum kWh_t}$$

Equation 3-22: Savings fraction at an Hourly Timestep “ t ” derived from Hourly Consumption (kWh) aggregated to an 8,760 “Typical Year” Load Shape

In a typical CCSD school year, energy consumption, and therefore savings, peaks in July and August (Figure 3-1). HVAC-dependent energy savings also peak during these months, which is reflected in the HVAC load shape (and the New Construction load shape, which takes HVAC-dependent loads into account). The base load shape is flat across the year, as the coefficients that are used to estimate base loads remain constant across the year (Figure 3-2).

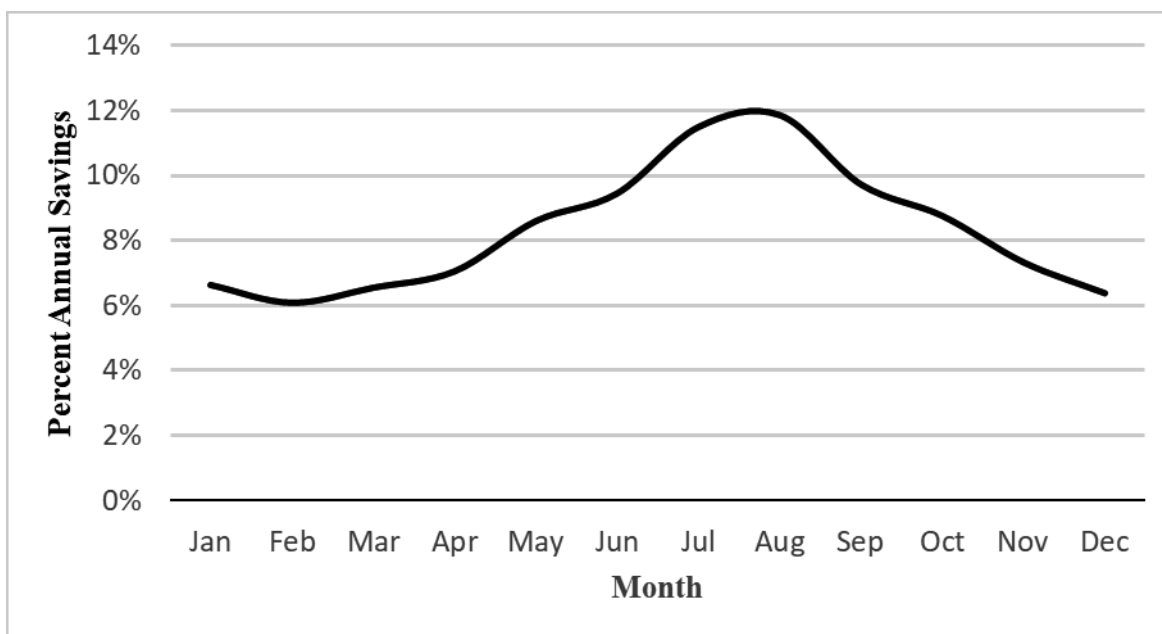


Figure 3-1. Program-Level Annual Energy Savings Curve for a Typical Year

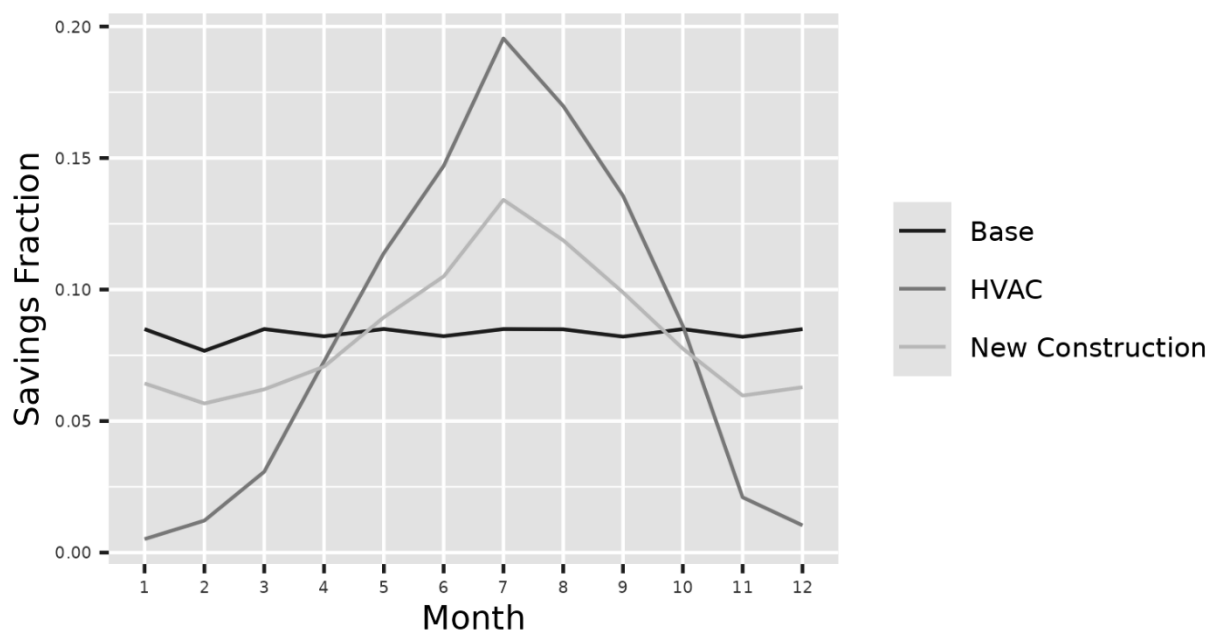


Figure 3-2. Monthly Savings Fractions for Base, HVAC, and New Construction Loads, CCSD

On a typical school day, base loads are highest when school is in session (8:00 – 16:00), and lowest when the building is unoccupied. HVAC dependent loads are highest during the hottest hours of the day (Figure 3-3).

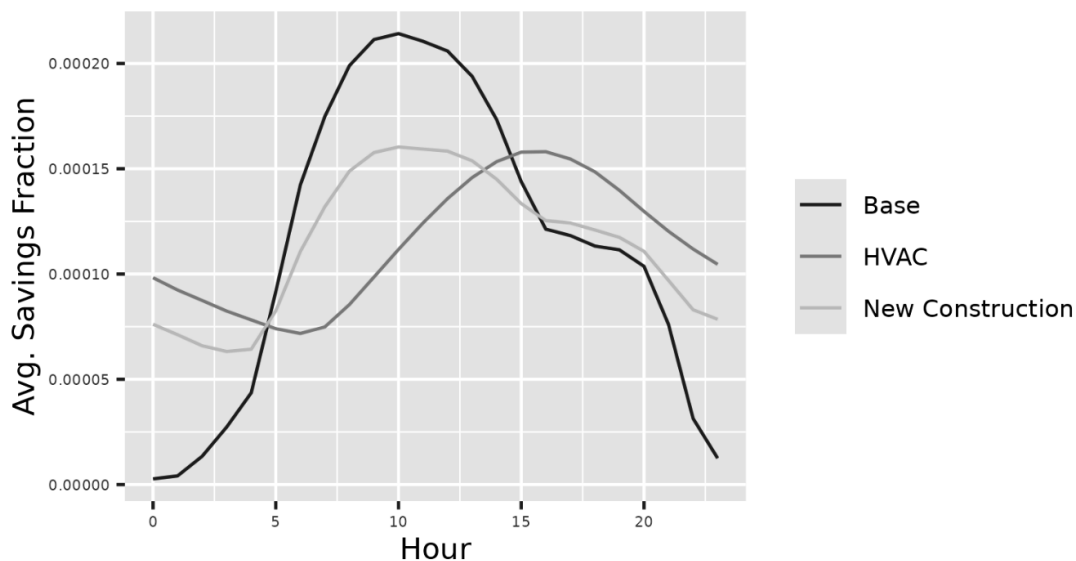


Figure 3-3. Average Hourly Savings Fractions for Base, HVAC, and New Construction Loads, CCSD

In a typical WCSD school year HVAC-dependent energy savings also peak during July and August. However, WCSD also has more HVAC-dependent savings in the coldest months of the year because of the impact of HDD on savings. The impact of HDD on the HVAC load is smaller than the CDD impact because most WCSD schools use gas heating (Equation 3-19). As with CCSD, the base load shape is flat across the year (Figure 3-4).

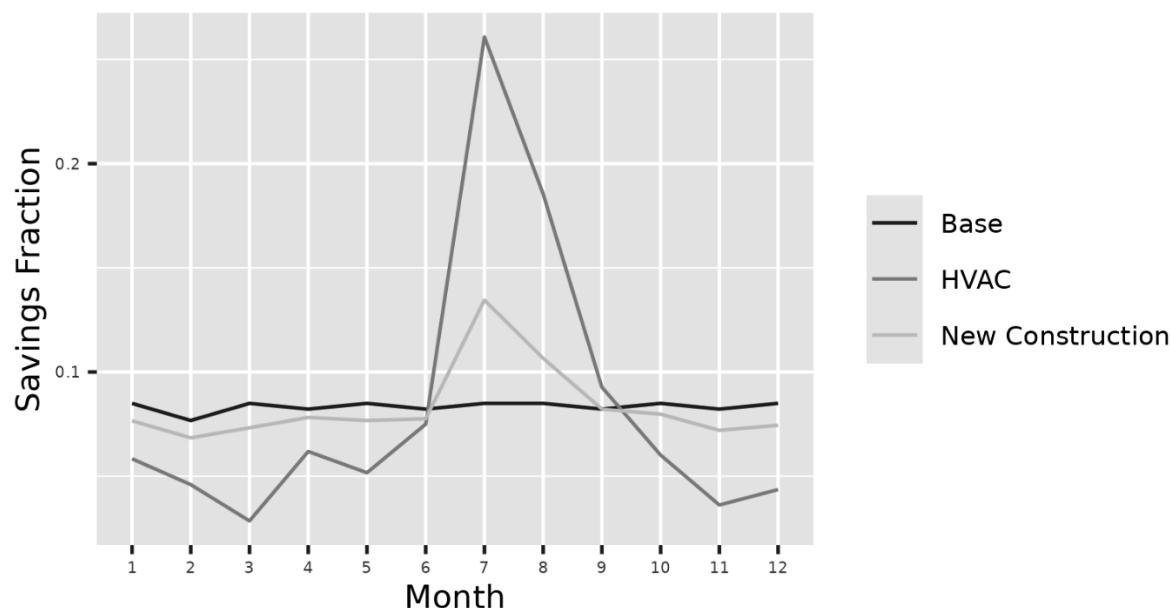


Figure 3-4. Monthly Savings Fractions for Base, HVAC, and New Construction Loads, WCSD

On a typical school day, base loads are highest when school is in session (8:00 – 16:00), and lowest when the building is unoccupied. HVAC dependent loads are highest during the hottest hours of the day with a smaller savings fraction increase during the hours before school is in session (5:00-7:00) due to winter heating (Figure 3-5).

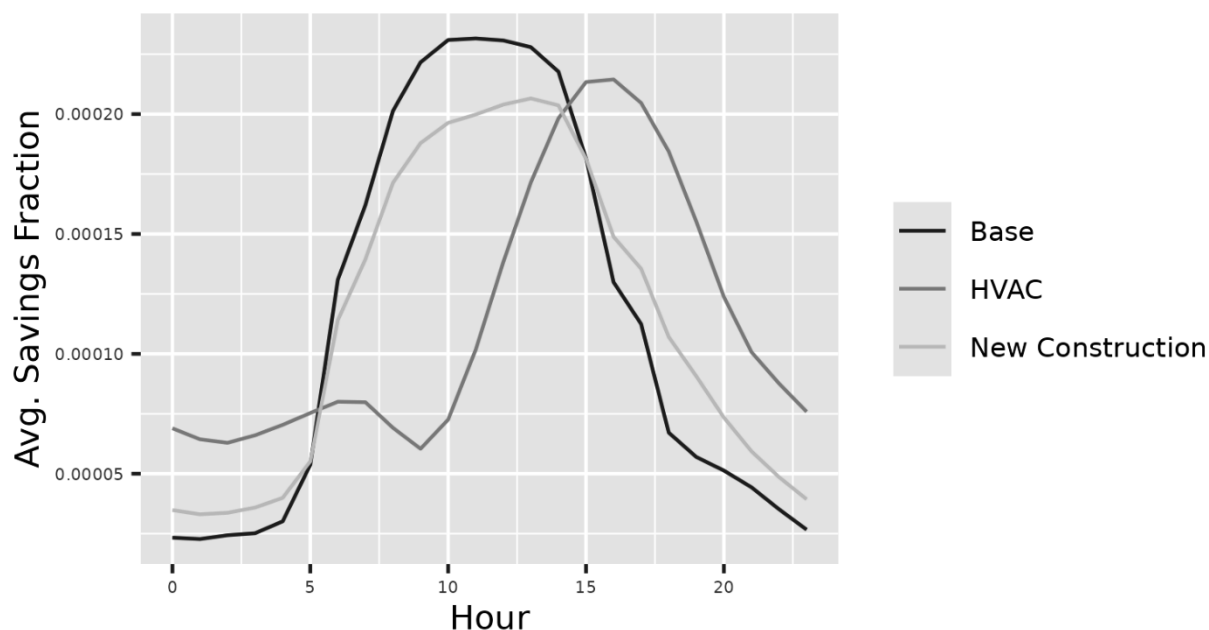


Figure 3-5. Average Hourly Savings Fractions for Base, HVAC, and New Construction Loads, WCS D

The savings curves derived from modeled consumption data were assigned to capital projects based on the measure type. For CEI and SEM projects, PY2025 consumption data was used to estimate savings directly (Table 3-11).

Table 3-11. Curves Specific to the 2025 Program

Energy Savings Curve	Source / Modification	Applicability
HVAC-dependent Energy Savings, NPC Program	LMEM with PY2022-PY2023 hourly post-period billing data	CCSD HVAC projects and HVAC projects in higher education facilities in the NPC service territory.
Base (non HVAC-dependent) Energy Savings, NPC Program	LMEM with PY2022-PY2023 hourly post-period billing data	CCSD interior lighting projects and interior lighting projects in higher education facilities in the NPC service territory.
New Construction Energy Savings, NPC Program	LMEM with PY2022-PY2023 hourly post-period billing data	CCSD new construction projects and new construction projects in higher education facilities in the NPC service territory. CCSD monitoring based recommissioning projects and monitoring based recommissioning projects in higher education facilities in the NPC service territory.
HVAC-dependent Energy Savings, SPPC Program	LMEM with PY2022-PY2023 hourly post-period billing data	WCSD HVAC projects and HVAC projects in other school districts/higher education facilities in the SPPC service territory.
Base (non HVAC-dependent) Energy Savings, SPPC Program	LMEM with PY2022-PY2023 hourly post-period billing data	WCSD interior lighting projects and interior lighting projects in other school districts/higher education facilities in the SPPC service territory.
New Construction Energy Savings, SPPC Program	LMEM with PY2022-PY2023 hourly post-period billing data	WCSD new construction projects and new construction projects in other school districts/higher education facilities in the SPPC service territory. WCSD monitoring based recommissioning projects and monitoring based recommissioning projects in other school districts/higher education facilities in the SPPC service territory.
Measure-level energy savings curve, PY2025 CEI	Hourly billing data, CCSD schools.	NPC schools, PY2025 CEI behavioral program.
Measure-level energy savings curve, PY2025 SEM	Hourly billing data, WCSD and Carson SD schools.	SPPC schools, PY2025 SEM behavioral program.

3.5.5 Applicability of Model Derived Savings Curves and Comparing the Results to Other Findings

As behind-the-meter data is becoming more accessible to utilities and evaluators, it has become more feasible to use these data for deriving savings curves. Previous studies have shown

comparable results from consumption derived HVAC load shapes and runtime data provided by equipment manufacturers¹² and onsite interviews.¹³

Consumption model studies in Las Vegas, and the desert climate of Abu Dhabi¹⁴ show that HVAC loads peak in the summer, which is also when overall energy consumption is highest. The lowest energy loads—and the loads with the greatest ratio of base load to peak load—were in the winter.^{13,15} These findings are comparable to the consumption-derived savings curves that were used for CCSD (Figure 3-2).

3.6 Determining First-Year Electric (kWh) Savings

First year electric (kWh) savings were calculated by determining the percentage of the year remaining when each measure was installed. The Evaluator used measure-startup data from NV Energy's tracking database to calculate the number of days left in the calendar year. For each measure, the number of days remaining in the year was used, including the normalized energy savings curve described above, to determine the annualized kWh savings realized during the 2025 calendar year. Electric savings were summed by month across each customer rate class in the program population to determine first-year electric savings per month per rate class. The first-year electric savings table is provided in Table 4-4.

For the CEI and SEM Program components, which the Evaluator evaluates every year throughout the life of a CEI or SEM cohort, first-year savings are the same as annual savings.

3.7 Determining Critical Peak Demand (kW) Savings

The critical peak demand (kW) provided in Table 3-12, is the hourly period per month during which NV Energy has historically experienced maximum system-level demand.

¹² Navigant. Michigan Tier 3 Thermostat Exploratory Research – Savings Potential Findings.

[https://www.michigan.gov/mpsc/-](https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/workgroups/EWR_Collaborative/2019/Tier_3_Thermostat_Savings_Potential_Fin)

[/media/Project/Websites/mpsc/workgroups/EWR_Collaborative/2019/Tier_3_Thermostat_Savings_Potential_Fin](https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/workgroups/EWR_Collaborative/2019/Tier_3_Thermostat_Savings_Potential_Fin)
dings.pdf. June 18, 2019. Last Accessed: February 16, 2026.

¹³ Arash Khalilnejad, Roger H. French, Alexis R. Abramson, *Evaluation of cooling setpoint setback savings in commercial buildings using electricity and exterior temperature time series data*, Energy, Volume 233, 2021, 121117, ISSN 0360-5442, <https://doi.org/10.1016/j.energy.2021.121117>. Last Accessed: February 16, 2026.

¹⁴ According to the Köppen-Geiger climate classification system, Las Vegas is in the *BWh* climate zone, whereas Abu Dhabi is in the *BWk* climate zone (see Peel, M. C., Finlayson, B. L., and McMahon, T. A.: Updated world map of the Köppen-Geiger climate classification, Hydrol. Earth Syst. Sci., 11, 1633–1644, <https://doi.org/10.5194/hess-11-1633-2007>, 2007).

¹⁵ Muhammad Tauha Ali, Marwan Mokhtar, Matteo Chiesa, Peter Armstrong, *A cooling change-point model of community-aggregate electrical load*, Energy and Buildings, Volume 43, Issue 1, 2011, Pages 28-37, ISSN 0378-7788, <https://doi.org/10.1016/j.enbuild.2010.07.025>. Last Accessed: February 16, 2026.

Table 3-12. Critical Peak Demand Period per Month

Month	Critical Peak Hours	
	NPC	SPPC
January	18-20	18-19
February	19-20	19-20
March	20	20-21
April	20	21
May	17-18	21
June	17-18	17-18
July	16-18	17-18
August	16-17	17-18
September	17	17-18
October	18-19	19-20
November	18-19	18-19
December	18-19	18-19

Critical peak demand (kW) savings are calculated per month, by per rate class utilizing ex-post program savings determinations and appropriate measure-level 8,760-hour energy savings curves.

For each PY2025 participant and measure, the ex-post annualized energy savings were allocated to the participant's rate class and the appropriate measure-level energy savings curve. This provided a two-dimensional matrix of hourly savings per rate class for 8,760 hours of a typical (non-leap year) calendar year. The results were then inspected for each month to identify the maximum average hourly demand (kW) savings during each month's designated peak demand hour.

Summer critical peak demand (kW) savings are defined as the maximum kW reduction that could be expected in a typical year during the July or August peak demand hours indicated in Table 3-12 above. The average hourly kWh savings of the PY2025 Program for a typical weekday in July or August is shown in Figure 3-6. As demonstrated, the largest program-level savings fractions were in July and August. On weekdays in July and August, average hourly savings peaked at 13:00—earlier than the critical demand period (Table 3-12). The shape of the hourly savings curve during the summer peak aligns with when schools are typically in session, with almost 50 percent of average savings occurring between 8:00 and 16:00 (Figure 3-6).

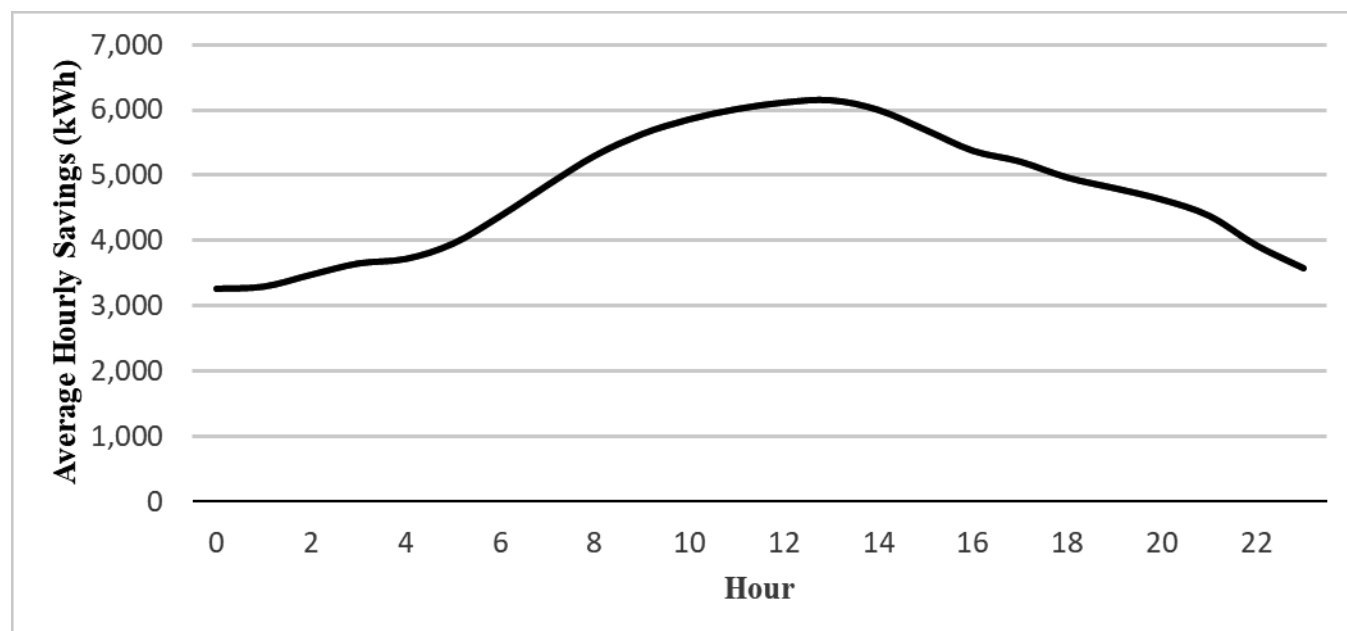


Figure 3-6. Typical Hourly Energy Savings Curve (2025 July and August, weekday)

The complete ex-post critical peak demand savings per month, by rate class, are provided in Appendix A. For a detailed discussion of the analytical steps for determining critical peak demand (kW) savings, please refer to “M&V Technical Appendix 1.”

3.8 Determining Effective Useful Life and Lifetime Savings

The Evaluator analyzed various data to determine the EUL for each category of measures installed by NV Energy’s 2025 Program. The Evaluator subsequently employed its EUL determinations to calculate lifetime energy (kWh) savings per measure category and at the program level. To determine EUL values for the retrofit lighting and HVAC equipment replacement measure categories, the Evaluator utilized the California Energy Efficiency Policy Manual.¹⁶ The following are measure-specific items that affect EUL values:

- For the “HVAC Equipment Replacement” category, high efficiency air conditioner and heat pump measures installed in the PY2025 Program have the same EUL of 15.0 years; the chiller measure EUL is 20 years. Every NPC HVAC measure was determined to be a new construction HVAC equipment installation. Under SPPC, the HVAC measures were determined to be new construction HVAC equipment installation or HVAC Retrofit.
- The “VFD Retrofit” measures installed in the PY2025 Program have the same EUL value of 15.0 years.

¹⁶ <https://docs.cpuc.ca.gov/published/Graphics/11474.pdf>

- For the lighting measures installed, the DEER provides a methodology for calculating EUL using the lamp or fixture rated life divided by HOU. Rated life is typically available on submitted specification sheets, but in the case that rated life is not available, the Evaluator defaults to the DEER assumptions for lamp or fixture rated life: 50,000 for LED fixtures and 70,000 for ballasted fixtures.

For a given energy efficiency program, the program-level EUL is calculated as the quotient of lifetime kWh savings (numerator) and annual kWh savings (denominator). If a program achieves lifetime kWh savings of 1,500 MWh and annual savings of 100 MWh, the program-level EUL would be the quotient of 1,500 and 100, or 15 years, whichever is less. For PY2025, the weighted average EUL values for the lighting retrofits measure category were 9.7 years for NPC and 14 years for SPPC. The reason for the lower EUL for the NPC service territory was high hours of use for the lighting projects, especially in areas where lighting is on for 8,760 hours per year.

- For Monitoring based Commissioning measures, the EUL is 5 years.
- For CEI and SEM, the EUL is typically one year because the Evaluator evaluates a census of participant sites each year that the sites are actively enrolled in the Program.
 - For SEM, the Program claimed 12 months of savings, and the EUL is 1.0 years.
 - For CEI, the Program claimed 12 months of savings, and the EUL is 1.0 years.

For any given program, the program-level EUL is calculated as the quotient of (i) lifetime kWh savings for all projects, and (ii) annual kWh savings for all projects. In other words, the numerator is (i) and the denominator is (ii); if a program had lifetime savings of 1,200 GWh and annual savings of 120 GWh per year, the program-level EUL would be the quotient of 1,200 and 120, or 10.0 years.

4 ENERGY IMPACT RESULTS

This chapter presents the energy impact results and findings from the desk reviews and energy savings analysis for the NPC and SPPC Programs.

4.1 Results of Ex-Post Verified Electric (kWh) Savings Calculations

The ex-post verified electric savings for the Program are summarized by service territory and sampling stratum in Table 4-1 below. NPC ex-post verified savings of 20,308,676 kWh were 101.1 percent of ex-ante savings. SPPC ex-post verified savings of 5,996,246 kWh were 106 percent of ex-ante savings.

Table 4-1. Summary of Annual Energy (kWh) Savings by Stratum

Stratum	NPC			SPPC		
	Ex-Ante Savings (kWh)	Ex-Post Savings (kWh)	Realization Rate	Ex-Ante Savings (kWh)	Ex-Post Savings (kWh)	Realization Rate
Stratum 1	894,998	912,518	102.0%	49,489	49,489	100.0%
Stratum 2	870,851	904,050	103.8%	132,992	170,893	128.5%
Stratum 3	2,994,320	3,372,830	112.6%	463,324	470,679	101.6%
Stratum 4	2,749,072	2,804,929	102.0%	207,711	195,472	94.1%
Stratum 5	12,585,139	12,314,349	97.8%	4,800,695	5,109,714	106.4%
Total	20,094,380	20,308,676	101.1%	5,654,211	5,996,246	106.0%

For NPC, Table 4-2 provides site-level ex-ante and ex-post savings for M&V sample sites.

Table 4-2. NPC Ex-Ante and Ex-Post Electric Savings for Sampled Projects

NPC Channel or Facility Name	Ex-Ante Savings (kWh)	Ex-Post Savings (kWh)	Realization Rate
CEI	12,585,139	12,314,349	97.8%
CCSD - Phase 1 - Centennial HS	683,390	697,276	102.0%
UNLV MBCx	321,563	393,226	122.3%
CCSD Southern Career Academy NC	262,087	264,203	100.8%
CCSD - Phase 1 - Duncan Ruby	162,360	168,550	103.8%
CCSD Laura Dearing NC	154,311	156,576	101.5%
CCSD Walter Bracken ES NC	50,439	52,182	103.5%
Subtotal for M&V Sample	14,219,289	14,046,361	98.8%
Not Sampled	5,875,091	6,262,315	106.6%
Total	20,094,380	20,308,676	101.1%

For SPPC, Table 4-3 provides site-level ex-ante and ex-post savings for M&V sample sites.

Table 4-3. SPPC Ex-Ante and Ex-Post Electric Savings for Sampled Projects

Facility Name	Ex-Ante Savings (kWh)	Ex-Post Savings (kWh)	Project Realization Rate
SEM	4,800,695	5,109,714	106.4%
Washoe County Debbie Smith HS	207,711	195,472	94.1%
UNR Annual Lighting	188,628	187,767	99.5%
Lander ES - lighting	114,001	119,666	105.0%
Washoe County Incline HS	47,219	60,676	128.5%
Lyon SSSH Chiller Retrofit	12,273	12,273	100.0%
Subtotal for M&V Sample	5,370,527	5,685,568	105.9%
Not Sampled	283,684	310,679	109.5%
Total	5,654,211	5,996,246	106.0%

First-year savings were calculated using the methodology presented in Section 3.6 above. First-year energy savings for projects implemented in the Program totaled 18,299,383 kWh for NPC and 5,442,991 kWh for SPPC. First-year and annual ex-post kWh savings of the Program are summarized in Table 4-4.

Table 4-4. First Year and Annual Electric Savings

Service Territory	First Year (2025) Ex-Post Savings (kWh)	Annual Ex-Post Savings (kWh)
NPC	18,299,383	20,308,676
SPPC	5,442,991	5,996,246

See Appendix A for tables depicting Program ex-post verified energy savings by month, by rate class for calendar years 2025 and 2026.

4.2 Review of Variances

This section provides brief descriptions of the causes of significant variances between the expected savings and ex-post verified savings for channels or projects.

4.2.1 NPC Variances

CCSD - Phase 1 - Duncan Ruby HS (104 percent RR):

The ex-ante calculations used hours of use (“HOU”) for the lighting fixtures applicable to the SPPC service territory; however, given the project’s location, the Evaluator used an NPC-specific HOU value. In addition, the ex-ante savings associated with the controls utilized an HCIF value of 1.05 (applicable to the SPPC service territory), while the ex-post calculation used the NPC-

specific HCIF value of 1.15. Notably, the implementer has since revised the formula to use location-specific HOU and HCIFs for each service territory.

CCSD - Phase 1 - Centennial HS (102 percent RR):

The ex-ante calculations used hours of use (“HOU”) for the lighting fixtures applicable to the SPPC service territory; however, given the project’s location, the Evaluator used an NPC-specific HOU value. In addition, the ex-ante savings associated with the controls utilized an HCIF value of 1.05 (applicable to the SPPC service territory), while the ex-post calculation used the NPC-specific HCIF value of 1.15. HOUAs noted previously, the ex-ante calculations have since been revised to account for location-specific variable inputs.

CCSD Walter Bracken ES NC (104 percent RR):

The savings variance was caused by not including the heating savings in the ex-ante saving estimates for HVAC measure. The implementer calculated cooling savings for heat pumps, whereas the ex-post savings included both cooling and heating savings.

UNLV MBCx (122 percent RR):

The realization rate of 122 percent resulted from the following two reasons:

The first reason is that the ex-ante calculations used a combination of base temperatures when calculating CDH, whereas the Evaluator used 50 °F consistently. Ex-ante calculations appear to have used a base temperature of 50 °F to calculate CDH for the pre regression, and 55 degrees for the post regression periods. Additionally, 55 °F was used as a set point to calculate CDH from TMYx in combination with the CDH50 coefficients from the pre regression.

The second reason was that the ex-ante and ex-post regression coefficients from the post implementation period data did not match. The Evaluator was not able to determine the cause for this misalignment.

4.2.2 SPPC Variances**SEM (106 percent RR):**

Ex-ante and ex-post regression models vary in modeling structure and assumptions. The Evaluator’s model uses hourly data together with multiple variables that characterize school operations in baseline and measurement periods. Using LMEM reduces the impact of correlations between variables for WCSD school buildings within the same cohort to provide the most accurate representation of school operations and energy savings resulting from SEM intervention.

Washoe County Debbie Smith HS (94 percent RR):

This is a new construction project, and the savings variance was caused by HVAC, lighting, and fan VFD measures. The ex-ante savings for the HVAC measure were underestimated, which

resulted in a gross realization rate of 136 percent. The air-conditioning unit model #TC7B6021S is a split system with a 17 New SEER rating and 13 minimum SEER, whereas the ex-ante calculations used 14.7 New SEER and 14 minimum SEER.

The gross realization rate for the lighting measure was 96 percent due to the following actions taken during ex-post calculations:

- Adjustments to many of the fixture wattages for various line items based on specification sheet review.
- Changed the calculator to add whole building as a schedule (claimed)
- Adjusted the HCIF to 2025 value (1.05 for the SPPC service territory)
- Adjusted the calculator for calculating control savings as a part of realized lighting savings; excluded control savings as these were not applicable.

The gross realization rate for the fan VFD measure was 84.5 percent. This was because deemed savings associated with the NPC service territory high school (500.1 kWh/HP) were used instead of the SPPC-specific value of 422.35 kWh/HP. All the differences mentioned above contributed to an overall gross realization rate of 94 percent.

Lander ES - Lighting (105 percent RR):

The main reason for the discrepancy is due to a difference in HOU. Under ex-ante calculations, all line items used 2,200 (11 hours x 200 days) HOU. The savings calculations should be using deemed hours in cases where the claimed HOU are greater or less than deemed hours by 35 percent. For this project, the ex-post analysis for the two hallway line items used a deemed HOU of 4,373 instead of the claimed 2,200 HOU, because the claimed HOU were approximately 50 percent less than deemed.

The realization rate was also impacted by differences in the HCIF used in the ex-ante versus ex-post analyses. For ex-ante, an HCIF of 1.06 was used; however, the ex-post calculation used an HCIF of 1.05 prescribed for 9-month schools in the SPPC service territory.

Washoe County Incline HS (128 percent RR):

This is a new construction project, and the savings variance was related to HVAC, lighting, and fan VFD savings calculations.

The ex-ante savings for the HVAC measures were underestimated, which resulted in a gross realization rate of 169 percent. The ex-ante HVAC savings did not include heating savings for heat pump units, whereas ex-post savings included both heating and cooling savings.

The gross realization rate for the lighting measure was 111 percent due to ex-ante calculations using 2,804 HOU whereas the ex-post calculation used deemed HOU for the classrooms.

The gross realization rate for the fan VFD measure was 84.4 percent. This was because the ex-ante analysis used a deemed savings associated with the NPC service territory high school (500.1 kWh/HP), whereas the ex-post analysis used a deemed savings assigned for a high school building in the SPPC territory (422.35 kWh/HP). All the differences mentioned above contributed to an

overall gross realization rate of 128 percent.

4.3 Ex-Post Verified Demand Reduction (kW)

When evaluating the Program, an hourly savings curve was developed as described in Section 3.5. The hourly energy savings curve is used to calculate peak demand (kW) savings for the Program. The program-level energy savings curve is also used as an input in NV Energy’s cost-effectiveness testing. Ex-post verified summer critical peak demand savings are 4,114 kW for NPC and 1,291 kW for SPPC. The complete ex-post determination for critical peak demand savings (kW) per month, by rate class are provided in Appendix A. Additional information regarding the methodology for calculating critical peak demand savings can be found in “M&V Technical Appendix 1.”

4.4 Effective Useful Life and Lifetime Energy (kWh) Savings

As described in Section 3.8 above, the Evaluator determined the EUL for each measure implemented by the Program. The Evaluator subsequently employed EUL values to calculate lifetime energy (kWh) savings per measure. As shown in Table 4-5 for NPC, the Evaluator determined program-level lifetime savings of 85,309,049 kWh. NPC program-level EUL was then taken to be lifetime kWh divided by annual kWh, or 85,309,049 divided by 20,308,676, which equals 4.2 years.

Table 4-5. EUL and Lifetime Energy Savings, PY2025 NPC Program

Measure Category	Ex-Post Verified Annual Savings (kWh)	EUL (years)	Ex-Post Verified Lifetime Savings (kWh)
HVAC	240,076	13.7	3,297,305
MBCx	393,226	5.0	1,966,129
New Construction	1,434,517	10.7	15,333,910
Prescriptive Lighting	5,926,509	8.8	52,397,357
Subtotal, Capital Improvement Projects	7,994,327	9.1	72,994,700
CEI	12,314,349	1.0	12,314,349
Total, All PY2025 NPC Projects	20,308,676	4.2	85,309,049

As shown in Table 4-6 for SPPC, the Evaluator determined program-level lifetime savings of 17,120,180 kWh. SPPC program-level EUL was then taken to be lifetime kWh divided by annual kWh, or 17,120,180 divided by 5,996,246, which equals 2.9 years.

Table 4-6. EUL and Lifetime Energy Savings, PY2025 SPPC Program

Measure Category	Ex-Post Verified Annual Savings (kWh)	EUL (years)	Ex-Post Verified Lifetime Savings (kWh)
HVAC	104,349	16.9	1,767,978
Midstream	55,357	14.2	785,243
New Construction	419,393	13.7	5,744,933
Prescriptive Lighting	307,433	12.1	3,712,311
Subtotal, Capital Improvement Projects	886,532	13.5	12,010,466
SEM	5,109,714	1.0	5,109,714
Total, All PY2025 SPPC Projects	5,996,246	2.9	17,120,180

5 FINDINGS AND RECOMMENDATIONS

This chapter presents key findings and recommendations from M&V analyses of the PY2025 Program.

5.1 Findings

The ex-post verified energy (kWh) savings determined by the Evaluator varied from ex-ante estimated electric savings reported by the Program. Variances resulted mainly from the use of different values of deemed savings for VFD measures, not including heating savings for heat pump units, and using different HOU and HCIFs for lighting measures for determining savings from capital improvement projects, and modeling assumptions in CEI and SEM models. The following are our major findings, including issues that contributed to variances between ex-ante estimated savings and ex-post verified savings.

- Both the ex-ante and ex-post CEI savings were lower than the CEI savings for PY2024, continuing the downward trend in CEI savings, which began last year. The SEM ex-post savings were about 136 percent of last year's savings.
- The Evaluator found that for a few projects the ex-ante lighting calculator applied prescriptive HOU and HCIFs for the SPPC territory to project in the NPC territory. The implementer is investigating these instances and making applicable corrections. Refer to section 4.2 above for specific examples of projects with detailed information on saving variance due to these issues. These include CCSD - Phase 1 - Duncan Ruby HS and CCSD - Phase 1 - Centennial HS.
- The Evaluator found that the ex-ante HVAC savings calculator did not include heating savings for heat pump units. The heating savings should be included for the projects involving installation of heat pump units.
- The Evaluator found that VFD deemed savings associated with the NPC service territory were used for projects located in the SPPC service territory. Refer to section 4.2 above for specific examples of projects with detailed information on saving variance due to this issue. These include Washoe County Debbie Smith HS and Washoe County Incline HS projects under SPPC territory. For VFD projects, revise ex-ante calculations to apply location-specific deemed values associated with each territory and facility type.
- The Evaluator found that different base temperatures were used in the pre and post retrofit regression analyses. It is recommended to be consistent in using the base temperature under both periods.
- The Evaluator found that a proper QA/QC was lacking in some projects' saving calculations and recommends review of QA/QC processes for ex-ante calculations of energy savings.

- The Evaluator recommends a closer coordination between the Implementer and the Evaluator for scheduling on-site inspections that will assist in facilitating data collection activities on sampled projects in a timely manner to improve accuracy of the results.

5.2 Status of 2024 Recommendations

Table 5-1 below provides a summary of recommendations that were made in the PY2024 M&V report, the status, and applicable notes describing how the recommendations were incorporated into the 2025 management and operations of the Program.

Table 5-1. Recommendations from the 2024 Schools Program M&V Report

2024 M&V Report Recommendation	2025 Status	Notes
The Program should consider removing COVID-19 related impacts from the modeling structure for CEI as much as possible. The close alignment between the ex-ante and ex-post CEI models indicates that COVID-19 related impacts are not needed for estimating CEI savings.	Completed	The implementer removed COVID-19 related impacts from its PY2025 ex-ante CEI models.
The Program should consider using the same post-period durations for both the CEI and SEM models. The ex-ante CEI models included all non-baseline weeks in the post-period, whereas the ex-ante Washoe SEM models excluded November 2, 2020 – January 2, 2022, from the post-period, and the Carson SD models had variable baselines for each facility. The Evaluator recommends that the Program should align the ex-ante CEI and SEM modelling approaches wherever possible.	Completed	The implementer's ex-ante CEI and SEM models included all baseline and PY2025 days and excluded other years. Therefore, the CEI and SEM modelling approaches were aligned.
For capital improvement projects, the Program could benefit from a pre-construction review process similar to the process that has been in place for the NV Energy Business Energy Services Program since 2013. A pre-construction review process would enable the Program and the Evaluator to review large projects before implementation, provide the Evaluator insights regarding ex-ante claimed energy savings, and facilitate ongoing coordination between implementation and M&V activities.	Ongoing	
For the Capital Improvement lighting projects, the implementer should apply heating and cooling interaction factor ("HCIF") to the lighting fixture replacement savings and associated lighting controls savings. Currently, the implementer is applying HCIF to fixture replacement savings only.	Completed	
The Evaluator recommends a more stringent quality assurance and quality control ("QA/QC") process, which will help enhance the accuracy of the claimed energy savings.	Ongoing	
The Evaluator recommends closer coordination between the implementer and the Evaluator for scheduling on-site inspections. Optimal coordination facilitates data collection activities and improves efficiencies for all involved.	Ongoing	

5.3 Recommendations Resulting from M&V Findings for PY2025

This section presents recommendations resulting from PY2025 M&V activities and analyses. The Evaluator provides several recommendations, each of which relate to the M&V findings described in this report. The Evaluator looks forward to collaborating with NV Energy and the implementation team to help all Program stakeholders benefit from enacting the following recommendations.

5.3.1 Recommendation 1

The Evaluator recommends that the implementer perform an RCA when negative savings are found for a given school type (or individual site, where applicable), along with aligning the ex-ante and ex-post approaches for adjusting negative savings in future program years. Both the ex-ante and ex-post analyses found negative savings for some school types in PY2025, which suggests that both the implementer and evaluator could benefit in future program years from a more rigorous approach to documenting negative savings and adjusting models, where needed. In PY2025, negative savings were adjusted to zero kWh in the ex-ante models. Negative savings were not adjusted for the ex-post approach, as was the case in previous program years. Consistency in calculating savings may lead to more accurate savings estimates and better alignment between the ex-ante and ex-post modelling approaches overall. Therefore, the Evaluators will align our approach for adjusting negative savings to that of the implementer in addition to performing an RCA when negative savings are found.

5.3.2 Recommendation 2

The Evaluator recommends that NV Energy pursues a more thorough QA/QC process with respect to advanced metering infrastructure (“AMI”) data completion. The final AMI meter dataset sent to both the implementer and the Evaluator was incomplete, and therefore up to 36 percent of sites were excluded from the ex-post models (Table 3-7). Additionally, the Evaluator added the “Oct25” coefficient to the WCSD and Carson SD models to account for data completion issues specific to the time period between October 1 and October 31, 2025 (Equation 3-4-Equation 3-7; Equation 3-12-Equation 3-13). A complete dataset for each evaluated site will lead to more accurate ex-ante and ex-post savings estimates.

5.3.3 Recommendation 3

The Evaluator recommends that the implementer provides monthly documented progress updates on Phase 1 and Phase 2 CEI and SEM operations for PY2026. These updates will keep the Evaluators informed as to the Phase 2 rollout progress and will help both the implementation and evaluation teams achieve their analysis timeline goals.

5.3.4 Recommendation 4

For the Capital Improvement projects, revise the lighting calculator to apply location-specific hours of use (“HOU”) and heating and cooling interactive effects (“HCIFs”) associated with different territories and facility types

5.3.5 Recommendation 5

For the Capital Improvement variable frequency drive (“VFD”) projects, revise ex-ante calculations to apply location-specific deemed values associated with each territory and facility type.

5.3.6 Recommendation 6

Review QA/QC processes for ex-ante calculations of energy savings.

5.3.7 Recommendation 7

Strengthen coordination efforts between the implementer and the Evaluator for scheduling on-site inspections. This coordination will assist in facilitating data collection activities in a timely manner to improve efficiency and accuracy of the results.

5.3.8 Recommendation 8

Provide custom calculations for the sampled Capital Improvement Projects to enhance alignment on inputs and assumptions used to estimate ex-ante claimed savings.

6 APPENDIX A: SAVINGS PER MONTH AND PER RATE CLASS

The savings tables presented below are a result of Evaluator's evaluation of the PY2025 Program. First-year savings include all measures implemented during the 2025 program year. CIP, which by definition has multi-year EUL, will continue saving energy for multiple years in the future. In contrast, CEI/SEM savings have a one-year EUL, and all CEI/SEM savings occurred in the 2025 calendar year. To show the difference more clearly between CEI/SEM projects and CIP, the Evaluator provides separate tables for CEI/SEM versus CIP in sections 6.1 and 6.2 below.

6.1 NPC Savings per Month by Rate Class

*Table 6-1. Capital Improvement Projects – Monthly Energy Savings in Calendar Year 2025
(units are kWh)*

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GS	-	-	2,310	13,859	14,325	13,865	14,322	14,306	13,834	14,319	13,830	14,317	129,287
LGS1	40,821	43,157	52,654	74,097	76,592	90,577	97,529	94,837	89,476	88,727	83,502	86,630	918,600
LGS2	100,232	108,856	200,569	252,995	261,515	367,095	414,545	394,893	391,246	395,534	381,453	395,015	3,663,948
LGS3	-	-	45,556	103,547	107,034	143,988	171,756	163,045	150,037	140,591	122,589	125,056	1,273,199
Total	141,053	152,013	301,089	444,497	459,467	615,524	698,152	667,082	644,593	639,171	601,375	621,019	5,985,034

*Table 6-2. Capital Improvement Projects – Monthly Energy Savings in Calendar Year 2026
(and subsequent calendar years) (kWh)*

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GS	14,321	12,929	14,322	13,859	14,325	13,865	14,322	14,308	13,836	14,319	13,828	14,317	168,550
LGS1	86,815	78,164	86,492	85,262	90,963	90,825	97,790	95,175	89,587	88,915	83,481	86,623	1,060,092
LGS2	396,228	356,456	395,605	400,507	443,303	457,242	511,808	486,287	445,731	422,404	380,915	394,948	5,091,434
LGS3	124,768	113,368	128,111	132,697	148,493	153,730	171,957	163,500	149,736	140,561	122,301	125,030	1,674,251
Total	622,132	560,916	624,530	632,325	697,084	715,662	795,877	759,269	698,890	666,199	600,524	620,918	7,994,327

*Table 6-3. Capital Improvement Projects – Monthly Critical Peak Demand Savings Full Year
(kW)*

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GS	19.9	19.1	18.8	18.8	20.5	20.5	24.3	24.2	20.4	19.9	19.9	19.9
LGS1	121.5	116.4	114.0	120.9	137.1	139.6	166.0	163.2	139.7	130.0	121.3	121.5
LGS2	556.2	532.9	529.1	599.9	706.8	732.1	872.2	846.1	733.9	653.9	567.6	556.2
LGS3	173.6	166.3	178.2	204.3	240.3	248.5	296.0	287.5	249.0	222.6	191.8	173.6
Total	871.2	834.6	840.1	943.8	1,104.5	1,140.7	1,358.4	1,321.0	1,142.9	1,026.5	900.6	871.2

Table 6-4. CEI Monthly Energy Savings in Calendar Year 2025 (kWh)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GS	-	-	-	-	-	-	-	-	-	-	-	-	-
LGS1	-	-	-	-	-	-	-	-	-	-	-	-	-
LGS2	868,255	819,176	898,261	965,889	1,054,222	1,175,301	1,260,124	1,436,827	1,252,448	1,033,043	792,515	758,288	12,314,349
LGS3	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	868,255	819,176	898,261	965,889	1,054,222	1,175,301	1,260,124	1,436,827	1,252,448	1,033,043	792,515	758,288	12,314,349

Table 6-5. CEI Monthly Critical Peak Demand Savings (kW)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GS	-	-	-	-	-	-	-	-	-	-	-	-
LGS1	-	-	-	-	-	-	-	-	-	-	-	-
LGS2	1,440.8	1,625.5	1,773.3	1,820.7	2,164.1	2,039.0	2,174.9	2,756.2	2,240.0	1,879.9	1,563.9	1,391.5
LGS3	-	-	-	-	-	-	-	-	-	-	-	-
Total	1,440.8	1,625.5	1,773.3	1,820.7	2,164.1	2,039.0	2,174.9	2,756.2	2,240.0	1,879.9	1,563.9	1,391.5

6.2 SPPC Savings per Month by Rate Class

Table 6-6. Capital Improvement Projects – Monthly Energy Savings in Calendar Year 2025 (kWh)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GS1	-	-	-	-	-	-	3,053	2,175	1,101	1,214	15,942	16,460	39,946
GS2	-	-	-	-	3,995	4,640	30,564	57,058	49,018	48,815	48,744	49,960	292,795
GS3	-	-	-	-	-	-	-	109	174	126	127	127	537
Total	-	-	-	-	3,995	4,640	33,617	59,233	50,229	50,203	64,813	66,547	333,277

Table 6-7. Capital Improvement Projects – Monthly Energy Savings in Calendar Year 2026 (and subsequent calendar years) (kWh)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GS1	16,616	14,926	16,280	16,232	16,551	16,289	18,993	18,145	16,500	16,677	15,888	16,466	199,563
GS2	51,933	46,084	48,065	53,590	51,300	53,312	94,350	76,389	56,640	53,888	48,489	50,000	684,042
GS3	166	130	83	198	150	212	756	546	265	181	113	129	2,928
Total	68,716	61,140	64,428	70,020	68,001	69,813	114,098	95,080	73,405	70,746	64,490	66,595	886,532

Table 6-8. Capital Improvement Projects – Monthly Critical Peak Demand Savings Full Year (kW)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GS1	22.1	14.0	11.5	12.3	12.3	32.0	36.3	34.6	32.9	16.5	21.5	21.9
GS2	67.3	48.6	37.4	66.1	64.4	185.0	288.9	245.9	204.7	94.5	62.2	65.5
GS3	0.3	0.3	0.2	0.7	0.7	1.9	3.0	2.5	2.1	1.0	0.1	0.2
Total	89.7	62.9	49.1	79.1	77.3	218.9	328.1	283.1	239.8	112.0	83.8	87.6

Table 6-9. SEM Monthly Energy Savings in Calendar Year 2025 (kWh)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GS1	475,886	413,756	412,030	402,500	399,042	345,367	349,673	465,316	479,631	469,976	443,058	453,480	5,109,714
GS2	-	-	-	-	-	-	-	-	-	-	-	-	-
GS3	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	475,886	413,756	412,030	402,500	399,042	345,367	349,673	465,316	479,631	469,976	443,058	453,480	5,109,714

Table 6-10. SEM Critical Peak Demand Savings/Month/Rate Class (kW)

Rate Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GS1	710.3	623.4	536.5	501.8	494.1	797.1	669.4	962.7	935.1	633.6	710.3	689.8
GS2	-	-	-	-	-	-	-	-	-	-	-	-
GS3	-	-	-	-	-	-	-	-	-	-	-	-
Total	710.3	623.4	536.5	501.8	494.1	797.1	669.4	962.7	935.1	633.6	710.3	689.8

7 APPENDIX B: SCHOOLS REMOVED FROM THE EX-POST CEI AND SEM MODELS

This section lists the specific schools that were removed from the ex-post CEI and SEM models, along with the reasons for removal, in a consolidated table.

Table 7-1. Schools Removed from the Ex-Post CEI and SEM Models

Territory	Cohort	School Type	School	Reason
NPC	Alumni	Elementary School	Bracken, Walter ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Beatty, John R. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Bendorf, Patricia A. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Jeffers, Jay W. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Jones Blackhurst, Jan ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Mountain View Elementary School	Insufficient Data
NPC	Non-Alumni	Elementary School	Newton, Ulis ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Priest, Richard C. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Sewell, C. T. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Smith, Helen M. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Snyder, William E. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Ward, Gene ES	Inconsistent and Insufficient Data
NPC	Non-Alumni	Elementary School	Wengert, Cyril ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Wolff, Elise L. ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Beckley, Will ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Red Rock ES	Insufficient Data
NPC	Non-Alumni	Elementary School	Thomas, Ruby S. ES	Insufficient Data
NPC	Non-Alumni	High School	Advanced Technologies Academy (ATA)	Insufficient Data
NPC	Non-Alumni	High School	Cimarron-Memorial HS	Insufficient Data
NPC	Non-Alumni	Middle School	Becker, Ernest A. MS	Insufficient Data
NPC	Non-Alumni	Middle School	Brown, B. Mahlon JHS	Insufficient Data
NPC	Non-Alumni	Middle School	Canarelli, Lawrence and Heidi MS	Insufficient Data
NPC	Non-Alumni	Middle School	Cortney, Francis H. JHS	Insufficient Data
NPC	Non-Alumni	Middle School	Escobedo, Edmundo “Eddie”, Sr. MS	Insufficient Data
NPC	Non-Alumni	Middle School	Fertitta, Victoria MS	Insufficient Data
NPC	Non-Alumni	Middle School	Garside, Frank F. JHS	Insufficient Data
NPC	Non-Alumni	Middle School	Johnson, Walter JHS	Insufficient Data
NPC	Non-Alumni	Middle School	Johnston, Carroll M. MS	Insufficient Data
NPC	Non-Alumni	Middle School	Orr, William E. MS	Insufficient Data
NPC	Non-Alumni	Middle School	Schofield, Jack Lund MS	Insufficient Data
NPC	Non-Alumni	Middle School	White, Thurman MS	Insufficient Data
NPC	Non-Alumni	Middle School	Woodbury, C. W. MS	Insufficient Data

Energy Smart Schools Program – 2025 NV Energy

M&V Report

March 2026

Territory	Cohort	School Type	School	Reason
NPC	Non-Alumni	Middle School	Brinley, J. Harold MS	Insufficient Data
NPC	Non-Alumni	Other	CCSD Food Services #953	Insufficient Data
NPC	Non-Alumni	Other	Risk Management & Environmental Services Dept.	Insufficient Data
NPC	Non-Alumni	Other	Telecom	Insufficient Data
NPC	Non-Alumni	Other	Food Svc.	Inconsistent Data
SPPC	Non-Alumni	Elementary School	Pleasant Valley ES	Insufficient Data
SPPC	Non-Alumni	High School	Damonte Ranch HS	Insufficient Data
SPPC	Non-Alumni	High School	Spanish Springs HS	Insufficient Data
SPPC	Non-Alumni	Middle School	O'Brien MS	Insufficient Data
SPPC	Non-Alumni	Other	Reno Community Resource Center	Insufficient Data

8 APPENDIX C: STATISTICAL VALIDATION OF LINEAR MIXED EFFECTS MODELS

This section includes the R^2 , t -statistics, and analysis of variance (“ANOVA”) tests for the ex-post LMEM used to verify savings. The ANOVA tests were performed with the “lmerTest” package in R¹⁷ using Satterthwaite’s approximation.¹⁸

8.1 Model Statistics for Program Year 2025

In this section, we will present the R^2 and t -statistics for our PY2025 models. Table 8-1 presents the statistics for Carson SD, Table 8-2 presents the statistics for CCSD, and Table 8-3 presents the statistics for WCSD. Robust LMEM models have R^2 values above 0.50 and t -statistics above 1.645. If the models do not meet both of these criteria, steps are taken to resolve the issue such as removing colinear variables, or other factors are considered. The CCSD Alumni Other cohort did not have model statistics due to the single facility in that cohort not having enough post-period data (Table 3-7).

Table 8-1. R^2 and t -statistics for PY2025 Carson SD GLM

School	School Type	R^2 PY2025	t -statistic PY2025 ¹⁹
Empire ES	Elementary School	0.55	9.20
Fritsch ES	Middle School	0.52	5.03
Mark Twain ES	High School	0.57	4.58
Gleason-Training Facility	Other	0.60	4.78
Transportation	Other	0.66	45.89

Table 8-2. R^2 and t -statistics for PY2025 CCSD LMEM

Cohort	School Type	R^2 PY2025	t -statistic PY2025 ¹⁹
Alumni	Elementary School	0.54	56.31
Alumni	Middle School	0.57	25.09
Alumni	High School	0.52	9.61
Non-Alumni	Elementary School	0.63	3.76
Non-Alumni	High School	0.58	136.02
Non-Alumni	Middle School	0.55	42.90
Non-Alumni	Other	0.86	50.03

¹⁷ Kuznetsova A, Brockhoff PB, Christensen RHB (2017). “lmerTest Package: Tests in Linear Mixed Effects Models.” Journal of Statistical Software, 82(13), 1–26. doi:10.18637/jss.v082.i13.

¹⁸ Satterthwaite, F. E. (1946), "An Approximate Distribution of Estimates of Variance Components.", Biometrics Bulletin, 2 (6): 110–114.

¹⁹ Absolute value

Table 8-3. R^2 and t -statistics for PY2025 WCSD LMEM

Territory	School Type	R^2 PY2025	t-statistic PY2025 ^{Error! Bookmark not defined.}
SPPC	Elementary School	0.55	45.40
SPPC	High School	0.48	49.90
SPPC	Middle School	0.54	52.20
SPPC	Other	0.89	28.93

8.2 Analysis of Variance Tests for Linear Mixed Effects Models

In this section, we will present the results of the analysis of variance (“ANOVA”) tests used to evaluate the PY2025 LMEM (Figure 8-1 through Figure 8-11). The variable definitions for these results correspond to those outlined in Equation 3-8 through Equation 3-13. All F values need to be statistically significant (i.e., the value shown in the “Pr(>F)” column needs to be below 0.05) to demonstrate that the predictor variables have a statistically significant contribution to the model results and are independent from one another.

Elementary School							
Insufficient Data: Bracken, Walter ES							
Removing 1 school(s) with insufficient/outlying data (9 %)							
Saving 7 x 7 in image							
Type III Analysis of Variance Table with Satterthwaite's method							
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	5693083	5693083	1	160120	3170.99	< 2.2e-16	***
CDD	91638628	91638628	1	160120	51041.73	< 2.2e-16	***
`Elementary Day`	4240903	4240903	1	160120	2362.14	< 2.2e-16	***
`Staff Day`	3919902	3919902	1	160120	2183.34	< 2.2e-16	***
hour	64857597	2819896	23	160120	1570.65	< 2.2e-16	***
`Elementary Day`:Summer	909590	909590	1	160120	506.63	< 2.2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1							

Figure 8-1. LMEM ANOVA Results for the CCSD Alumni “Elementary School” Model

```

High School
Removing 0 school(s) with insufficient/outlying data ( 0 %)
Saving 7 x 7 in image
Type III Analysis of Variance Table with Satterthwaite's method

```

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	11654118	11654118	1	48013	629.402	< 2.2e-16	***
CDD	494555686	494555686	1	48013	26709.386	< 2.2e-16	***
`Middle-High Day`	11598507	11598507	1	48013	626.399	< 2.2e-16	***
`Summer Chillers`	1339212	1339212	1	48013	72.327	< 2.2e-16	***
`Staff Day`	19307162	19307162	1	48013	1042.719	< 2.2e-16	***
hour	245417815	10670340	23	48013	576.271	< 2.2e-16	***
`Middle-High Day`:Summer	3113137	3113137	1	48013	168.131	< 2.2e-16	***

```

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Figure 8-2. LMEM ANOVA Results for the CCSD Alumni “High School” Model

```

Middle School
Removing 0 school(s) with insufficient/outlying data ( 0 %)
Saving 7 x 7 in image
Type III Analysis of Variance Table with Satterthwaite's method

```

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	496298	496298	1	32001	92.3079	< 2.2e-16	***
CDD	23542624	23542624	1	32001	4378.7659	< 2.2e-16	***
`Middle-High Day`	2982091	2982091	1	32001	554.6484	< 2.2e-16	***
`Summer Chillers`	53082	53082	1	32001	9.8729	0.001679	**
`Staff Day`	11266076	11266076	1	32001	2095.4124	< 2.2e-16	***
hour	58789748	2556076	23	32001	475.4125	< 2.2e-16	***

```

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Figure 8-3. LMEM ANOVA Results for the CCSD Alumni “Middle School” Model

```

Elementary School
Insufficient Data: Beatty, John R. ES Bendorf, Patricia A. ES Jeffers, Jay W. ES Jones
Blackhurst, Jan ES Mountain View Elementary School Newton, Uli ES Priest, Richard C. ES
Sewell, C. T. ES Smith, Helen M. ES Snyder, William E. ES Ward, Gene ES Wengert, Cyril ES
Wolff, Elise L. ES
Insufficient Data: Beatty, John R. ES Beckley, Will ES Bendorf, Patricia A. ES Jeffers, Jay
W. ES Jones Blackhurst, Jan ES Mountain View Elementary School Newton, Uli ES Priest,
Richard C. ES Red Rock ES Sewell, C. T. ES Smith, Helen M. ES Snyder, William E. ES Thomas,
Ruby S. ES Ward, Gene ES Wengert, Cyril ES Wolff, Elise L. ES
Inconsistent Data: Ward, Gene ES
Removing 16 school(s) with insufficient/outlying data ( 10 %)
Saving 7 x 7 in image
Type III Analysis of Variance Table with Satterthwaite's method

```

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
post	23253	23253	1	2376213	14.146	0.0001691 ***
CDD	1423155615	1423155615	1	2376213	865816.886	< 2.2e-16 ***
`Elementary Day`	45303525	45303525	1	2376213	27561.678	< 2.2e-16 ***
`Staff Day`	59424443	59424443	1	2376213	36152.537	< 2.2e-16 ***
hour	1068919522	46474762	23	2376213	28274.233	< 2.2e-16 ***
`Elementary Day`:Summer	38273	38273	1	2376213	23.285	1.397e-06 ***

```

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Figure 8-4. LMEM ANOVA Results for the CCSD Non-Alumni “Elementary School” Model

```

High School
Insufficient Data: Advanced Technologies Academy (ATA) Cimarron-Memorial HS
Insufficient Data: Advanced Technologies Academy (ATA) Cimarron-Memorial HS
Removing 2 school(s) with insufficient/outlying data ( 6 %)
Saving 7 x 7 in image
Type III Analysis of Variance Table with Satterthwaite's method

```

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
post	395134540	395134540	1	524749	18501.584	< 2.2e-16 ***
CDD	1406907318	1406907318	1	524749	65876.333	< 2.2e-16 ***
`Middle-High Day`	37672477	37672477	1	524749	1763.957	< 2.2e-16 ***
`Summer Chillers`	943722	943722	1	524749	44.188	2.985e-11 ***
`Staff Day`	124245321	124245321	1	524749	5817.601	< 2.2e-16 ***
hour	2047800300	89034796	23	524749	4168.921	< 2.2e-16 ***
`Middle-High Day`:Summer	507938	507938	1	524749	23.783	1.078e-06 ***

```

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Figure 8-5. LMEM ANOVA Results for the CCSD Non-Alumni “High School” Model

```

Middle School
Insufficient Data: Becker, Ernest A. MS Brown, B. Mahlon JHS Canarelli, Lawrence and Heidi
MS Cortney, Francis H. JHS Escobedo, Edmundo Eddie , Sr. MS Fertitta, Victoria MS Garside,
Frank F. JHS Johnson, Walter JHS Johnston, Carroll M. MS Orr, William E. MS Schofield, Jack
Lund MS White, Thurman MS Woodbury, C. W. MS
Insufficient Data: Becker, Ernest A. MS Brinley, J. Harold MS Brown, B. Mahlon JHS
Canarelli, Lawrence and Heidi MS Cortney, Francis H. JHS Escobedo, Edmundo Eddie , Sr. MS
Fertitta, Victoria MS Garside, Frank F. JHS Johnson, Walter JHS Johnston, Carroll M. MS
Orr, William E. MS Schofield, Jack Lund MS White, Thurman MS Woodbury, C. W. MS
Removing 14 school(s) with insufficient/outlying data ( 36 %)
Saving 7 x 7 in image
Type III Analysis of Variance Table with Satterthwaite's method

```

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
post	9665630	9665630	1	399184	1840.59	< 2.2e-16 ***
CDD	540436489	540436489	1	399184	102913.23	< 2.2e-16 ***
`Middle-High Day`	48602227	48602227	1	399184	9255.13	< 2.2e-16 ***
`Summer Chillers`	1118691	1118691	1	399184	213.03	< 2.2e-16 ***
`Staff Day`	68889305	68889305	1	399184	13118.32	< 2.2e-16 ***
hour	727019120	31609527	23	399184	6019.28	< 2.2e-16 ***

```

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Figure 8-6. LMEM ANOVA Results for the CCSD Non-Alumni “Middle School” Model

```

Other
Insufficient Data: CCSD Food Services #953 Risk Mgmt. & Environmental Svcs. Dept. Telecom
Insufficient Data: CCSD Food Services #953 Risk Mgmt. & Environmental Svcs. Dept. Telecom
Inconsistent Data: Food Svc. Food Svc.
Removing 4 school(s) with insufficient/outlying data ( 15 %)
Saving 7 x 7 in image
Type III Analysis of Variance Table with Satterthwaite's method

```

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
post	6447219	6447219	1	368175	2502.68	< 2.2e-16 ***
CDD	190993189	190993189	1	368175	74139.77	< 2.2e-16 ***
`Staff Day`	51835473	51835473	1	368175	20121.50	< 2.2e-16 ***
hour	53141250	2310489	23	368175	896.89	< 2.2e-16 ***

```

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Figure 8-7. LMEM ANOVA Results for the CCSD Non-Alumni “Other” Model

Elementary School							
Inconsistent Data: Pleasant Valley ES							
Removing 1 school(s) with insufficient/outlying data (2 %)							
Saving 7 x 7 in image							
Type III Analysis of Variance Table with Satterthwaite's method							
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	829006	829006	1	1045840	2061.43	< 2.2e-16	***
CDD	16904829	16904829	1	1045840	42035.97	< 2.2e-16	***
HDD	3301879	3301879	1	1045840	8210.53	< 2.2e-16	***
`School Day`	2347040	2347040	1	1045840	5836.21	< 2.2e-16	***
Oct25	2538763	2538763	1	1045841	6312.95	< 2.2e-16	***
`Student Holiday`	6369190	6369190	1	1045840	15837.79	< 2.2e-16	***
`Staff Day`	2933927	2933927	1	1045840	7295.58	< 2.2e-16	***
`COVID Shutdown`	2459562	2459562	1	1045840	6116.01	< 2.2e-16	***
hour	144483201	6281878	23	1045840	15620.68	< 2.2e-16	***
`School Day`: `Student at home learning`	309065	309065	1	1045840	768.53	< 2.2e-16	***
`Staff Day`: `Teacher at home teaching`	2159117	2159117	1	1045840	5368.91	< 2.2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1							

Figure 8-8. LMEM ANOVA Results for the WCSD “Elementary School” Model

High School							
Insufficient Data: Damonte Ranch HS Spanish Springs HS							
Insufficient Data: Damonte Ranch HS Spanish Springs HS							
Removing 2 school(s) with insufficient/outlying data 15 %)							
Saving 7 x 7 in image							
Type III Analysis of Variance Table with Satterthwaite's method							
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	15500470	15500470	1	183196	2489.69	< 2.2e-16	***
CDD	11029734	11029734	1	183196	1771.60	< 2.2e-16	***
HDD	1885165	1885165	1	183196	302.80	< 2.2e-16	***
`School Day`	5322270	5322270	1	183196	854.86	< 2.2e-16	***
Oct25	35542242	35542242	1	183196	5708.81	< 2.2e-16	***
`Student Holiday`	5524794	5524794	1	183196	887.39	< 2.2e-16	***
`Staff Day`	3519950	3519950	1	183196	565.38	< 2.2e-16	***
`COVID Shutdown`	10113937	10113937	1	183196	1624.50	< 2.2e-16	***
hour	169123435	7353193	23	183196	1181.07	< 2.2e-16	***
`School Day`: `Student at home learning`	666226	666226	1	183196	107.01	< 2.2e-16	***
`Staff Day`: `Teacher at home teaching`	3591361	3591361	1	183196	576.85	< 2.2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1							

Figure 8-9. LMEM ANOVA Results for the WCSD “High School” Model

Middle School							
Insufficient Data: OBrien MS							
Insufficient Data: OBrien MS							
Removing 1 school(s) with insufficient/outlying data (6 %)							
Saving 7 x 7 in image							
Type III Analysis of Variance Table with Satterthwaite's method							
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	5716657	5716657	1	243695	2724.85	< 2.2e-16	***
CDD	10025733	10025733	1	243695	4778.78	< 2.2e-16	***
HDD	3275790	3275790	1	243695	1561.41	< 2.2e-16	***
`School Day`	6177639	6177639	1	243695	2944.58	< 2.2e-16	***
Oct25	437048	437048	1	243695	208.32	< 2.2e-16	***
`Student Holiday`	10765175	10765175	1	243695	5131.23	< 2.2e-16	***
`Staff Day`	1548846	1548846	1	243695	738.26	< 2.2e-16	***
`COVID Shutdown`	5000209	5000209	1	243695	2383.35	< 2.2e-16	***
hour	175445857	7628081	23	243695	3635.93	< 2.2e-16	***
`School Day`: `Student at home learning`	2350475	2350475	1	243695	1120.36	< 2.2e-16	***
`Staff Day`: `Teacher at home teaching`	375170	375170	1	243695	178.83	< 2.2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1							

Figure 8-10. LMEM ANOVA Results for the WCSO “Middle School” Model

Other							
Insufficient Data: Reno Community Resource Center							
Insufficient Data: Reno Community Resource Center							
Removing 1 school(s) with insufficient/outlying data (7 %)							
Saving 7 x 7 in image							
Type III Analysis of Variance Table with Satterthwaite's method							
	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
post	203420	203420	1	229907	836.704	< 2.2e-16	***
CDD	4363035	4363035	1	229907	17945.992	< 2.2e-16	***
HDD	17235	17235	1	229907	70.891	< 2.2e-16	***
`Staff Day`	4960378	4960378	1	229907	20402.980	< 2.2e-16	***
Oct25	15959	15959	1	229907	65.644	5.428e-16	***
`Student Holiday`	811596	811596	1	229907	3338.249	< 2.2e-16	***
`COVID Shutdown`	5469	5469	1	229907	22.493	2.110e-06	***
hour	5965017	259349	23	229907	1066.750	< 2.2e-16	***
`School Day`: `Student at home learning`	406047	406047	1	229907	1670.149	< 2.2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1							

Figure 8-11. LMEM ANOVA Results for the WCSO “Other” Model

8.3 Statistical Tests for the Carson School District Generalized Linear Models

For the Carson SD models, *t*-statistics were used to evaluate all variables. A p-value (“Pr(>|t|)”) of 0.05 or less meant that the variable had a significant independent contribution to the model. Equation 3-4 through Equation 3-7 were used to model these sites. The results for this site are in Figure 8-12 through Figure 8-16. All variables were statistically significant at $p < 0.05$ with the exception of individual hours within the hourly adjustment variable; some hours were colinear with other hours, which is expected.


```
Call:
glm(formula = formula(formula), data = x)

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    7.7706     0.6174  12.585 < 2e-16 ***
post1          2.4846     0.2700   9.202 < 2e-16 ***
CDD            6.2070     0.6021  10.308 < 2e-16 ***
HDD            6.9992     0.2728  25.657 < 2e-16 ***
`Elementary Day` 25.4151     0.2716  93.584 < 2e-16 ***
Oct25         -6.6165     0.7041  -9.398 < 2e-16 ***
`COVID Shutdown` -6.0445     0.4151 -14.561 < 2e-16 ***
Summer         6.8654     0.3840  17.877 < 2e-16 ***
hour1          0.9270     0.7770   1.193  0.23288
hour2          0.2265     0.8395   0.270  0.78736
hour3         -0.7914     0.8235  -0.961  0.33658
hour4          2.5273     0.7761   3.256  0.00113 **
hour5         19.5851     0.8183  23.933 < 2e-16 ***
hour6         29.7604     0.7917  37.589 < 2e-16 ***
hour7         23.9515     0.7698  31.115 < 2e-16 ***
hour8         33.5812     0.7889  42.566 < 2e-16 ***
hour9         33.8109     0.7864  42.994 < 2e-16 ***
hour10        33.0695     0.7719  42.842 < 2e-16 ***
hour11        32.9899     0.8041  41.029 < 2e-16 ***
hour12        31.8060     0.8015  39.681 < 2e-16 ***
hour13        30.4799     0.7929  38.443 < 2e-16 ***
hour14        27.6781     0.8060  34.339 < 2e-16 ***
hour15        13.9167     0.7966  17.471 < 2e-16 ***
hour16         2.6719     0.7882   3.390  0.00070 ***
hour17         0.3384     0.8007   0.423  0.67255
hour18         0.4617     0.7880   0.586  0.55796
hour19         1.2561     0.7800   1.610  0.10732
hour20         2.1965     0.8107   2.709  0.00674 **
hour21         1.4216     0.8053   1.765  0.07755 .
hour22         0.9770     0.7740   1.262  0.20686
hour23        -0.1321     0.8155  -0.162  0.87136
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 297.0359)

    Null deviance: 14469270  on 21804  degrees of freedom
Residual deviance:  6467661  on 21774  degrees of freedom
(2720 observations deleted due to missingness)
AIC: 186067

Number of Fisher Scoring iterations: 2
```

Figure 8-12. GLM t-statistic Results for Empire Elementary School

```

Call:
glm(formula = formula(formula), data = x)

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    2.54230    0.73623   3.453 0.000555 ***
post1           1.69066    0.33579   5.035 4.82e-07 ***
CDD            22.24791    0.74527  29.852 < 2e-16 ***
HDD            15.41943    0.69561  22.167 < 2e-16 ***
`Elementary Day` 27.82990    0.34018  81.811 < 2e-16 ***
Oct25          -8.44630    0.84675  -9.975 < 2e-16 ***
`COVID Shutdown` -6.61600    0.52024 -12.717 < 2e-16 ***
Summer          8.59015    0.46380  18.521 < 2e-16 ***
hour1           0.65981    0.97367   0.678 0.497997
hour2           0.29856    1.05173   0.284 0.776507
hour3          -0.04409    1.03177  -0.043 0.965917
hour4           1.85382    0.97220   1.907 0.056557 .
hour5           6.36543    1.02495   6.210 5.38e-10 ***
hour6          23.65614    0.99200  23.847 < 2e-16 ***
hour7          27.31834    0.96473  28.317 < 2e-16 ***
hour8          35.28845    0.98853  35.698 < 2e-16 ***
hour9          38.16612    0.98578  38.717 < 2e-16 ***
hour10         38.55952    0.96782  39.842 < 2e-16 ***
hour11         39.09827    1.00832  38.776 < 2e-16 ***
hour12         40.13946    1.00519  39.932 < 2e-16 ***
hour13         38.38542    0.99427  38.606 < 2e-16 ***
hour14         37.28875    1.01081  36.890 < 2e-16 ***
hour15         24.80770    0.99936  24.823 < 2e-16 ***
hour16          5.00783    0.98854   5.066 4.10e-07 ***
hour17         -1.20828    1.00424  -1.203 0.228917
hour18         -0.06625    0.98816  -0.067 0.946550
hour19          0.64701    0.97788   0.662 0.508204
hour20          1.08254    1.01603   1.065 0.286681
hour21          2.69813    1.00929   2.673 0.007517 **
hour22          0.18403    0.96997   0.190 0.849528
hour23         -0.64569    1.02165  -0.632 0.527384
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 467.8194)

Null deviance: 21098223 on 21875 degrees of freedom
Residual deviance: 10219515 on 21845 degrees of freedom
(2720 observations deleted due to missingness)
AIC: 196610

Number of Fisher Scoring iterations: 2

```

Figure 8-13. GLM t-statistic Results for Fritsch Elementary School

```

Call:
glm(formula = formula(formula), data = x)

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   -6.1776     0.8720  -7.084 1.44e-12 ***
post1          1.7166     0.3752   4.576 4.78e-06 ***
CDD            7.5622     1.0975   6.890 5.71e-12 ***
HDD           11.2869     0.3479  32.439 < 2e-16 ***
`Elementary Day` 34.5234     0.3759  91.847 < 2e-16 ***
Oct25         -11.1416     0.9322 -11.951 < 2e-16 ***
`COVID Shutdown` -5.3832     0.5734  -9.388 < 2e-16 ***
Summer         8.1453     0.5303  15.361 < 2e-16 ***
hour1          1.0896     1.0763   1.012 0.31141
hour2         -0.3746     1.1632  -0.322 0.74744
hour3         -1.9007     1.1411  -1.666 0.09579 .
hour4          0.5238     1.0755   0.487 0.62622
hour5         13.8821     1.1340  12.241 < 2e-16 ***
hour6         50.2831     1.0957  45.893 < 2e-16 ***
hour7         44.0347     1.0650  41.345 < 2e-16 ***
hour8         47.9280     1.0923  43.878 < 2e-16 ***
hour9         47.9295     1.0883  44.039 < 2e-16 ***
hour10        48.3970     1.0670  45.359 < 2e-16 ***
hour11        48.8389     1.1113  43.949 < 2e-16 ***
hour12        48.3539     1.1081  43.639 < 2e-16 ***
hour13        45.9686     1.0965  41.921 < 2e-16 ***
hour14        44.8246     1.1148  40.208 < 2e-16 ***
hour15        34.3766     1.1021  31.193 < 2e-16 ***
hour16        16.8212     1.0911  15.417 < 2e-16 ***
hour17         7.8225     1.1078   7.061 1.70e-12 ***
hour18         6.5689     1.0892   6.031 1.65e-09 ***
hour19         5.9950     1.0789   5.557 2.78e-08 ***
hour20         5.1312     1.1227   4.570 4.90e-06 ***
hour21         5.1316     1.1151   4.602 4.21e-06 ***
hour22         3.3227     1.0720   3.099 0.00194 **
hour23        -0.2897     1.1298  -0.256 0.79762
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 567.0572)

    Null deviance: 28512500  on 21755  degrees of freedom
Residual deviance: 12319318  on 21725  degrees of freedom
(2715 observations deleted due to missingness)
AIC: 199717

Number of Fisher Scoring iterations: 2

```

Figure 8-14. GLM t-statistic Results for Mark Twain Elementary School

```

Call:
glm(formula = formula(formula), data = x)

Coefficients:
(Intercept)      1.58677      0.11528     13.764 < 2e-16 ***
post1           -0.24655      0.05162     -4.776 1.8e-06 ***
CDD              6.92593      0.15051     46.017 < 2e-16 ***
HDD              6.44892      0.06750     95.538 < 2e-16 ***
`High Day`       3.39586      0.04995     67.987 < 2e-16 ***
Oct25            -0.42742      0.12911     -3.310 0.000933 ***
`COVID Shutdown` -1.14952      0.08003    -14.364 < 2e-16 ***
Summer           2.15323      0.07083     30.398 < 2e-16 ***
hour1             0.13782      0.14895      0.925 0.354825
hour2             0.12610      0.16090      0.784 0.433192
hour3             0.11913      0.15783      0.755 0.450378
hour4             0.31394      0.14871      2.111 0.034778 *
hour5             2.35501      0.15683     15.016 < 2e-16 ***
hour6             4.19763      0.15169     27.673 < 2e-16 ***
hour7             4.85358      0.14752     32.901 < 2e-16 ***
hour8             6.79019      0.15119     44.913 < 2e-16 ***
hour9             6.69163      0.15070     44.405 < 2e-16 ***
hour10            6.41578      0.14785     43.394 < 2e-16 ***
hour11            6.28689      0.15402     40.817 < 2e-16 ***
hour12            6.13512      0.15358     39.949 < 2e-16 ***
hour13            6.16759      0.15199     40.578 < 2e-16 ***
hour14            6.18846      0.15457     40.036 < 2e-16 ***
hour15            5.42276      0.15280     35.489 < 2e-16 ***
hour16            4.11811      0.15113     27.248 < 2e-16 ***
hour17            0.13699      0.15342      0.893 0.371933
hour18            0.12939      0.15091      0.857 0.391224
hour19            0.42619      0.14933      2.854 0.004322 **
hour20            0.40977      0.15524      2.640 0.008306 **
hour21            0.26505      0.15427      1.718 0.085788 .
hour22            0.33906      0.14830      2.286 0.022248 *
hour23            0.23156      0.15624      1.482 0.138338
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 10.93765)

Null deviance: 591027  on 21869  degrees of freedom
Residual deviance: 238867  on 21839  degrees of freedom
(2719 observations deleted due to missingness)
AIC: 114415

Number of Fisher Scoring iterations: 2

```

Figure 8-15. GLM t-statistic Results for Gleeson Training Facility

```
Call:
glm(formula = formula(formula), data = x)

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    15.9784     0.4060  39.358 < 2e-16 ***
post1          -7.9961     0.1742 -45.890 < 2e-16 ***
CDD            -8.6150     0.5113 -16.848 < 2e-16 ***
HDD            21.5490     0.1615 133.398 < 2e-16 ***
`High Day`     -2.6883     0.1678 -16.020 < 2e-16 ***
Oct25          -3.1309     0.4332  -7.227 5.11e-13 ***
`COVID Shutdown` -4.4562     0.2682 -16.615 < 2e-16 ***
Summer         -7.2891     0.2467 -29.549 < 2e-16 ***
hour1          -1.4120     0.5003  -2.823 0.004769 **
hour2          -1.1297     0.5404  -2.090 0.036590 *
hour3          -1.2071     0.5302  -2.277 0.022823 *
hour4          -3.0830     0.4999  -6.167 7.06e-10 ***
hour5          -0.4813     0.5270  -0.913 0.361075
hour6          -2.3373     0.5099  -4.583 4.60e-06 ***
hour7          -3.6846     0.4957  -7.434 1.10e-13 ***
hour8          -0.7955     0.5079  -1.566 0.117284
hour9           1.9931     0.5062   3.937 8.27e-05 ***
hour10         4.7684     0.4967   9.600 < 2e-16 ***
hour11         7.4674     0.5173  14.435 < 2e-16 ***
hour12         8.6023     0.5158  16.678 < 2e-16 ***
hour13         9.7029     0.5104  19.010 < 2e-16 ***
hour14        10.1664     0.5190  19.588 < 2e-16 ***
hour15         9.1044     0.5131  17.745 < 2e-16 ***
hour16         9.5178     0.5076  18.751 < 2e-16 ***
hour17         8.9647     0.5154  17.395 < 2e-16 ***
hour18         9.3006     0.5070  18.345 < 2e-16 ***
hour19         7.1054     0.5018  14.160 < 2e-16 ***
hour20         5.7658     0.5216  11.054 < 2e-16 ***
hour21         4.0964     0.5183   7.904 2.83e-15 ***
hour22         1.8799     0.4983   3.773 0.000162 ***
hour23         2.4376     0.5249   4.644 3.44e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 123.4978)

    Null deviance: 7843146  on 21876  degrees of freedom
Residual deviance: 2697934  on 21846  degrees of freedom
(2720 observations deleted due to missingness)
AIC: 167482

Number of Fisher Scoring iterations: 2
```

Figure 8-16. GLM t-statistic Results for the Transportation Facility

9 APPENDIX D: “MEASUREMENT AND VERIFICATION REPORT CONTINUOUS ENERGY IMPROVEMENT (CEI)” PREPARED BY THE IMPLEMENTER FOR CLARK COUNTY SCHOOL DISTRICT

The following report, which was created by the 2025 ESS Program’s implementation contractor, was prepared for Clark County School District (**38** pages including the title page).

WHEN TRUST MATTERS

DNV

MEASUREMENT AND VERIFICATION REPORT CONTINUOUS ENERGY IMPROVEMENT

ENERGY SMART SCHOOLS PROGRAM

PREPARED FOR



SPONSORED BY





Contents

1 INTRODUCTION..... 3

2 CEI SCOPE OF WORK..... 3

3 ENGAGEMENT AND ENERGY SAVING ACTIONS..... 3

4 BASELINE MODEL AND MEASURED SAVINGS 4

5 CEI PROJECTS 7

6 CONCLUSION 8

7 APPENDIX A: 2024 OPPORTUNITY REGISTER 9



1 INTRODUCTION

In 2018, NV Energy's Energy Smart Schools program partnered with the Clark County School District (CCSD) to launch a Continuous Energy Improvement (CEI) initiative. The program demonstrated significant energy savings through low-cost/no-cost operational improvements, leveraging best practices from their past experiences. Following the successful pilot, NV Energy approved continued CEI at no cost to CCSD to sustain energy savings and complement the district's energy management systems.

In 2025, DNV became the new implementer for Energy Smart Schools. DNV updated its support plan for CCSD to focus on reducing energy consumption through collaborative strategies. The team held regular meetings with CCSD's maintenance and construction management team to reinforce low-cost/no-cost measures and ensure consistent maintenance practices. At the start of the year, the team regularly engaged with the executive team to review upcoming capital improvements, new construction projects, and recurring maintenance practices to ensure consistent energy savings year over year. This group included Tom Nizetich, Joshua Chesnik, Kenneth Ballard, Stephen Molina, and Brandon McLaughlin. By mid-year we pivoted to regular engagement with Doug Díaz, the Director of Facilities Optimization, and Tela Rivera, Construction Project Manager, while still having quarterly meetings with the executive team to keep them abreast of the energy-saving initiatives.

2 CEI SCOPE OF WORK

The CEI program emphasizes operational and behavioral improvements to achieve energy savings. The Energy Smart Schools team engaged district personnel to implement these changes to their custodial and facilities management teams, identify low-cost/no-cost opportunities, and recommend process efficiencies. Technical assistance from DNV helps offset staffing limitations within school facilities teams.

In 2025, all partners collaborated to build on prior successes, focusing on energy use reduction through capital improvement projects, low-cost/no-cost strategies, and behavioral changes. The program team guided behavioral practices, suggested equipment upgrades, and supplemental support.

3 ENGAGEMENT AND ENERGY SAVING ACTIONS

DNV built a good relationship with the CCSD team during regular meetings to discuss opportunities for strategic energy management, as well as upcoming capital improvement projects, and the best practices for future energy-saving. The meetings included Chris Walden, Energy Engineer, who provided expertise on capital improvement projects; John Greco, Western District Director of Engineering, who offered strategic energy-management and building-management recommendations and reinforced capital-improvement project specifications; Crystal Troiano, Program Manager, who provided regular communications highlighting low-cost and no-cost ideas; and Lisa Shelton, NV Energy Major Account Executive, who assisted with questions related to meters and energy supply.

Program team support included:

- Reviewed projects (current and future) for potential incentives
- Ensuring past energy-saving tactics, such as maintenance processes, were still active
- Brainstorming options and strategies to further reduce energy use
- Implementation of energy-saving tactics at specific locations
- Investigating potential energy-saving projects for program incentives



DNV engaged the school district to verify the continuation of the energy-saving strategies and measures implemented in previous years. This verification allowed DNV to use the 2019 baseline to verify energy savings to be in alignment with the previous year's process. The facilities department of the school district worked to implement previous maintenance measures such as coil cleaning, filter replacement, adjusting controls for HVAC and chillers, adjusting setback points, checking that schedules were being followed at the schools, etc. Doug Diaz worked with the facilities personnel to deliver recommended behavioral and engineering modifications for different schools in the district. This collaborative approach delivered substantial benefits for CCSD and strengthened support from the program team.

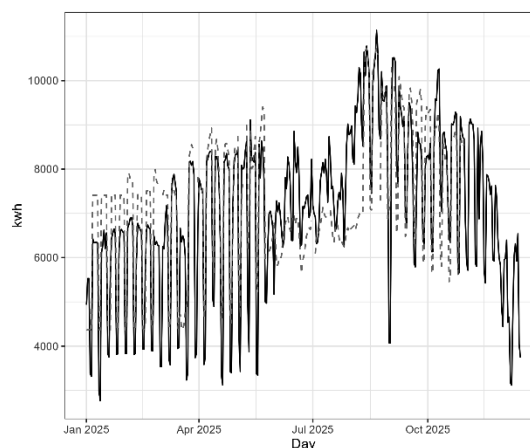
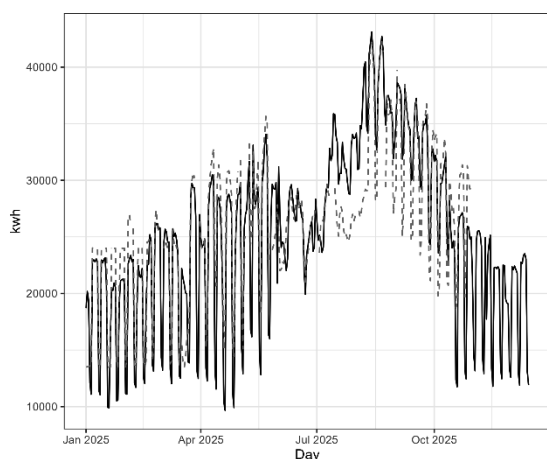
4 BASELINE MODEL AND MEASURED SAVINGS

CEI savings are determined using statistical energy models. These whole-building linear regression models use facility meter data, local weather, and school calendar data to isolate the change in energy usage between the baseline (2019) and reporting (2025) periods. For CCSD, DNV data scientists pooled individual schools into separate models, grouped by cohort (alumni or non-alumni) and school type (elementary, middle, high, or administrative). This is consistent with previous evaluation methods. The designation of alumni signifies the 13 locations that were originally in the CEI program, whereas non-alumni is the remainder of the schools added to the program more recently.

We considered information about new construction and major renovations when determining modeling exclusions, in addition to standard exclusions like outlier usage and missing data.

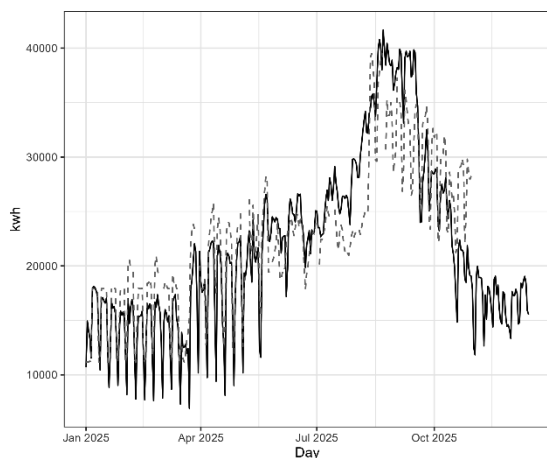
The analysis was initiated with 283 locations in the initial data collection, and then 15 locations were excluded due to inconsistent data or major renovations. A total of 167 Elementary Schools, 37 Middle Schools, 37 High Schools, 27 Other/Administrative Facilities produced the initial CEI savings at 15,839,203 total kWh. From there, we excluded 3,254,064 kWh in previously paid capital improvement projects, adjusting the total savings achieved to 12,585,139.

Shown below are visuals showing the actual consumption (black line) against the predicted baseline (red dashed line) to identify deviations.

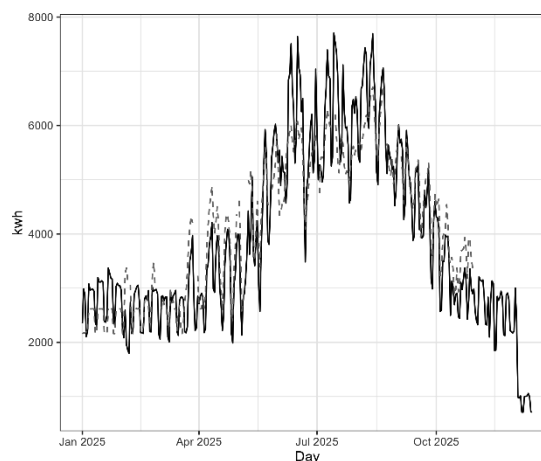




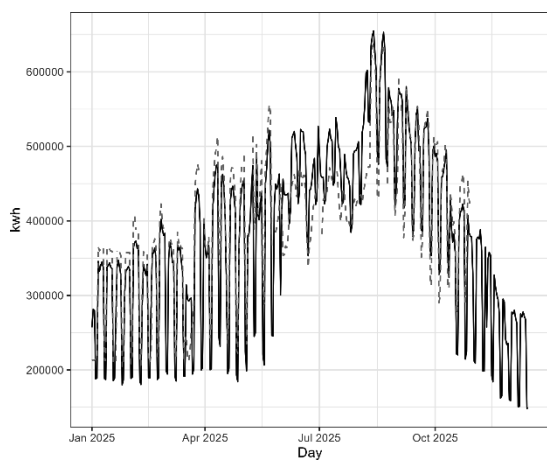
Alumni Elementary School



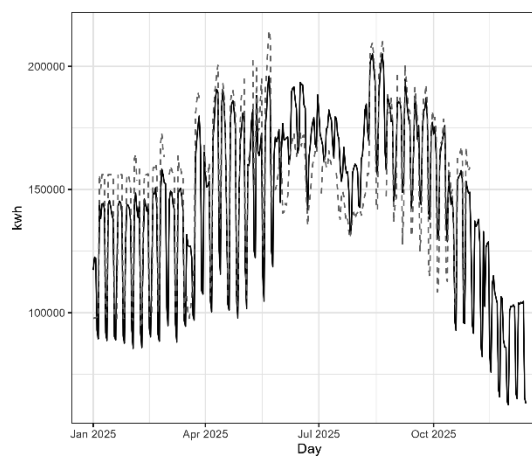
Alumni Middle School



Alumni High School



Alumni Other/Admin Facilities

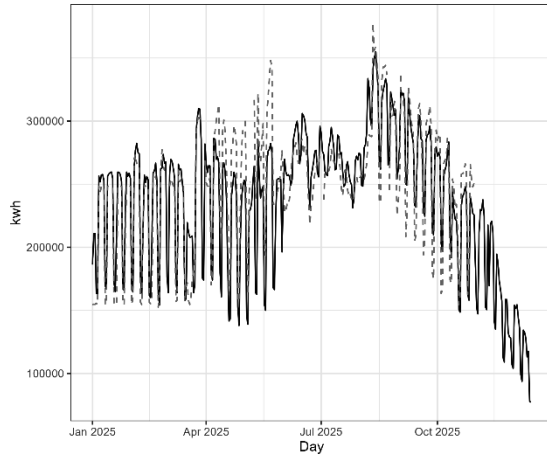


Non-Alumni Elementary School

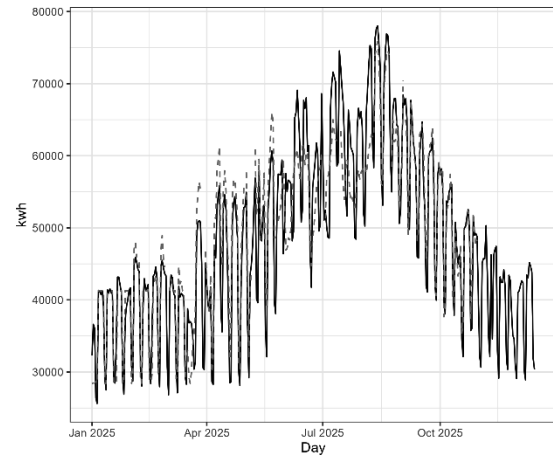


Non-Alumni Middle School





Non-Alumni High School



Non-Alumni Other/Admin Facilities



5 CEI PROJECTS

As part of the CEI engagement, it was crucial to verify that the previously initiated tactics were still in effect and contributing to the overall energy savings in the school district. The list developed by the previous implementation was utilized to ensure that all measures were still in effect and that the overall themes of those measures were still being implemented. These measures can be seen below:

- BAS/EMS settings improved, malfunctions addressed for bas/ems
- Improved operator use of BAS/EMS
- District-wide adjustments made to HVAC and lighting schedules
- Summer scheduling strategies
- Filter replacement for 367 filters
- Coil cleaning at 128 locations
- Maintaining proper water treatment at 300 locations
- Window film installed
- EMS morning operations watch at 4 am
- Limited HVAC operation on weekends and unoccupied periods to avoid overheating
- Standardized setback approach across all sites, higher in summer, lower in winter during unoccupied hours

In regular conversations with CCSD, it was expressed that they were working to maintain the measures that had been previously implemented in all locations, as well as reviewing the 2024 opportunity register delivered by the program in early 2025 ([Appendix A: 2024 Opportunity Register](#)). This list will continue to drive conversations and ensure that previously successful measures are extended to drive savings in future years.



6 CONCLUSION

2025 was a successful year for the Clark County School District in terms of energy management and savings. Through the collaborative efforts of the school district and the Energy Smart Schools Program, the district achieved a total energy savings of 15,839,203 kWh compared to the 2019 baseline. This accomplishment reflects not only the effectiveness of strategic energy management practices but also the strong partnerships and ongoing engagement among all stakeholders.

The district's commitment to maintaining and enhancing energy-saving measures, supported by regular communication, technical expertise, and data-driven decision-making, has resulted in measurable improvements across elementary, middle, high school, and administrative sites. The use of advanced monitoring tools, timely interventions, and continuous feedback loops ensured that operational and behavioral changes translated into sustained savings.

CCSD's engagement with the Energy Smart Schools Program demonstrates a dedication to long-term sustainability and operational excellence. The relationships built throughout the year have strengthened the district's capacity to identify opportunities, address challenges proactively, and support ongoing improvements. These efforts not only reduced energy consumption and costs but also positioned CCSD as a leader in energy stewardship within Nevada's educational community.

7 APPENDIX A: 2024 OPPORTUNITY REGISTER

#	Opportunity Area	School	Equipment#	Recommended Project	Type	Apply	Existing condition	Project Details
1	HVAC	All	All units	Schedule off on holidays	BMS	All	Found no holiday schedule in place @ Faiss MS. Unable to review other schools schedule. (Verified with Tim A 6/19)	Units should be set to unoccupied on holidays to reduce energy use. This may have to be entered every year for specific days. Recommend do so when school schedule comes out.
2	HVAC	All	OAT sensor	Replace sensor	Onsite	All	See sheet 'tracker for opps - all schools for per school findings.	Check against calibrated handheld. If not within 2F, calibrate/replace sensor. Ensure OAT sensor is in a shady spot on north side of building so not influenced by sun. If more than one sensor recommend replacing with one weather station and tying all equipment to it to reduce maintenance requirements. This is probably the most important sensor as it is used for control of various systems. Add sensor checks to regular PMs especially this one.
3	Chiller plant	Cortez ES	Cooling Plant	Add CHWST reset	BMS	N/A	Says future chilled water reset, so assuming setpoint is fixed now at 45F.	Add chilled water temperature reset to reduce wasting cooling energy during periods of low load. Also recommend showing setpoint and control variable (OAT?) on BMS graphics so able to compare actual to setpoint to identify times when the system might not be able to keep up.
4	Chiller plant	Cortez ES	Chiller 1	Fix equipment	OnSite	Site	Chiller 1 is in alarm and on but enable is set to off.	Looks like this is overridden to on. May be on 24/7, check trends. Correct issue so chiller comes on only when a call for cooling. The cooling tower and tower pumps however are off. How is the chiller dissipating heat to the outside if the CT are off while the chiller is on?
5	HVAC	Cortez ES	MZU: 1, 2, 5	Fix CW valve	BMS	Site	Cold deck temp is way lower than setpoint and chilled water valve is 100% open.	Valve may be stuck at 100% open or leaking, investigate & repair: Look at trends to see if always overshoots or if always at 100% open. May need to verify temp at unit.
6	HVAC	Cortez ES	All MZ units	Economizers: Check setpoint, ensure functional.	BMS	Site	Economizer issues identified based on damper position and temperatures. e.g. for MZU-1: OA is open 78% and RAD is also open. Based on RAT (70.1F) and MAT (72.1F), and actual OAT of ~69F suspect OAD is mostly shut not at 78% open.	What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Also verify at unit that: if unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as

								besides humidity sensors they are the most common failure.
7	HVAC	Cortez ES	MZU-2, 3, 4, 5, 6	OA flow station and/or damper repair	BMS	Site	OA damper position and flow station cfm do not jive.	Check OA damper position, and verify flow using calibrated handheld if doesn't match BMS, replace flow station or damper actuator as needed.
8	Boiler plant	Cortez ES	Boiler	Reduce boiler enable setpoint	BMS	Site	Hot deck temp (72.7F) is way lower than setpoint (119.9F), and very close to MAT (72.1F) but HW valve is 75% open. Boiler & pumps are off, water temp is ~79F. Boiler enable setpoint is 95F which is high. However with the inaccurate OAT sensor the boiler plant may be being kept off when it should be enabled.	How is boiler enabled? Should it be on? Fix OAT sensor (described elsewhere) and decrease the boiler enable setpoint so the boiler plant doesn't come on when warm outside (adjust lower to perhaps 65F).
9	HVAC	Cortez ES	EF-5	Schedule off when not needed	BMS	Site	On the central plant sheet it shows EF-5 as on, its 7am.	Does EF-5 need to be on, what does it serve? Could it be scheduled on as needed?
10	HVAC	Cortez ES	All MZ units	Schedule off when not needed	BMS	Site	Unoccupied setpoints are 42F heating, 120F cooling. If this represents space setpoints and the unit goes into unoccupied mode, this is too wide to trigger the unit on most all of the year. This could lead to a huge delta T to overcome in the space when switching into occupied mode and having to start the unit up early.	What is the occupied schedule? Does this align with the space use schedule? Could equipment on time be further reduced? Adjust unoccupied setpoints to =occupied setpoint +/-10F and tighten time-based schedule to match space use schedule. Trial and error to balance unoccupied setpoints with the time schedule to minimize time on. Reviewing trends of supply fan status, cold and hot deck temperatures vs setpoints on extreme temperature days could help determine if equipment is started too early or comes on too often during the unoccupied periods.
11	HVAC	Faiss MS	All MZ units	Economizers: Check setpoint, ensure functional.	Onsite	Site	OA damper position was at minimum on all MZUs because it was hot outside (100F). It is not clear what the economizer setpoint is and if economizers are working.	What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Also verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMIsas besides humidity sensors they are the most common failure.
12	HVAC	Faiss MS	MZU 11 zone 5, 6, 7, 8	Fix equipment	Onsite	Site	In Alarm, based on temperatures, looks like the hot air damper might be broken.	Investigate, repair, and release alarm.

DNV

13	HVAC	Faiss MS	Central plant	Fix equipment	Onsite	Site	Both boilers, HW LO temp, and chiller 2 are in alarm	Investigate, repair, and release alarm.
14	HVAC	Faiss MS	Outdoor relative humidity sensor	Fix sensor	Onsite	Site	RH sensor reading 100% on 6/6/2019 when the actual RH is much lower.	Is RH controlling anything? I'd suspect the only thing its used for could be economizer control. If it is used for something, repair or replace sensor.
15	Boiler plant	Faiss MS	Boiler plant	Turn off pumps when not needed	BMS	Site	Boiler pumps SHWP1 & SHWP2 are on, boilers are off, and it is 100F outside.	Do the boiler pumps need to be running all the time? If not, program to turn these off when the boilers are off.
16	HVAC	Faiss MS	All MZ units	Schedule off when not needed	BMS	Site	Night setback setpoint is 55F. I assume this is the heating setpoint, not sure what unoccupied cooling setpoint is and how set.	Show night heating and cooling setpoints in BMS. Verify unoccupied setpoints are =occupied setpoint +/-10F and tighten time-based schedule to match space use schedule. Trial and error to balance unoccupied setpoints with the time schedule to minimize time on.
17	HVAC	All	All units	Occupied temperature setpoint adjustment	BMS	All	Across schools low and high occupied setpoints vary (tstat slider): 72F/74F global Faiss, 71F/74F global Goolsby, 70F/73F global Heweston, 73F/76F zone McMillan, 75F/75F global Bartlett, 75F/75F global Bracken, 71F zone (only 1 SP shown) Chappel Theater add , 70F/73F global Diaz, 72F/73F zone Carl, 72/73F global Reedon, 71F/73F global Dooley 0-2F deadband, 68F or 73F zone Foothill (for single zone AHUs), 71F/75F zone Foothill (for MZUs). Global setpoints (if enabled) override the zone setpoints as the allowed range for the slider in the thermostat. offsets/differentials between the heating and cooling setpoint vary across schools in how programmed and if shown on graphic.	Recommend standardize slider range across all schools to minimize occupant adjustment (2F max differential) (72F/74F) using the global setpoints, and standardize the offset to 4F (i.e. the deadband between heating and cooling setpoints) for all schools except for Cortez ES. For the schools with tighter slider control (Bracken, Bartlett, Chappel Theater add(?), Carl) recommend reduce to around the same temp ~73F and leave differential as is to minimize energy use increase.
18	HVAC	Goolsby ES	All MZ units	Economizers: Verify min OA & add to BMS, check setpoint, ensure functional.	BMS	Site	Goolsby OA damper = yes. Carl ES OA damper=enabled. It is not clear what this represents and if economizers exist and are functioning correctly.	Goolsby: What does yes mean? Economizer enabled? If so, recommend rename this economizer enabled. Also recommend update BMS screens to: add OAD % open and show OA damper min % setpoint so you can verify the position is as expected. What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Are there economizers on these units? If so recommend verify at unit that: If unit is on: OA damper is at minimum

									when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.
19	HVAC	Goolsby ES	Boiler plant & Exhaust fan	Fix equipment	OnSite	Site	Boiler 1 & EF-7 is in alarm		Investigate, repair, and release alarm.
20	HVAC	Goolsby ES	FCU2 Storage and restrooms & MZU zone 3	Adjust zone temperature setpoint	BMS	Site	FCU2: Zone temp was 71.9F and calling for 100% heating. Zone temp setpoint is 72H/75C. MZU6 Zn3: always at 100% cooling and zone temp setpoint is 72.5F. Do these serve the same areas?	If these serve the same areas recommend use FCU as back-up so make the zone temperature setpoints wider than the MZU Zn3 setpoint range (71-74F adjustable at tstat). So FCU zone setpoints should be more like 68H/77C (+/-3F of MZU Zn3 range) so ensure systems are not fighting each other or causing to overshoot.	
21	HVAC	Hewetson ES	All units	Economizers: Verify min OA, check setpoint, ensure functional.	Onsite	Site	In general, during occupied hours Min OA damper should never be overridden to 0% as ventilation air is required to all occupied spaces. Investigate, repair, and release override. AHU-1 looks to be overridden to 0%, not sure what the issue on AHU-4 is.	Check AHU-1 & AHU-4: to verify that these dampers are the main source of ventilation air for the space. If so, investigate why set to 0% for AHU-4 and why overridden for AHU-1. Determine what min OA is required, repair and release override. If another source of ventilation air exists and is expected to be used for these units, add note to BMS screen indicating that 0% is as expected because not main source of ventilation air. All units: What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Also verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.	
22	Chiller plant	Hewetson ES	Central plant	Cooling plant enablement		Site	Says Chiller is off, but the CHWST is 42.9F and return is 52.2F (cooling 10F). This is not possible unless the	Check trends of chiller status point and temperatures. Replace, repair sensor as needed.	

									plant is on. Did it just turn off? Investigate.			
23	HVAC	Hewlett son ES	Exhaust fans	Fix equipment	Onsite	Site			Investigate, repair, and release alarm.			
24	HVAC	Hewlett son ES	All units	Investigate night setbacks		Site			What is the unoccupied space temperature setpoints? All units appear to have two sets of night setback setpoints, one based on space temperature (night setback cooling and heating setpoints) and one based on return temperature (night setback cool and heating return). What setpoints are used for control?	If goes into unoccupied mode, adjust space setpoints to =occupied setback +/- 10F and tighten time-based schedule to match space use schedule. Trial and error to balance unoccupied occ setpoints with the time schedule to minimize time on.		
25	HVAC	Hewlett son ES	AHU-1	Fix sensor	Onsite	Site			CHWST varies by unit, is there a separate sensor at each valve? AHU-1 says 32.9F, this is almost freezing, seems wrong as the setpoint is around 42F.	Recommend link to a single global sensor to reduce required maintenance, like the HWST appears to be.		
26	HVAC	Hewlett son ES	All equipment	Verify equipment turns off during unoccupied hours	BMS	Site			Occupancy schedule is 3am to 1pm Monday through Friday.	Verify all equipment is off outside of these hours by: reviewing trends, going to each unit or reviewing summary screen outside of these hours. Review central plant equipment, AHUs, and exhaust fans. Add equipment to schedule as needed.		
27	Chiller plant	McMill an ES	Cooling Plant	Verify cooling plant turns on when needed		Site			CHW valves all at 100% open but cooling plant appears to be off (delta between supply and return is ~0) so cold deck supply setpoints are not being met. Graphic page says CHW plant info may be unreliable.	Is cooling plant off? Should it be? Investigate and correct as needed.		
28	HVAC	McMill an ES	All MZ units	Economizers: Verify min OA & add to BMS, check setpoint, ensure functional.	Onsite	Site			OAT=92.9F so OAD should be at minimum for all but OA damper positions vary. MZU-7 min OA is 50% but it is at 100%.	Check MZU-7 specifically and others: What is economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Also verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.		

29	HVAC	McMillan ES	All MZ units	Fan speeds		Site	All supply fans at 100% speed.	Are fan speeds supposed to vary? i.e. is there VFDs and do these units serve terminal boxes with dampers? Investigate if supply fan speeds ever vary by looking at trends, compare to design. If supposed to vary, investigate duct static pressure setpoint and possibility of lowering. If not, remove % speed from BMS graphics as this is misleading.
30	Chiller plant	McMillan ES	Cooling Plant	Remove override on CW Pump CWP-1 & Chiller system.		Site	CWP-1 VFD is overridden and operating in hand at 42% speed and chiller system is overridden to enable. At 1:42pm on 6/19/19 all MZUs were off but chiller, CWP and CHWPs were on.	Investigate, repair, and release override so entire cooling plant turns off when there is no call for cooling.
31	Chiller plant	McMillan ES	Cooling Plant	Reduce pumping		Site	CHW-DP setpoint is 150 psi and actual DP is 1.4psi with CHWP-2 operating at 60Hz.	What is design DP setpoint? Review design docs to find, and revise setpoint to this. Then verify CHW pump speed varies as needed to meet setpoint.
32	HVAC	McMillan ES	All units	Schedule off when not needed	BMS	Site	MZUs occupied schedule is 4am-4pm, custodial from 4pm to 11pm (except for MZU-9 which has custodial until 9pm. RTUs occ schedule is 4am to 11pm M-F.	Typical setpoints are more like 1-15psi. Given discrepancy, suspect there is opportunity to tighten schedule. Review space use schedule and compare to HVAC equipment schedule to minimize on time of each HVAC unit.
33	Boiler plant	Cortez ES	Boiler	Fix equipment	Onsite	Site	BLR-1 is in alarm	Investigate, repair as needed and reset alarm.
34	HVAC	Goolsby ES	FCU 4 Chiller room	Investigate zone conditions & HVAC unit, adjust setpoint		Site	FCU 4 temperature setpoints are 68H/71C and the CHW is always at 100% open, but the actual zone temperature doesn't get below 80F.	Investigate why the zone temperature doesn't get below 80F. Is the tstat a bad location? Is 80F accurate for the space temperature? Is the CHWV working? If the zone is expected to always be above 80F increase setpoint to reduce the time the FCU is cooling.
35	HVAC	Bracken ES	All AHUs	Adjust global economizer setpoint	BMS	Site	Global econo SP is 65F.	It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively.
36	HVAC	Bracken ES	AHU 3-1, AHU 4-7	Adjust Min MA damper SP	BMS	Site	Economizer min damper position setpoint seems inappropriate: 1. AHU 3-1 is 100% min. Is 100% OA required for this unit? 2. AHU 4-7 is 0% min. Is no OA required for this unit?	Verify what min OA is required (check design drawings/space use) and adjust min damper position setpoint. CR can help with determining appropriate setpoint if given square footage, and # of people occupying space per AHU space. Then verify at unit that: if unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs



37	HVAC	Bracke n ES	AHU 4-12, AHU 2-1, AHU 4-8, AHU 4-9, AHU 8-2, AHU 8-6	Fix economizer operation	Onsite	Site	OAT is 93.4F so all MA dampers (i.e. economizer dampers) should be at min position. The following were found at different positions as noted: AHU 4-12: MA damper was 100% open AHU 2-1, AHU 4-8, AHU 4-9, AHU 8-2, AHU 8-6: MA damper was 0% open, but MA damper min SP is >0.	as besides humidity sensors they are the most common failure. Verify at unit that: if unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when setpoint and is closed when off. Stroke dampers as needed to verify functionality.
38	HVAC	Bracke n ES	All	Schedule off when not needed	BMS	Site	All HVAC equipment was set to occupied and found on Sunday 6/30/2019 except Ahu 8-2. Couldn't review schedule - got error when try to view schedule by clicking on blue or black text on screen.	What is the occupied schedule? Does this align with the space use schedule? Could equipment on time be further reduced? Adjust unoccupied setpoints to =occupied setpoint +/-10F and tighten time based schedule to match space use schedule. Trial and error to balance unoccupied setpoints with the time schedule to minimize time on. Reviewing trends of supply fan status, cold and hot deck temperatures vs setpoints on extreme temperature days could help determine if equipment is started too early or comes on too often during the unoccupied periods. Investigate, repair as needed and reset alarm.
39	HVAC	Bracke n ES	AHU 4-6 SF, EF 4-3, EF 1-6, EF 4-4, EF 3-7; FCU 7-1, FCU 7-2;	Fix equipment	Onsite	Site	All this equipment was found in alarm. AHU 4-6 SF in alarm, enable=fan on, fan proof=fan off; EF 4-3, EF 1-6, EF 4-4, EF 3-7; FCU 7-1 & FCU 7-2: fan and night SB alarms;	
40	HVAC	Bracke n ES	Cooling Plant	Fix equipment	Onsite	Site	Chilled water in alarm. CHW SP is reset between 42F and 57F. Found SP at 42F but actual supply temperature of 47.8F.	Investigate what chilled water alarm means and correct. Also investigate what CHW SP is based on and verify that it is not always stuck at the minimum of 42F.
41	HVAC	Bracke n ES	All AHUs & RTUs	Adjust zone temperature setpoint	BMS	Site	Zone temp setpoints vary. Found 73H/75C, 74H/75C, 71H/75C, 71H/73C.	Standardize across all AHU & widen zone temperature setpoints to at least 4F delta in the occupied period. Recommend reduce heating setpoint to 68F as heating to 73F seems extreme and use cooling setpoint of 75F.
42	HVAC	Bracke n ES	AHU 4-1	Fix CW valve	Onsite	Site	AHU 4-1 CHW valve position is 0% and HW valve position is 100%, yet the DAT is 60F, when the MAT is 81F (i.e. DAT is less than MAT even though CHW valve says closed). As a result, the boiler plant is on even though its 93.4F outside.	It appears that the CHWV is leaking by. Investigate and repair valve. Then verify no call for heating and that boiler plant (including pumps) are not turning on at high OATs.
43	HVAC	Bracke n ES	Boiler	Reduce boiler enable setpoint	BMS	Site	Boiler pumps and boiler is on but it is 93.4F outside. Boiler enable setpoint is 95F.	Decrease the boiler enable setpoint so the boiler plant doesn't come on when warm outside (adjust lower to perhaps 65F).

44	HVAC	Bracken ES	AHU 4-6	Fix controls	BMS	Site	AHU 4-6 SF is in alarm, fan enable=fan on, fan proof=fan off, and CHW and HW valves are open 100%.	Investigate. When SF is in alarm or fan proof=off, CHW and HW valves both should go to 0% not 100%. Review and update controls.
45	HVAC	Bracken ES	FCU 3-3 & FCU 3-4	Reduce heating setpoint	BMS	Site	Heating setpoint is 75F, cooling setpoint is 76F. Delta T between H/C is only 1F.	Delta T should be at least 4F to minimize simultaneous heating and cooling. Heating setpoint seems really high. What is the minimum setpoint required by this space? Recommend reduce heating setpoint to 68F.
46	HVAC	Bracken ES	MZU 3-1	Fix valves	Onsite	Site	CHW valve @ 0% open but cold deck temperature (50.5F) is ~22F less than MAT (72F). Also the HW valve is at 100% but hot deck temperature (72F) is the same as the mixed air temperature (72F), even though the HW loop temperature is 76F.	It appears that the CHW valve is leaking by. Investigate and repair valve. Also it appears that the HW valve may be stuck closed. Investigate and repair valve.
47	HVAC	Bracken ES	All MZUs	CD reset	BMS	Site	CD reset: For MZU 5-5: CD damper max SP is 95% and max cold deck SP is 75F and min is 55F. Zone damper positions are 50% though and current cold deck temp SP is 75F. For MZU 6-2: CD damper max SP is 75% and max cold deck SP is 65F and min is 50F. Zone damper positions are 50% though and current cold deck temp SP is 65F.	Shouldn't the CD SP vary linearly between the min & the max when the zone damper is less than the damper max SP? What is min zone damper position required for min CD temperature? Verify in controls programming and/or trends that when max zone damper position is 95% or more that the CD temp SP is = min cold deck SP; when max zone damper is at min , CD temp SP is = max cold deck SP; and when it is in between the SP is in between.
48	HVAC	Karl ES	MZU 3	Fix CW valve	Onsite	Site	CHW valve @ 0% open but cold deck temperature (69F) is ~10F less than MAT (79F).	It appears that the CHW valve may be leaking by. Investigate and repair valve.
49	HVAC	Karl ES	All MZU	CD reset	BMS improvement	Site	The cold deck SP changes so I assume it is being reset but there is no way to tell if the SP is appropriate or not because the independent variable isn't indicated.	Check in programming how the CD SP is reset and add all appropriate info to the BMS screens so an operator could verify the resets are working correctly.
50	HVAC	Karl ES	MZU 5 Zone 15 Conference 13	Adjust zone temperature setpoint	BMS	Site	Zone temp setpoint is 78F. All other zones served by MZU 5 are within the global temperature setpoints 72/73F (global setpoints are shown as enabled).	Verify that this zone's temperature setpoint is limited by the global setpoints. If not, change programming to limit it.
51	HVAC	Karl ES	Boiler	Outside air temperature lockout	BMS	Site	Boiler pumps and boiler is on but it is 82.2F outside. The Boiler System Call is on, and there is a red dot next to it, OSA HWS Enabled=OFF, OSA heat on SP is 95F, OSA heat off SP is 100F.	Does the red dot indicate an override? If so, remove override. Enable the OSA lockout feature. Decrease the OSA heat off setpoint so the boiler plant doesn't come on when warm outside (adjust lower to perhaps 65F). Also determine what the OSA heat on setpoint is and adjust so the boiler plant only comes on when colder outside.

52		HVAC	Karl ES	Cooling Plant	Outside air temperature lockout	BMS	Site	CHWS OSA On SP is 60F (under Chiller heading) and CHWS OAT On SP is 52F (under CHW System Enable heading). Also CHWS OA Off SP is 55F (under Chiller heading) and CHWS OAT Off SP is 50F (under CHW System Enable). So between 52 and 55F OAT just the plant equipment operates to circulate water. Once the OAT gets above 60F the chiller comes on and once the OAT drops below 55F the chiller turns off, once it drops below 50F the plant turns off.	These points are similarly named so it is not clear which are associated with the chiller and which are associated with the plant. I recommend changing the chiller point names to include the word chiller to make this more obvious.
53		HVAC	Karl ES	Cooling Plant	Chilled water setpoint	BMS	Site	Current CHWS SP is 54F but CHWS Temp is 43.9F and CHWR Temp is 46.9F.	Why is the chiller supply water temperature 10F less than the setpoint? Investigate. As is you are circulating much colder water than what is called for.
54		HVAC	Karl ES	EF-4	Fix equipment	OnSite	Site	EF-4 is in alarm	Investigate, repair as needed and reset alarm.
55		HVAC	Karl ES	All	Schedule off when not needed	BMS	Site	All HVAC equipment was set to occupied and found on Sunday 6/30/2019 except the FCUs. Looks like under special events was set to on 24/7 from 6/27/2019 to 7/12/2019. In addition there is another special event entered for the date range 7/1 to 7/19.	Does all equipment really need to be on 24/7 to keep the zone temperature around 72F? Is the space occupied 24/7? What happens when the second special event kicks in? Which will take president? Recommend remove override and use occupancy schedule.
56		HVAC	Karl ES	MZU-6	CD reset & Fix CHW valve	BMS & Onsite	Site	CD Setpoint is 72F when the OSA Temp is 82F but the CD temperature is 48F with the CHW valve at 0%.	The CD setpoint seems really high given the OAT. Investigate that the reset range is inversely related to the demand (e.g. at OAT 55F CD setpoint is 55F and at OAT 65F CD setpoint is 45F). Also it appears that the CHW valve may be leaking by. Investigate and repair valve.
57		HVAC	Karl ES	MZU-4	Fix HW valve	BMS	Site	HW valve position is 0% but the hot deck temperature says 122.7 while the MAT is 84.6F, the HW setpoint is 75F, and the HW temperature is 155F.	It appears that the HW valve may be leaking by. Investigate and repair valve.
58		HVAC	Reedom ES	MZU-2, FC-10, EF-2	Controller offline	BMS	Site	These units are offline. I assume this is a controller issue.	Investigate/reset/replace - do whatever is needed to get back online. As is I assume these are on 24/7 and operating based on onboard controls (if any).
59		Exterior Lights	Bartlett ES	Lighting	Schedule	BMS	Site	The time and date doesn't show up on any of the BMS screens. Also when clicking on schedules an error occurs saying cannot find file. Lastly exterior lighting & pole lighting has a time based, but the schedules are different. Exterior lighting page also	Set time and date in BMS. Determine how exterior lighting is controlled if at all and if lights need to be on for safety all hours of the night. If so, recommend use just astronomical clock to keep lights off when sun is up - add if not already in place. If lights do NOT need to be on all dark hours, recommend in addition to

60	HVAC	Bartlett ES	RTU 1, 4, RTU 6,	Change filters	Onsite	Site	shows an astronomical clock. It is not clear how exterior lights are controlled. Filters are dirty and duct static pressure setpoint is not being met.	astronomical clock add schedule and enable only when needed and dark.
61	HVAC	Bartlett ES	RTU: 2, 3, 5, 8, 9, 9a, 10	Add graphics	BMS improvement	Site	Clicking on any of these RTUs results in showing the database only.	Change filters. Add to PM plan to change regularly. Fan motors have to work harder to maintain SP when filters are dirty.
62	HVAC	Bartlett ES	RTU 4 SF, VAV 4-1 & 4-2, VAV 7-8, VAV: 6-1, 6-5 through 6-9, BP-1 alarm, CP-4 alarm, EF-6	Fix equipment	Onsite	Site	Alarms on all of these units. RTU 4 SF is at 34% and not meeting duct static pressure setpoint. BP-1 alarm might be due to the HW system enable and the boiler enable override to off.	Update system to add graphics for each RTU so users can see associated points and verify operation is as expected. Investigate, repair as needed and reset alarm.
63	HVAC	Bartlett ES	RTU: 4, 9A, 9B, 10	Fix equipment	BMS	Site	On the summary & RTU-4 graphic screens there are multiple points shown in yellow. The other units (RTU-9A, RTU 9B and RTU-10) do not have graphic screens so unable to further investigate. What does yellow mean?	Investigate and correct any issues.
64	HVAC	Bartlett ES	RTU-4	Fix sensor	BMS	Site	Cooling setpoint is reset from 52 to 65F based on return air temperature of 69 to 65F respectively. RTU-4 RAT is 93.1F but the zone temperature range is 73.0F to 80.8F (i.e. RAT>>zones feeding it). The rest of the RTU RATs are within a few degrees of the zone temperatures.	Check/replace RAT sensor. If it is found that RAT sensor is reading correctly and is in a good position then recommend contact a duct sealing company to investigate. Add to PM it not already included.
65	HVAC	Bartlett ES	RTU-4, RTU 6 & RTU-8	Fix equipment	Onsite	Site	RTU-4 is supplying 82F air but the setpoint is 52F. RTU 6 is supplying 70F air but the setpoint is 50F. Also enable mode is overridden to enable cool but the cooling output says 0%. RTU-8 is supplying 80.1F air but the setpoint is 51.9F.	It is not clear why the cooling output is 0% (RTU 4 & 6, RTU-8 unknown) when the unit is not reaching this setpoint. Verify SA temperature at the unit. Verify DX cooling compressors and condensers are working correctly.
66	HVAC	Bartlett ES	RTU-8	OA flow station and/or damper repair	Onsite	Site	OA damper is at 100% open when OAT is 84.1F and RAT is 81.2F. All other unit OA dampers are <30% open (assuming at minimum required for ventilation).	Verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality.

67	HVAC	Bartlett ES	All RTUs	Adjust global economizer setpoint	BMS	Site	Econ OA Hi L/O SP is 60F and Econ OA Lo L/O is 50F for all RTUs that have graphic screens.	If all RTU economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.
68	HVAC	Bartlett ES	RTU 2, 4, 6.	OA flow station and/or damper repair	Onsite	Site	OA damper position and flow station cfm do not jive. RTU-2 OA damper position unknown, flow says 0cfm. RTU-4 OA damper position 2%, flow says 0cfm. RTU- 6 OA damper position says 15%, flow says 0cfm.	Check OA damper position, and verify flow using calibrated handheld if doesn't match BMS, replace flow station or damper actuator as needed.
69	HVAC	Bartlett ES	RTU-1, RTU-3, RTU-5	Fix sensor	Onsite	Site	CO2 sensors are reading 65,535ppm	Replace CO2 sensor. Especially if this is used for control.
70	HVAC	Bartlett ES	RTU-1, RTU-4, RTU-6	Fix economizer operation	Onsite	Site	OA damper position is less than the min OAD SP.	Verify at unit that: if unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality.
71	HVAC	Bartlett ES	All units	Schedule	BMS	Site	The time and date doesn't show up on any of the BMS screens. Also when clicking on schedules an error occurs saying cannot find file.	Perform night walk to see if RTUs are on 24/7 (suspect they are). What is the occupied schedule (if there is one)? Does this align with the space use schedule? Could equipment on time be further reduced? Adjust unoccupied setpoints to =occupied setpoint +/-10F and tighten time-based schedule to match space use schedule. Trial and error to balance unoccupied cc setpoints with the time schedule to minimize time on. Reviewing trends of supply fan status, cold and hot deck temperatures vs setpoints on extreme temperature days could help determine if equipment is started too early or comes on too often during the unoccupied period
72	HVAC	Chaparral HS Theater	RTU 1	Change filters	Onsite	Site	Filter is dirty.	Change filters. Add to PM plan to change regularly. Fan motors have to work harder to maintain SP when filters are dirty.

73	HVAC	Chaparral HS Theater	AHU-1, FCU 4 through 7	Fix equipment	Onsite	Site	Alarms on all of these units. AHU- 1: Zn1 temperature alarm, Zn2 temperature alarm, comp1 alarm, RA filter DP. Zone 2 is supplying 83.6F air while zone 1 is supplying 65.2F air and the space temperatures of both zones is ~79F. Space temperature alarms: FCU- 4, FCU-5, FCU-6, FCU-7; temperatures range from 96.1F to 103.9F.	Investigate, repair as needed and reset alarm. AHU-1: Based on temperatures it looks like the compressor for zone 2 isn't working, but there is an alarm shown for mapping & fix broken compressor. For FCU 4 through 7, serving various mechanical rooms, what are the setpoints? Could you increase the setpoints without negatively affecting equipment in the room so that alarms are not activated?
74	HVAC	Chaparral HS Theater	AHU-1	Fix equipment	Onsite	Site	Return Air Filter DP is 1.07 in wc and is red color. I assume this means it is in alarm because the filter is dirty. Also the cfms don't add up. SA cfm should equal the OA cfm plus the RA cfm.	Change filters. Add to PM plan to change regularly. Fan motors have to work harder to maintain SP when filters are dirty. Calibrate flow sensors.
75	HVAC	Chaparral HS Theater	AHU-1, & all RTUs	Adjust economizer setpoint	BMS	Site	AHU-1 Econo SP is 70F, but the sequence of operations says 75F. RTUs economizer control is at the unit based on the sequence of operations.	It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. If the economizer setpoint is a dial in the RTU units use setpoint "A". This corresponds with a point at approximately 73F dry bulb and 50% RH.
76	HVAC	Chaparral HS Theater	All units	Schedule off when not needed	BMS	Site	All units have the same Occ_Schedule for Sunday 5am- 2pm. Monday: all except RTU-1 have the Occ_Schedule 5am- 9pm. Tuesday through Friday: all except RTU-2 have the Occ_Schedule 5:30am-9pm. Saturday: AHU-1, RTU-2, and RTU-5 have the same Occ_Schedule 6am-8pm. RTU-1 6:30-7:30pm, RTU-3 & RTU-4 have the same Occ_Schedule 7am-8pm.	Given discrepancy, suspect there is opportunity to tighten schedule. Review space use schedule and compare to HVAC equipment schedule to minimize on time of each HVAC unit.
77	HVAC	Diaz ES	All MZUs	Schedule off when not needed	BMS	Site	MZU 1, 3, 4, 6: Have the same schedule set to unoccupied from 6:30am to 9pm M-F. MZUs 2 & 5 have the same schedule set to unoccupied from 6am to 9pm Monday, and 6:30am to 9pm T-F. All units are on at 8am on Wednesday 7/24/2019. MZU1 though 4 were on Saturday 7/27/2019 at 5am.	MZU 1 through 4 are suspected to be on 24/7. Verify all units turn off outside of occupied hours. If they do not investigate and revise schedule to turn them off outside of space occupied schedule. There may be an opportunity to tighten the schedule. Review space use schedule and compare to HVAC equipment schedule to minimize on time of each HVAC unit.
78	HVAC	Diaz ES	All FCUs	Schedule off when not needed	BMS	Site	All FCUs that can be scheduled have an occupied and a custodial schedule but the schedules vary.	Given discrepancy, suspect there is opportunity to tighten schedule. Review space use schedule and compare to HVAC

79	HVAC	Diaz ES	FCU-10, E EF-2, CT fan	Fix equipment	OnSite	Site	FCU-10 fan serving storage room 50A, EF-2 serving restroom area C, Cooling Tower fan, and boiler 2 are in alarm. Enable=on, but proof=off for FCU-10 and EF-2. Enable=off, but proof=on for the cooling tower fan.	equipment schedule to minimize on time of each HVAC unit. Investigate, repair as needed and reset alarm.	
80	HVAC	Diaz ES	All MZUs	CD & HD reset	BMS improv ement	Site	There is a min and max cold deck & hot deck SP listed (and setpoints for all MZUs are consistent at CD 50-75 (except MZU-1 with max of 65 (overridden), HD 75-95) so I assume the setpoint it is being reset but there is no way to tell if the SP is appropriate or not because the independent variable isn't indicated.	Check in programming how the CD & HD SP is reset and add all appropriate info to the BMS screens so an operator could verify the resets are working correctly.	
81	HVAC	Diaz ES	MZU-1 through MZU-5	HD reset	BMS & Onsite	Site	HD Setpoint is 95F when OSA Temp is 92.0F and the reset range is 75F to 95F.	The HD setpoint seems really high given the OAT. Investigate that the reset range is inversely related to the demand (e.g. at OAT 55F HD setpoint is 95F and at OAT 95F HD setpoint is 75F).	
82	HVAC	Diaz ES	Boiler Plant	Boiler enable	BMS	Site	Max HW valve position according the summary screen is 100% but the HW System screens shows the max HW valve position as 0%, yet the HW plant is enabled and HW setpoint is 180F even though the max HW valve SP is 95%.	Review control logic to ensure the HW plant (boilers and pumps) are only enabled when the max HW valve position is greater than the setpoint. Verify the max HW valve position on the HW system screen represents the actual max HW valve position.	
83	HVAC	Diaz ES	Boiler Plant	HW temp reset	BMS	Site	The min HWS Setpoint is 140 with a reset range of 40F and a high-OA-T reset SP of 55F and a low-OA-T reset SP of 25F. Yet the actual HWS Setpoint is 180F.	The HW ST SP seems really high given the OAT. Investigate that the reset range is inversely related to the demand (e.g. at OAT 25F HWS Setpoint is 180F and at OAT 55F HWS Setpoint is 140F).	
84	HVAC	Diaz ES	Boiler Plant pumps	Fix sensor	Onsite	Site	Pump VFD speed says 100%, but the HW DP is 0.0psi	Are the pumps on? Verify and replace DP sensor if broken. Once replaced verify that the pump speed is not stuck at 100%.	
85	HVAC	Diaz ES	Boiler Plant	Revise graphics	BMS	Site	Both boilers seem to be on (fire rate says 100% and boiler enable is on), but the supply temperature is ~78F with a setpoint of 180F and OAT is ~92F.	Are the boilers actually on? If so, they are not working right, if not recommend remove or revise the info shown in the BMS so that it is useful.	
86	HVAC	Reedo m ES	All MZUs	Economizers: Check setpoint, ensure functional.	Onsite	Site	economizer - min OA damper=OPEN, It is not clear if there is economizer functionality on these units, what the economizer setpoint is and if economizers are working as no other	Are there airside economizers on these units? If so recommend update BMS screens to: add OAD % open, and show OA damper min % setpoint so you can verify the position is as expected. What is the economizer setpoint? It is recommended for the climate zone to use either: OA drv bulb high limit with a	

							OA damper related points are shown in the BMS.	setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Also verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure. Recommend remove this graphic screen so that it doesn't confuse operators.
87	HVAC	Diaz ES	Chiller Plant	Revise graphics	BMS improvement	Site	The Chiller Data GUI has all zero values. This screen seems quite useless. OA damper=100% for all MZU units when OAT ~92F. The OA dampers should be at minimum. It is not clear if: this point represents economizer functionality, what the economizer setpoint is and if economizers are working as no other OA damper related points are shown in the BMS.	Are there airside economizers on these units? If so recommend update BMS screens to: show OA damper min % setpoint so you can verify the position is as expected. What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Also verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.
88	HVAC	Diaz ES	All MZUs	Economizers: Check setpoint, ensure functional.	Onsite	Site		
89	HVAC	Diaz ES	MZU-4	Fix sensor	Onsite	Site	The RAT sensor reads 82F, when the zones feeding it range from 69.8 to 73.2F and the MAT reads 74.9F while the OAT reads ~92F.	Check/replace RAT sensor. If it is found that RAT sensor is reading correctly and is in a good position then recommend contact a duct sealing company to investigate. Add to PM it not already included.
90	HVAC	Diaz ES	All FCUs	Revise graphics	BMS improvement	Site	Zone setpoints are less than the occupied heating and cooling setpoints when the units are in occupied mode.	It seems zone setpoint is miss-labelled as this is also a black field which otherwise indicates a feedback/sensor reading. Alternatively these may be controlled via a tstat in which case the occupied cooling and heating fields wouldn't be applicable. Investigate and revise graphics to show useful information so operators can compare the setpoint to the actual zone temp and the

91		HVAC	Goolsby y ES	All MZ units	Schedule off when not needed	BMS	Site	Night setback setpoint is 55F. I assume this is the heating setpoint, not sure what unoccupied cooling setpoint is and how set.	Show night heating and cooling setpoints in BMS. Verify unoccupied setpoints are =occupied setpoint +/-10F and tighten time-based schedule to match space use schedule. Trial and error to balance unoccupied setpoints with the time schedule to minimize time on.
92		HVAC	Karl ES	All MZ units	Economizers: Verify min OA & add to BMS, check setpoint, ensure functional.	BMS	Site	Goolsby OA damper = yes. Carl ES OA damper=enabled. It is not clear what this represents and if economizers exist and are functioning correctly.	Goolsby: What does yes mean? Economizer enabled? If so, recommend rename this economizer enabled. Also recommend update BMS screens to: add OAD % open, and show OA damper min % setpoint so you can verify the position is as expected. What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Are there economizers on these units? If so recommend verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.
93		HVAC	Dooley ES	All MZU	Occupied temperature setpoint adjustment	BMS	Site	Zone setpoints are shown in black cells with deadband values at right in graphics. Zone setpoints and deadbands vary across MZUs (71-73F setpoint, 0F to 2F deadband). The zone deadband is the range of temperatures as which no heating or cooling would be provided. Trends show cooling damper opening more when this zone setpoint is exceeded so I am quite confident this (setpoint and deadband), not the global setpoints, are controlling the damper position. We recommend a 4F deadband between the heating and the cooling setpoint.	Verify understanding of how the deadband relates to the zone setpoint: if zone setpoint is 71F and deadband is 2F will the unit open the cold damper at 73F (72+2F) or at 72F (72+2/2F)? Verify that unit is NOT controlling to the global setpoints as expected. Change zone deadbands such that there is at least a 4F delta between the temperature at which the unit calls for more hot air and calls for more cool air as this feedback from the zones can drive the heating/ and cooling at the MZU.
94		HVAC	Dooley ES	All MZU	Unoccupied temperature setpoint adjustment	BMS	Site	Unoccupied setpoints appear to be set as high and low setpoints on the MZU graphic screens (white cells). These setpoints only have a 4F	We recommend widening the unoccupied setpoints to encompass the custodial setpoints and have at least a 10F delta T. This will save energy by allowing the MZUs to

							deadband between the heating and the cooling setpoint. The low limit is also higher than the custodial setpoint, so during the custodial period the zone can be anywhere between 68F and 76F for example before a damper opens more, then when the unoccupied period hits the range is 72F to 76F. This higher low limit setpoint (72F vs 68F) could cause heating at the unit.	remain off more often. A recommended range is 55-60F low limit and 80-85F high limit.
95	HVAC	Dooley ES	All MZU	CD reset	BMS	Site	The cold deck SP changes for MZU-3 but not for the rest. So I assume it is being reset for MZU-3 at least but there is no way to tell if the SP is appropriate or not because the independent variable isn't indicated. Other MZUs have a CD setpoint of 52F.	Check in programming how the CD SP is reset and add all appropriate info to the BMS screens so an operator could verify the resets are working correctly (independent variable(s) and setpoint range). If MZU 1, 2, 4, 5 are not being reset considering adding a reset. All MZU units should have similar setpoints and ranges.
96	HVAC	Dooley ES	All MZU	Schedule off when not needed	BMS	Site	MZU-1 and MZU-5 are scheduled: M&W occupied: 5:30am to 9pm; T, R, F: occupied: 5:30am to 4pm, custodial: 4pm- 9pm. MZU-2, 3, 4 are scheduled: M-F occupied: 5:30am to 4pm, custodial: 4pm-9pm.	Does MZU-1 and MZU-5 need to be on until 9pm M & W? Does this align with the space use schedule? Could equipment on time be further reduced? Tighten time-based schedule to match space use schedule such that equipment is only in occupied mode (tightest zone temperature setpoints) the minimal amount of time.
97	HVAC	Dooley ES	All MZ units	Fix economizer operation	Onsite	Site	MZU-1 OSA min damper position says open and there is a min economizer damper position of 38F, yet the mixed air temperature very closely matches the return air temperature. All other units show similar MAT much closer to the RAT than the OSAT.	Why is there a economizer min position if there is a separate min OSA damper? Only one of these is needed to provide ventilation air during the occupied period. Check at unit that min OSA damper is open, if so set economizer min position to 0%. Check that the economizer damper position matches what the BMS says. The temperature values found make it seem like there is little to no outside air coming into the unit. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.
98	HVAC	Dooley ES	All MZ units	HD reset	BMS & Onsite	Site	All MZUs have a HD setpoint of 75F on a ~81F OSAT day except MZU-1 which has a HD setpoint of 95F. What is the HD setpoint based on?	MSU-1: The HD setpoint seems really high given the OAT. Investigate that the reset range is inversely related to the demand (e.g. at OAT 55F HD setpoint is 95F and at OAT 95F HD setpoint is 75F). Check in programming how the HD SP is reset and add all appropriate info to the BMS screens so an operator could

99	HVAC	Dooley ES	Cooling Plant	Fix equipment	Onsite	Site	CHWP-1 and system is in alarm. Chilled water supply temp seems way off at 97.5F when the return temp says 47F. Is 47F the supply temp or is the temperature sensor bad? Compressors say off but also show currents and pressures so suspect they are not actually off.	verify the resets are working correctly (independent variable(s) and setpoint range). All MZU units should have similar setpoints and ranges.
100	HVAC	Dooley ES	MZU-1 zone 4	Fix equipment	Onsite	Site	Zone 4 kit, gen, elec has a temperature setpoint of 72.1F a 100% damper position and a zone temperature above setpoint. Reviewing the trends the setpoint never seems to be met.	Investigate alarms and supply temperature and correct. Also investigate what CHW SP is based on and verify that it is not always stuck at the minimum of 42F.
101	HVAC	Foothill IHS	AHU-1	Fix equipment	Onsite	Site	EFS associated with AHU-1 is in alarm (EF-1, EF-2, EF-4)	Investigate and repair. What temperature air is being discharged? Check with calibrated handheld and verify matches cold deck temp of MZU-1.. Does the damper modulate fully? If not, repair. Where is the temperature sensor, is it behind something hot? If so, move or widen deadband to avoid a constant call for cooling.
102	HVAC	Foothill IHS	HW plant	Fix equipment	Onsite	Site	HW Supply Temp =40.7F. Separator 1 in alarm and boilers are enabled (overridden?) when it is 63F outside.	Investigate and repair all alarms.
103	HVAC	Foothill IHS	AHU-3	Fix equipment	Onsite	Site	EFS associated with AHU-3 is in alarm (EF-6, EF-8)	Investigate and repair.
104	HVAC	Foothill IHS	AHU-4	Fix equipment	Onsite	Site	EFS associated with AHU-4 is in alarm (EF-5, EF-7)	Investigate and repair.
105	HVAC	Foothill IHS	AHU-5	Fix equipment	Onsite	Site	EFS associated with AHU-5 is in alarm (EF-8)	Investigate and repair.
106	HVAC	Foothill IHS	AHU-7	Change filters	OnSite	Site	Filter is dirty.	Change filters. Add to PM plan to change regularly. Fan motors have to work harder to maintain SP when filters are dirty.
107	HVAC	Foothill IHS	AHU-7	Fix equipment	Onsite	Site	RFS associated with AHU-7 is in alarm (RF-5)	Investigate and repair.
108	HVAC	Foothill IHS	AHU-8	Fix equipment	Onsite	Site	Supply fan in alarm	Investigate and repair.
109	HVAC	Foothill IHS	AHU-9	Fix equipment	Onsite	Site	EFS associated with AHU-8 is in alarm (EF-11)	Investigate and repair.
110	HVAC	Foothill IHS	AHU-10	Fix equipment	Onsite	Site	EFS associated with AHU-10 is in alarm (EF-17, EF-18)	Investigate and repair.
111	HVAC	Foothill IHS	All AHUs and MZUs	Economizers: Verify min OA & add to BMS, check setpoint,	BMS	Site	OA damper enable=open for most units. For AHU12/14 OA damper=30% (not fully open). It is not clear what these values represents. All units should have the	What does OA damper enabled mean? Economizer is enabled? If so, recommend rename this economizer enabled. Also recommend update BMS screens to: add OAD % open, and show OA damper min % setpoint so you can verify the

112	HVAC	Foothill IHS	All AHUs and MZUs	Request for info	BMS	Site	same position yet two are at 30% and the rest are at 100% (assuming open=100% open). Also the MAT for some units is higher than both RAT & OAT or lower than both RAT & OAT. This is not physically possible. Therefore, it seems that if economizers exist they may not be functioning correctly.	position is as expected. What is the economizer setpoint? It is recommended for the climate zone to use either: OA dry bulb high limit with a setpoint of 73F or OAT vs RAT. This will enable the economizer when OAT is less than 73F or RAT respectively. Recommend add setpoint to the graphics too so you can verify working as expected. Are there economizers on these units? If so recommend verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality. If economizers are not checked regularly add to PMs as besides humidity sensors they are the most common failure.	Please provide the SOO (or describe here) and setpoint ranges so I can further investigate if the CD and HD resets are working. All units should have the same general strategy, as is it appears some are operating one way and the others another, so I there may be opportunity for improvement.
113	HVAC	Foothill IHS	All AHUs	Request for info	Onsite	Site	It is not clear if there is leakage across the CHW and HW valve. Does the % associated with the point 'CHW Valve (NC)' represent the % the valve is open? Does the % associated with the point 'HW	It is not clear how the CD and HD are reset and the sequence of operation document link is not working. Cold Deck Setpoint: It appears based on what is shown on the graphics that if the high zone pressure (Hi Zone Pressure) is 7.5 or less (CD reset SP @ 7.5#) then the Cold Deck Setpt should match that shown in grey (CD reset SP @ 7.5#). If it is higher than that the Cold Deck Setpt should decrease. Hot Deck Setpoint: It appears based on what is shown on the graphics that if the low zone pressure (LO Zone Pressure) is 7.5 or more (HD reset SP @ 7.5#) then the Hot Deck Setpt should match that shown in grey. If it is lower than that the Hot Deck Setpt should increase. What is the minimum cold deck setpoint? What is the maximum hot deck setpoint?	Please provide the SOO or explain how this works so I can further investigate whether valves are leaking or not. Also recommend update names to better describe the value and/or make them consistent.

DNV

								Valve (NO)' represent the % the valve is closed? If one represents % open and the other represents % closed this is a bit confusing.				
114	HVAC	Reedo m ES	FC-2, EF-3, EF-6, EF-8, Condenser water pump, CS pump alarm	Fix equipment	Onsite	Site	Fan alarms on all of these units	Investigate, repair as needed and reset alarm.				
115	HVAC	Foothil I HS	AHU-1, 2, 4	Fix temperature sensor	Onsite	Site	The MAT is lower than both the RAT and the OAT. This is not physically possible.	It seems the MAT is bad, investigate by comparing to a calibrated handheld.				
116	HVAC	Reedo m ES	Boiler Plant	Reduce boiler enable setpoint & correct override	BMS	Site	HW system enabled if less than 95F OAT and button next to HW system enable point is red. Its 94F and the pumps and boiler are on even though there is no HWVs open.	Does the red button indicate its overridden? If so investigate and put back under automatic controls. Also recommend reduce boiler enable setpoint to something more in line with when there would be a call for heating (maybe something like 75F) to keep the boiler plant (boilers & pumps) off more often.				
117	HVAC	Foothil I HS	AHU-7, 8	Fix temperature sensor	Onsite	Site	The MAT is higher than both the RAT and the OAT. This is not physically possible.	It seems the MAT is bad, investigate by comparing to a calibrated handheld.				
118	HVAC	Foothil I HS	All AHU & MZUs	Schedule off when not needed	BMS	Site	AHUs 2 through 8 and MZUs 1 & 2 are scheduled as occupied from 4am to 10pm M-F, AHUs 9-15 are scheduled as occupied from 4:30am to 10pm M-F and AHU 1 is scheduled as occupied from 3:45am to 10pm M-F. All also have custodial schedules but these are overridden by the occupied schedule because the time range is within it (e.g. 1:30pm-9pm). Review of trends confirmed fans turn off at end of occupied period as expected.	Does each of these schedules align with the space use schedule? Could equipment on time be further reduced? Tighten time-based schedule to match space use schedule such that equipment is only in occupied mode (tightest zone temperature setpoints) the minimal amount of time. If custodial settings are needed align with				
119	HVAC	Reedo m ES	All units	Schedule off when not needed	BMS	Site	On the schedule summary page the default output set to occupied and all equipment was found on Sunday 6/30/2019. However there is an occupied schedule entered M-F 6am-9pm. Also the date/time listed in the upper left corner is wrong. It says 12:04am 7/3/2019 and its 1:12pm 7/3/2019.	I assume this default output setting and the incorrect date time is what is causing the equipment to be overridden to on 24/7. Correct issue and verify following schedule by checking equipment is off after hours.				
120	HVAC	Foothil I HS	MZU-1, MZU-2	Unoccupied temperature	BMS	Site	Unoccupied setpoints appear to be set as high and low setpoints on the	We recommend widening the unoccupied setpoints to encompass the custodial setpoints (if plan to set a cleaning				

				setpoint adjustment			MZU graphic screens (grey cells). These setpoints only have a 4F deadband between the heating and the cooling setpoint. The low limit is also higher than the custodial setpoint, so during the custodial period the zone can be anywhere between 68F and 76F for example before a damper opens more, then when the unoccupied period hits the range is 72F to 76F. This higher low limit setpoint (72F vs 68F) could cause heating at the unit.	schedule) and have at least a 10F delta T. This will save energy by allowing the MZUs to remain off more often. A recommended range is 55-60F low limit and 80-85F high limit.
121	HVAC	Reedon ES	All MZUs	Remove overrides	BMS	Site	The Max and Min Cold Deck SPs are in purple colored boxes. The Occ CLSP for FC-5 is orange.	Does this mean they are overridden? If so investigate if the override is still needed, and if not remove override.
122	HVAC	Brackner ES	All AHUs, MZU, RTUs	Fix valves	BMS	Site	AHU 3-3: Both cooling and heating valve at 100%.	AHU 3-3: Investigate if both valves are open and correct issue. ALL Units: What does 100% mean? Both open? Investigate whether this means 100% open or 100% closed. Have Tim add label to state which.
123	HVAC	Reedon ES	All MZU	CD & HD reset	BMS improvement	Site	There is a min and max cold deck & hot deck SP listed (and setpoints for all MZUs are consistent at CD 50-65, HD 75-95) so I assume the setpoint it is being reset but there is no way to tell if the SP is appropriate or not because the independent variable isn't indicated.	Check in programming how the CD & HD SP is reset and add all appropriate info to the BMS screens so an operator could verify the resets are working correctly.
124	HVAC	Faiss MS	Units: MZU: 1, 2, 5, 9, 10, 12 and AHU 14	Investigate HW valve function	Onsite	Site	Its 92F outside and all of these units have HW valves at 100% open. Seems these are stuck and not modulating.	
125	HVAC	Faiss MS	MZU-1	Fix CW valve			CW valve says 0% open but CD setpoint is being overshoot by ~20F.	Valve may be stuck at 100% open or leaking, investigate & repair: Look at trends to see if temperature setpoint always overshoots. May need to verify temp/valve function at unit.
126	HVAC	McMillan ES	Cooling Plant	Outside air temperature lockout	BMS	Site	under CHW System Enable heading "CP Enable OA SP" and at top "OAD Lockout SP (low end)" is 52F indicating the all cooling (CHW plant and economizer functionality) is only enabled over 52F.	The OA dampers lock out of 52F seems way to high. Usually a low end OAD lockout is to protect the cooling coil from freezing. By locking the OAD out at a much higher temperature you are using more cooling energy than necessary at lower OATs. If OAD functionality is maintained and these setpoints are updated you could use the economizer function to provide free cooling instead at lower temperatures and limit the mechanical cooling to when the units are not in economizer mode (i.e. above ~65F). See guide section 2.1 for more info on appropriate



127	HVAC	McMillan ES	All MZUs	Investigate Alarms & Overrides	Onsite	Site	MZU-1, 2, 3, 6, 8, : Filter status in alarm (3.0 in/wc) MZU-2: In occupied override MZU-5: SF in alarm Zn-1 classroom 41 zone temp alarm (>76F) MZU-9: OA damper overridden to 15% EFs: 5,6,7, 9, 11, 12 in alarm and fans are off	lockouts and section 2.3 for more info on economizers. Change filters. Add to PM plan to change regularly. Fan motors have to work harder to maintain SP when filters are dirty. Investigate and correct other listed overrides and alarms. See guide section 2.0 for more info.
128	HVAC	McMillan ES	All MZUs	HD reset	BMS & Onsite	Site	MZU-6 & MZU-7: OAT Heat Enable SP is 70F, its 71.6F OAT and heat is enabled. Something seems wrong here.	Investigate why MZU-6 & MZU-7 had heat enabled when it was warmer than 70F OAT.
129	HVAC	McMillan ES	BAS	Time in BAS is off	BMS	Site	The time is listed as 15 minutes early in the BAS. While likely to not reduce energy usage, comfort might be affected.	Adjust time in BAS.
130	HVAC	McMillan ES	All MZUs	Setpoints vary	BMS	Site	Setpoints vary across units. See workbook 'McMillan Setpoints' for questions and more info.	Can we review this workbook together so we can get a better understanding of in general what we should flag as an issue?
131	HVAC	McMillan ES	MZU-2, MZU-3, MZU-5, MZU-9	Fix economizer operation	OnSite	Site	Check economizer strategy. See workbook 'McMillan Setpoints' column C for status found by MZU.	Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality.
132	HVAC	Reedman ES	All units	Fix equipment	BMS	Site	Lots of points are highlighted yellow (looks like this might mean a failure in connection?) & orange (looks like this might mean overridden).	Correct connection issues and review if overrides are appropriate.
133	HVAC	Reedman ES	All MZUs	Setpoints vary	BMS	Site	Zone setpoint ranges at tstats (high & low), and deadbands vary across units. See workbook 'Reedman ES Setpoints' for more info on setpoint variation across units and zones.	Recommend standardize the DB to 4F (i.e. the deadband between heating and cooling setpoints) for all zones.
134	HVAC	McMillan ES	MZU-6	Fix valves	OnSite	Site	CHWV=0% but delta T is 13F, valve likely leaking. See workbook 'McMillan Setpoints' column D.	It appears that the CHW valve may be leaking by. Investigate and repair valve.
135	HVAC	McMillan ES	MZU-7	Fix temperature sensor	Onsite	Site	RAT is more than 3F higher than the highest zone temperatures. See workbook 'McMillan Setpoints' column E.	It seems the RAT sensor is bad, investigate by comparing to a calibrated handheld.



136	HVAC	Reedon ES	Chiller Plant & MZU 5	Turn off pumps when not needed & CD reset	BMS	Site	MZU-5 CHWV at 100% but CD temperature setpoint higher than MAT and not even close to setpoint. The cold deck setpoint is 52F while all other MZU are >72F. Seems odd this one is different. Also the chillers are off but pumps are circulating the warm water so this MZU is adding heat when not requested. See workbook 'Reedon ES Setpoints' column E.	Recommend update controls programming to turn off pumps when chillers are off & investigate why MZU CD reset seems backwards compared to other MZUs.
137	HVAC	Bracken ES	All	Fix equipment	Onsite	Site	There is lots of equipment with points highlighted various colors: orange (meaning fan on and in fault), purple (fan off -down) indicating equipment issues. See file 'Bracken ES Setpoints' for AHU list.	investigate and repair
138	HVAC	Bracken ES	AHU 2-1	Fix equipment	Onsite	Site	AHU 2-1 fan is overridden on.	investigate, repair & release override
139	HVAC	Bracken ES	Boiler Plant	Fix equipment	Onsite	Site	Boiler points 'System enable', 'HWP-1 enable' and 'HWP-1VFD signal' are in fault and defaulted on yet the delta T (supply - return) =0F providing no heat to loop. So you are pumping water that isn't providing any benefit.	If heating equipment is off, turn off pumps too. investigate and repair.
140	Lighting	Bracken ES	lighting	Fix equipment	Onsite	Site	At ~6am all lighting on, at ~8:30am building 1 & 4 exterior lighting still on, at 1:30pm building 1 exterior lighting still on (fault). There are also faults on Building 2&3 & building 9.	Investigate lighting issues. All exterior lighting should be off during the day.
141	HVAC	Bracken ES	exhaust fans	Fix equipment	Onsite	Site	Lots of alarms and faults on the exhaust fan page.	Investigate, repair as needed and reset alarm.
142	HVAC	Bracken ES	All AHU, MZU	Fix economizer operation	Onsite	Site	See file 'Bracken ES Setpoints' column C for spot check results per AHU/MZU.	Verify at unit that: If unit is on: OA damper is at minimum when above setpoint, OA damper is open more than minimum when less than setpoint, and that RA and OA damper are inversely related. If unit is off: OA dampers are closed. Adjust, repair, and lube damper and actuators as needed to ensure when on that OA damper goes min when greater than setpoint and opens further when below setpoint and is closed when off. Stroke dampers as needed to verify functionality.
143	HVAC	Bracken ES	All AHU, RTU, MZU, FCU	Adjust zone temperature setpoint	BMS	Site	Zone temp setpoints vary. See file 'Bracken ES Setpoints' column under heading 'zone setpoints' for spot	Standardize across all AHU & widen zone temperature setpoints to at least 4F delta in the occupied period. Recommend reduce heating setpoint to 68F as heating to

144	HVAC	Bracken ES	AHU: 4-8, 8-3, 8-5	Fix valves	BMS	Site	check results per AHU/MZU/FCU/RTU AHU 4-8 in fault, but both CHW & HW valves were open 100%. AHU 8-3 & 8-5: Both CHW & HW valves were open 100% @~6am. See file 'Bracken ES Setpoints' column E for spot check results per AHU.	73F seems extreme and use cooling setpoint of 75F. Possible simultaneous heating and cooling. Correct programming such that never are both valves allowed to be open at the same time.
145	HVAC	Bracken ES	MZU 6-3	Check sensor	Onsite	Site	suspect MAT sensor is off (higher than RAT and OAT). See file 'Bracken ES Setpoints' column D&E for spot check results per MZU.	Calibrate sensor.
146	HVAC	Bracken ES	MZUs	CD reset	BMS	Site	There is a min and max cold deck & hot deck SP listed so suspect it is being reset, setpoints for all MZUs are NOT consistent at. Also there is no way to tell if the SP is appropriate or not because the independent variable isn't indicated. See file 'Bracken ES Setpoints' column H&I for spot check results per MZU.	Suspect variation with CD setpoints is warranted, but if can increase this use less energy. Recommend review setpoints and verify appropriate. Also recommend check in programming how the CD & HD SP is reset and add all appropriate info to the BMS screens so an operator could verify the resets are working correctly.
147	HVAC	Karl ES	All MZU & FCUs	Adjust zone temperature setpoint	BMS	Site	See workbook 'Karl Setpoints' MZU worksheet columns I through R and FCU worksheet. Highlighted cells indicate units with differing setpoints.	Standardize and widen setpoints as described in row 2.
148	HVAC	Karl ES	MZU-3	Fix CW valve	OnSite	Site	CW valve position is 0% but the MAT is 66.1F, the Cold deck setpoint is 65F, and the cold deck temperature is 62.7F (valve is overcooling).	It appears that the HW valve may be leaking by. Investigate and repair valve.
149	HVAC	Diaz ES	Boiler Plant	HW temp reset	BMS	Site	The min HWS Setpoint is 140 with a reset range of +40F and a high-OA-T reset SP of 55F and a low-OA-T reset SP of 25F. Yet the actual HWS Setpoint is 180F and OAT=~42.4F. The calc setpoint should be 156.8F. (same as #83, which was complete).	The HW ST SP seems really high given the OAT. Investigate that the reset range is inversely related to the demand (e.g. at OAT 25F HWS Setpoint is 180F and at OAT 55F HWS Setpoint is 140F) and that the calculation is correct.
150	HVAC	Diaz ES	MZU-3, MZU-4, MZU-6	Check valves & sensors	BMS	Site	MZU-3: HWV appears to be stuck closed. RAT is lower than all zones. MZU-4 RAT is lower than all zones. MZU-6 CHWV appears to be stuck open. See file 'Diaz Setpoints' for more info, highlighted cells under heading 'spot checks' indicate	MZU-3 & MZU-6: Investigate valve functionality. MZU-3 & MZU-4: check RAT sensors, calibrate or repair as needed.

			Diaz ES	All MZUs	Standardize setpoints	BMS	Site	potential issue.	
151	HVAC		Diaz ES	All MZUs	Standardize setpoints	BMS	Site	MZU-1 zone deadbands vary 0- 2F. CD bias varies across MZUs. See file 'Diaz Setpoints' for more info, highlighted cells under 'setpoints' indicate potential issue.	Standardize setpoints across zones and MZUs.
152	HVAC		Twitchell ES	FCU-3	Standardize setpoints	BMS	Site	FCU: Unocc cool setpoint on FCU- 3 is diff than rest (95F vs 90F). Occ setpoints are all C/H=73/71.	Standardize setpoints across FCUs. Can they all be increased to 95F?
153	HVAC		Twitchell ES	All MZUs	Time in BAS is off	BMS	Site	Schedule shows: MZUs: M: 5-10; T-F: 5:30-10; FCU M-F: 5-10. From 5:57am-6:12am all MZUs were found off, units started turning on around 6:15am. Under occupancy schedule says next value is occupied@ some time before time it was.	Is BAS time/clock wrong? I can't find it on the Twitchell BAS.
154	HVAC		Twitchell ES	Central plant	Fix equipment	OnSite	Site	Alarms: HI Chilled Water Supply Temp, Refrigerant Leak. Override on HW System=on.	Investigate, repair as needed and reset alarm & override
155	HVAC		Twitchell ES	All MZUs	Check valves & sensors	OnSite	Site	Many MZUs have MAT that don't make sense given the OAT and RAT and the CHW valve may be leaking. See file 'Twitchell Setpoints' for more info, highlighted cells under 'spot check' indicate potential issue.	Check sensors, valve for leaky, and OAD position.
156	HVAC		Twitchell ES	All MZUs	BAS alarm adjustment	BMS	Site	MZU-1, MZU-2 have HD low limit alarm when less than 90F even if HD setpoint is less than 90F.	Check all MZU HD low limit alarm setpoints and HD reset range and verify low limit is less than min HD temperature to reduce nuisance alarms.
157	HVAC		Twitchell ES	All MZUs	HD & CD reset	BMS	Site	HD setpoint appears to reset, it is not clear if CD does or what resets are based on.	If you provide the HD and CD reset range and independent variable (e.g. OAT?) I can check the setpoints are calc correctly. Also suggest add this to BAS screens so can verify working correctly in future.
158	HVAC		Bob Miller MS	All Gym units	Temperature setpoints	BMS	Site	Gym appeared to be cooler than expected, setpoints seemed to be low.	Consider raising temperature setpoints in gym after hours.
159	Lighting		Bob Miller MS	lighting	Occupancy Sensors	OnSite	Site	Certain restrooms and classrooms had lights on, could take advantage of occ sensors	Consider occupancy sensors in hallways/restrooms.
160	Lighting		Bob Miller MS	lighting	Daylight sensor	OnSite	Site	Several outside lights on during day	Timer/sensor calibration for outside lighting.
161	HVAC		Bob Miller MS	All equipment	Building Envelope	OnSite	Site	Several outer doors left open	Consider education/awareness campaign around affect of outside doors being open during hot summer weather and effects on building envelope.

FOOD SERVICE FACILITY OPPORTUNITY REGISTER #	Opportunity Area	Site	Equipment #	Recommended Project	Type	Apply	Existing condition	Project Details
OR- 1	Other	FSF	N/A	Begin using notched V-belts rather than smooth V-belts for garden-variety motor-driven applications. Schedule a remote BAS review with an SEM HVAC specialist. (No charge!)	Change belt types	Site	Some notched belts were observed during treasure hunt, but not all areas were screened. Mix of belt types, largely smooth V.	Order notched equivalents when restocking belts. Notched belts can be installed on the regular belt replacement schedule without pulley/sheave changes. Savings are typically 2-3%. For more information: https://www.nrel.gov/docs/fy13osti/56012.pdf
OR- 2	HVAC	FSF	N/A		Remote BAS review	Site	A BAS is present, though isolated from the main district BAS system. This could use a second set of eyes.	Work with your energy coach to determine if this is a good fit for your site, and if so, to schedule a review. You will screenshare your BAS interface with an SEM HVAC specialist who will identify problems and areas for improvement in real time. If you are unable to screenshare your BAS, saving screenshots is an option, too.
OR- 3	Boiler plant	FSF	N/A	Perform boiler tune-up (particularly for linkage controls). Schedule this as a regular maintenance activity.	Boiler tune-up	Site	Not discussed during the treasure hunt. This is typically a good fit if: Boiler tune-up has not been recently completed.	Obtain a vendor cost quotation. Work with your energy coach to understand what non-SEM incentives may be available.
OR- 4	Boiler plant		N/A	Survey and repair steam traps. Set this up as a recurring maintenance activity.	Steam trap maintenance	Site	Not discussed during the treasure hunt. This is typically a good fit if: Steam trap survey has not recently (in last 6-12 months) been completed.	Contact a vendor to schedule the survey. (Your boiler service vendor likely offers this service.) Allocate staff and resources to promptly repair all failed steam traps, starting with the highest-pressure traps and moving to the lowest-pressure traps. If you have not recently surveyed, you may see failure rates >15%. Work with your SEM energy coach to understand what non-SEM incentives may be available for this project. A steam trap survey cost analysis tool and trap log sheet are available from your energy coach.
OR- 5	Boiler plant		N/A	Improve boiler sequencing by connecting the boiler plant to the existing BMS system. (A boiler that	Improve boiler sequencing	Site	Two boilers are present but no longer are able to communicate with the BMS. Site utilizes a daily manual check and touch up procedure. An extensive BMS is available in the building, with district programmers available.	Work with your operators, district BMS programmers, and potentially vendors to review boiler sequencing and determine whether existing boilers are capable of communicating with the BMS, and what the economic feasibility of the project would be. When sequencing, consider efficiency across your full range of total system steam flow rates. Before beginning, be sure to collect part-

Page 324 of 367

DNV

										when not cooking, or after hours.		
OR- 10	Kitchen/ Refrigeration / Laundry			N/A	Keep preheat times minimal for ovens and fryers. Turn off unused equipment.	Minimize idle kitchen equipment run time	Site		Not discussed during the treasure hunt, but this is a common institutional kitchen efficiency measure.		Work with your energy coach and site staff to determine if this is a good fit for your site.	
OR- 11	Kitchen/ Refrigeration / Laundry			N/A	Keep ovens and fryers clean to improve their heating efficiency	Clear kitchen equipment	Site		Not discussed during the treasure hunt, but this is a common institutional kitchen efficiency measure.		Work with your energy coach and site staff to determine if this is a good fit for your site.	
OR- 12	Kitchen/ Refrigeration / Laundry			N/A	Make sure door seals and gaskets are in good shape for ovens, steamers, and reach-in coolers	Kitchen equipment weatherization	Site		Not discussed during the treasure hunt, but this is a common institutional kitchen efficiency measure.		Work with your energy coach and site staff to determine if this is a good fit for your site.	
OR- 13	Kitchen/ Refrigeration / Laundry			N/A	Install low-flow pre-wash sprayer valves in dishwashing areas	Low-flow pre-sprayer valves	Site		Not discussed during the treasure hunt, but this is a common institutional kitchen efficiency measure.		Work with your energy coach and site staff to determine if this is a good fit for your site.	
OR- 14	Lighting			N/A	Manually turn off lighting that's not needed	Shut off lighting	Site		The offices and admin areas tend to have lighting left on.		Work with your SEM Energy Coach to plan a "light on!" campaign to engage employees. Ensure this includes critical elements that change behavior: building motivation, addressing any barriers (such as hidden light switches), recognizing good behaviors, etc.	
OR- 15	Lighting			N/A	Install lighting occupancy sensors where appropriate	Lighting occupancy sensors	Site		No occupancy sensors were observed during the treasure hunt.		Add occupancy sensors in the areas with variable occupancy (e.g., offices, lunch room etc.) and where lighting tends to be left on. For areas with multiple entries, install sensors at each entryway. For areas in which workers may be sedentary, consider dual- technology SEMling-mounted passive infrared and ultrasonic sensors.	
OR- 16	Lighting			N/A	Delamp fluorescent lighting fixtures in areas with excessive light	Delamp lighting	Site		3- to 4-lamp troffers with T8 32W lamps in most non-high bay spaces.		Borrow a light meter through the SEM team and systematically check lighting levels against IESNA standards (available from your energy coach), removing lamps in a symmetrical way across the space to ensure best aesthetics.	

OR- 17	Lighting		N/A	Replace or relamp non-LED lighting fixtures with LED equivalents	Upgrade lighting to LED	Site	HID lighting dominates the refrigerated spaces, where its heat output is an extra burden on the ammonia system. 3-4 lamp T8 fluorescent is present in most other spaces. Poor light quality is a common complaint despite overlighting. Vendor quote has been requested for a comprehensive lighting upgrade.	Work with your SEM and Energy Smart Schools team to understand available incentives and financial case. Be sure to integrate lighting controls with your fixture upgrades for maximum cost effectiveness! Install ASAP.
OR- 18	Refrigeration		N/A	Update maintenance interval for strip curtains in doorways between spaces at different temperatures	Install strip curtains	Site	A lot of door curtains are old/tired/sticking together. These curtains are primarily between conditioned dry storage space and other areas.	Plan within your facilities team: should any of these be replaced with speed doors? Air curtains? New strip curtains, but on a more frequent replacement schedule? Set up work orders to address the chosen strategy.
OR- 19	Refrigeration		N/A	Install electronically commutated (EC) motors on evaporators. Specify these as the standard for replacement when evaporator motors fail.	Install ECM motors on evaporators	Site	Not discussed during the treasure hunt, but this is a common industrial refrigeration efficiency measure.	Work with your energy coach and site staff to determine if this is a good fit for your site.
OR- 20	Refrigeration		N/A	Review air circulation in the medium temp (cooler) area and determine if the air circulation system is needed to reduce hot spots.	Install ECM motors on evaporators	Site	Circulation fans (separate from evap. fans) are present to boost air flow around the cooler, but these are not used.	Check with the system operators to identify any known hot spots or obstructions to flow (e.g., blocked evaps.). When you borrow a thermal imaging camera from the SEM team, use this to check for any areas of the cooler that tend to stay warmer than the rest. If warm spots are present, test out running the fans and seeing if the cooler setpoint can be increased and still meet the same temperatures.
OR- 21	Refrigeration		N/A	Ensure evaporator defrost is appropriately controlled and evaporators	Service evaporators	Site	Not discussed during the treasure hunt, but this is a common industrial refrigeration efficiency measure.	Work with your energy coach and site staff to determine if this is a good fit for your site.

					are regularly cleaned and not blocked by racking	Reduced dock door cold air losses	Site	Great door closing habits (doors closed when no trailer pulled up and no active loading/unloading), but awnings and seals around doors not in great shape, actively looking to replace.	If seals need repair, issue work orders for maintenance. If replacement is needed, collect vendor quotations. If an energy savings estimate is needed to make a cost case to management, your SEM team can assist.
OR- 22	Refrigeration			N/A	Repair damaged loading dock seals.	Remote refriger. system review	Site	A refrigeration control system is present and well kept could use a second set of eyes.	Work with your energy coach to schedule a review. You will screenshare or provide screenshots/photos of your controls interface with an SEM refrigeration specialist who will identify problems and areas for improvement in real time.
OR- 23	Refrigeration			N/A	Schedule a controls system deep dive with an SEM refrigeration specialist. (No charge!)				
OR- 24	Envelope			N/A	Perform a thermographic scan of the building envelope (interior and exterior!) to reveal areas of significant radiant loss and air infiltration. Weatherize or insulate the affected parts of the building.	Thermographic scan	Site	Major wall between ammonia-cooled cooler section and dry goods storage (approx. 30' x 100') has a fair amount of temperature leakage likely occurring. Mario stated in the morning time if standing far enough away could see mirage effect!	Borrow a thermal imaging camera from the SEM team and use it to identify the most significant areas of energy loss. Your SEM team can help estimate the energy cost associated with specific areas so that you can prioritize for repair.
OR- 25	HVAC			N/A	Troubleshoot IT department humidity problems	Optimize data center return air	Site	RTU on the ground provides cooling for IT department via an open plenum above the space – 10 foot SEMling in rooms, with another 20+ of open plenum space above. Very high humidity, hard to control space temps, causing a number of issues with SEMling tiles as well with moisture	Work with your SEM team to plan next steps. While a vendor quote for system modifications may be in order, technical assistance is available from the SEM team.
OR- 26	Other			N/A	Promote awareness on energy efficiency (e.g.,	Employee awareness	Site	There is not a consistent energy efficient culture at the site, though some individuals do a great job with energy.	Educate staff on how their actions can lead to significant energy savings. Take an example of turning off a light or how to use thermostats and create awareness campaign. Provide success stories from your own or similar organizations. Collaborate with HR to design the campaign

OR- 27	Other			N/A	guidelines on turning off lights, managing plug loads)	HVAC	Site	Comfort complaints are common in the zones (Purchasing) on the same air handler as the server room. These may be being overcooled as a result of the high heat gain of the data room.	and run it across all the sites within your organization. Use an eNewsletter, web email, etc. to share relevant information. Work with your energy coach on how to create engagement campaign using ADKAR methodology. Recognize and celebrate achievements. Work with your HVAC team (both district staff and preferred vendors) to troubleshoot. Is the server room setpoint too cold (ASHRAE recommends 80.6 F server intake temp.)? Should it be provided with dedicated cooling? Should branch dampers be adjusted? Work with the IT team to build buy-in on any setpoint adjustments.
OR- 28	Refrigeration			N/A	Manage condenser water chemistry and surface cleanliness so that condensers are at peak efficiency	Service condensers	Site	Condenser treatment program is not very effective as the tubes have been calcified and filled with blisters. This was discussed in detail with the maintenance supervisor	It is recommended to get cost/performance quotes from possible vendors for 1) condenser cleaning to mitigate existing buildup; and 2) a chemical/blowdown management program to balance water usage against scale buildup sustainably over time. Water softening can often be used to support higher cycles of concentration. Cleaning the evaporative condenser will reduce head pressures and thus the refrigeration system energy usage.
OR- 29	Refrigeration			N/A	Reduce minimum head pressure to the lowest possible value	Reduce head pressure	Site	Minimum head pressure currently is 135 psig	Consider reducing this minimum head pressure in steps of 5 psig if possible. Investigate options to reduce the minimum head pressure as the energy savings can be achieved quickly by reducing it.
OR- 30	Refrigeration			N/A	Install floating head pressure controls	Floating head pressure	Site	Head pressure and/or condenser water temperature is constant. The condenser fans operate based on fan pressure switches.	Floating head pressure controls (also known as wet bulb sensing) allow the condensing temperature to float down to lower condensing temperatures as outside air temperature (wet-bulb) permits. Obtain vendor cost quotation and estimate project simple payback. Proceed if economical, or integrate into next major system upgrade (e.g., condenser replacement or overhaul).
OR- 31	Refrigeration			N/A	Optimize fan and pump staging. (Use surface area first to reduce head pressure, then start moving more air. When in doubt, cooler compressors are better.)	Optimize fan and pump staging	Site	Condenser fans have VFDs	Work with your energy coach to determine whether high-level support from the SEM program or more detailed support from a vendor would be the best fit for you. Data logging and/or trend data may be needed to support an analysis of the existing sequencing and potential improvements to it.

10 APPENDIX E: “MEASUREMENT AND VERIFICATION REPORT STRATEGIC ENERGY MANAGEMENT (SEM)” PREPARED BY THE IMPLEMENTER FOR WASHOE COUNTY SCHOOL DISTRICT

The following report, which was created by the 2025 ESS Program’s implementation contractor, was prepared for Washoe County School District (22 pages including the title page).

WHEN TRUST MATTERS

DNV

MEASUREMENT AND VERIFICATION REPORT STRATEGIC ENERGY MANAGEMENT (SEM)

ENERGY SMART SCHOOLS PROGRAM

PREPARED FOR



SPONSORED BY





Contents

1	INTRODUCTION.....	3
2	SEM SCOPE OF WORK.....	3
3	ENGAGEMENT AND ENERGY SAVING ACTIONS.....	3
4	MT&R BASELINE MODEL AND MEASURED SAVINGS	5
5	PREVIOUS PROJECTS.....	6
6	2025 ENERGY SAVING INITIATIVES	6
7	CONCLUSION	7
8	APPENDIX A: PREVIOUSLY IMPLEMENTED PROJECT REGISTER	8
9	APPENDIX B: 2025 ENERGY SAVING INITIATIVES.....	15



1 INTRODUCTION

In late 2020, NV Energy's Energy Smart Schools program partnered with Washoe County School District (WCSD) to launch a Strategic Energy Management (SEM) initiative. The program demonstrated significant energy savings through low-cost/no-cost operational improvements, leveraging best practices from other Nevada school districts. Following the successful pilot, NV Energy approved continued SEM funding at no cost to WCSD to sustain savings and complement the district's energy management systems.

In 2025, DNV became the new implementer for Energy Smart Schools. DNV updated its support plan for WCSD, focusing on reducing energy consumption through collaborative strategies. The team held regular meetings with WCSD's Energy & Sustainability Manager, Sandor Rosta, to reinforce low-cost/no-cost measures and ensure consistent maintenance practices that were initiated in previous years. They also coordinated efforts with McKinstry's powerED team to further support site-level energy reduction and capital improvement projects.

2 SEM SCOPE OF WORK

The SEM program emphasizes operational and behavioral improvements to achieve energy savings. The Energy Smart Schools team engages district personnel to implement these changes, identify low-cost/no-cost opportunities, and recommend process efficiencies. Technical assistance from DNV and McKinstry helps offset staffing limitations within school facilities teams.

In 2025, all partners collaborated to build on prior successes, focusing on energy use reduction through projects, strategies, and behavioral changes. WCSD and McKinstry led implementation efforts, while the program team provided guidance on behavioral practices, equipment upgrades, and supplemental support.

To maintain momentum, the program team conducted recurring check-ins with WCSD and McKinstry, twice monthly from January to June and bi-monthly from September to December. These sessions addressed challenges, identified new opportunities for energy savings. This feedback loop enabled WCSD to correct negative trends and plan for continued savings in the upcoming year.

3 ENGAGEMENT AND ENERGY SAVING ACTIONS

DNV built a strong relationship with Washoe County's Energy Manager, Sandor Rosta, while they met twice a month to discuss opportunities for strategic energy management as well as upcoming capital improvement projects and the best practices for future energy-saving efforts. The meetings included Matthew Albanese, Energy Engineer, who provided expertise on capital-improvement projects; David Wyllie, Senior Energy Engineer, who offered strategic energy-management and building-management recommendations; Crystal Troiano, Program Manager, who provided regular communications showcasing low-cost and no-cost ideas; and Billie Augustine, NV Energy Major Account Executive, who assisted with questions related to meters, solar, and other general energy topics.

McKinstry's work through the powerED program bolsters WCSD's energy management program, and it continues to have a very positive impact. McKinstry leverages their robust database to monitor energy usage trends and quickly identify anomalies. When schools show unexpected increases in energy consumption, McKinstry acts promptly to help the school district investigate and resolve the issue. Their team initiates targeted improvements and ensures that energy-efficient equipment is not only installed but also operating at peak performance. This proactive



approach helps maintain efficiency, reduce costs, and support sustainability goals across educational facilities.

Program team support included:

- Reviewed WCSD projects (historical, current, and future) for potential incentives
- Brainstorming options and strategies to further reduce energy use
- Reviewing models with an eye towards significant changes in energy use
- Implementation of energy-saving tactics at specific locations
- Investigating potential energy-saving projects for program incentives

DNV engaged with the school district to verify the continuation of the energy-saving strategies and measures implemented in previous years. This allowed DNV to verify the measures previously implemented by comparing them against the 2019 baseline to verify energy savings. McKinstry also collaborated with the facilities department of the school district to ensure that these measures were being implemented by adjusting controls for HVAC and chillers, adjusting setback points, and ensuring schedules were being followed at the schools. Sandor Rosta worked with the facilities personnel to pass on recommended low-cost/no-cost behavioral and engineering modifications for the different schools in their districts.

DNV held regular meetings with the school district and was highly engaged with them regarding the list of potential capital improvement projects for the current and upcoming years. This continued involvement enables them to track completed projects and propose more efficient equipment and solutions for future initiatives.

One of the most valuable contributions to WCSD's energy savings is the ongoing work from McKinstry's and their use of models. These models allowed the team to monitor energy consumption across all enrolled sites and quickly identify locations where usage deviated significantly from baseline or historical trends. Findings were shared with WCSD for further investigation, leading to faster resolution of issues such as incorrect building schedules, equipment malfunctions, and occupancy discrepancies, often a month or more ahead of previous troubleshooting timelines.

This collaborative approach delivered substantial benefits for WCSD and strengthened support from both McKinstry and the program team. Building on prior years, the team continued using the model trends log to track irregular patterns, capture insights, and share recommendations. Coaches documented anomalies, added comments, and flagged schools needing deeper review. This accelerated communication improved responsiveness, enhanced teamwork, and significantly boosted energy savings trends.

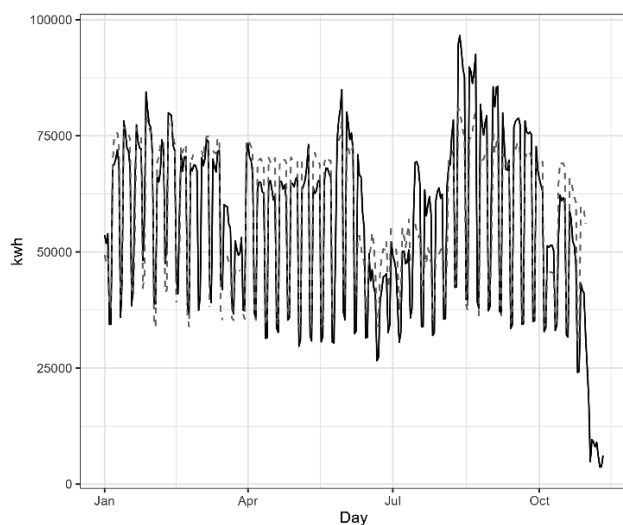


4 MT&R BASELINE MODEL AND MEASURED SAVINGS

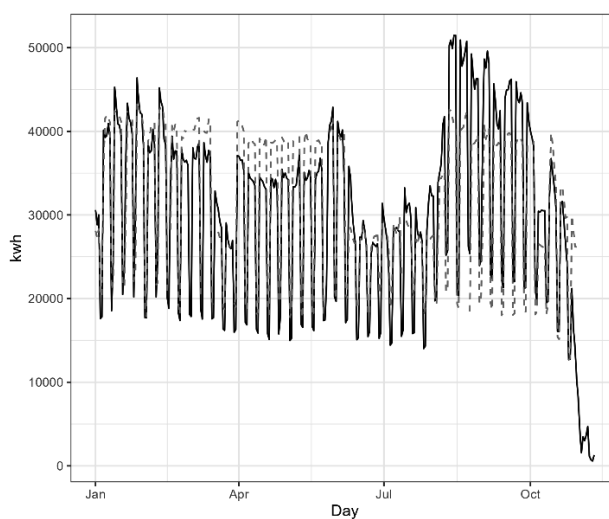
SEM savings are determined using statistical energy models. These whole-building linear regression models use facility meter data, local weather, and school calendar data to isolate the change in energy usage between the baseline (2019) and reporting (2025) periods. For WCSD, we pooled individual schools into separate models, grouped by school type (elementary, middle, high, or administrative). This is consistent with previous evaluation methods. We considered information about new construction and major renovations when determining modeling exclusions, in addition to standard exclusions like outlier usage and missing data.

The analysis was initiated with 108 locations in the initial data collection, and then six locations were excluded due to inconsistent data and meters being previously removed, which would falsely inflate the savings amounts. A total of 106 locations were produced in the final analysis, including 62 Elementary schools, 12 high schools, 15 middle schools, and 13 administrative buildings. Initial SEM savings were calculated at 4,814,484 ; however, all capital improvement projects that were previously paid out were reduced from the total (81,082), leaving a **total savings of 4,733,402**.

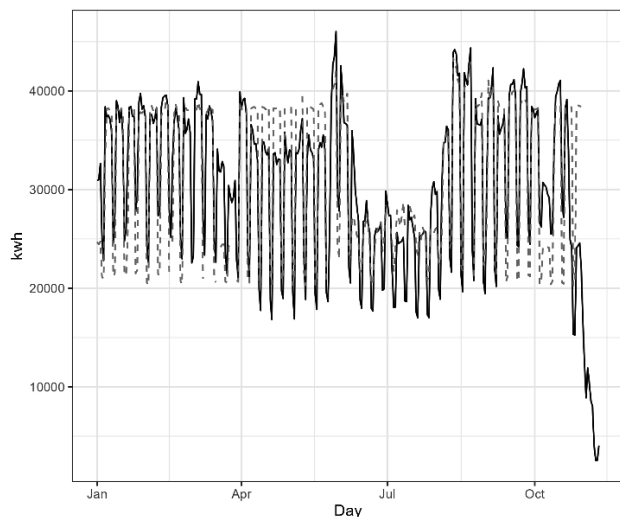
Shown below are visuals showing the actual consumption (black line) against the predicted baseline (red dashed line) to identify deviations.



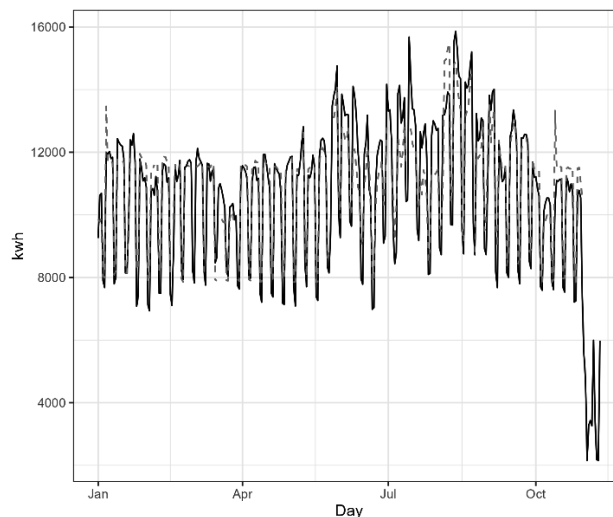
WCSD Elementary School



WCSD Middle School



WCSD High School



WCSD Administration/Other

5 PREVIOUS PROJECTS

As part of the SEM engagement, it was critical to verify that the work that was done previously was still in effect and contributing to overall energy savings in the school district. The list developed by the previous implementation was utilized to ensure that all measures were still in effect and that the overall themes of those measures were still being implemented. These measures can be seen below. The themes include, but are not limited to, monitoring schedules, HVAC controls with override and schedules, pump schedules, school break setback schedules, etc. See in [Appendix A: Previously Implemented Project Register](#)

6 2025 ENERGY SAVING INITIATIVES

In alignment with the measures initiated in 2024, the teams coordinated efforts to continue current energy-saving measures from the previous year. This encompasses HVAC controls optimization and maintains data visibility via McKinstry's Compass/REVEAL dashboards. Since these efforts were included in the work that was started in 2024, it maintained the baseline analysis of 2019. Efforts included identifying high usage and runtime anomalies, programming updates, and summer shut-downs coordinated with WCSD, correcting host/device issues after ACM upgrades, and initiating targeted fixes (setpoint corrections, schedule enforcement, and sequence reviews). Capital Improvement Projects were monitored and completed, including installing multiple sites with VFDs, lighting, new construction, etc. McKinstry completed a dashboard realignment for area/meter changes, and continued monitoring of building overrides was also planned to sustain visibility after scope changes. [See in Appendix B: 2025 Energy Saving Initiatives.](#)



7 CONCLUSION

2025 was a highly successful year for the Washoe County School District in terms of energy management and kWh savings. Through the collaborative efforts of WCSD, DNV, McKinstry, and NV Energy, the district achieved a total energy savings of 4,814,484 kWh compared to the 2019 baseline. This accomplishment reflects not only the effectiveness of strategic energy management practices but also the strong partnerships and ongoing engagement among all stakeholders.

The district's commitment to maintaining and enhancing energy-saving measures, supported by regular communication, technical expertise, and data-driven decision-making, has resulted in measurable improvements across elementary, middle, high school, and administrative sites. The use of advanced monitoring tools, timely interventions, and continuous feedback loops ensured that operational and behavioral changes translated into sustained savings.

WCSD's engagement with both DNV and McKinstry demonstrates a dedication to long-term sustainability and operational excellence. The relationships built throughout the year have strengthened the district's capacity to identify opportunities, address challenges proactively, and support ongoing improvements. These efforts not only reduced energy consumption and costs but also positioned WCSD's as a leader in energy stewardship within Nevada's educational community.



8 APPENDIX A: PREVIOUSLY IMPLEMENTED PROJECTS

ELEMENTARY SCHOOL SEM PROJECT LIST

Project Description	Completed	Location	Still in Effect
9/2/21 Gym AHU is operating 24/7. No override, but fan is operating well past scheduled time.	10/27/2021	Palmer ES	X
CWPs are operating 24/7. It appears that the "call from HP" button is overridden to YES. Recommend resetting this function to "auto" if pumps are not necessary to operate 24/7. 2/10/22: Call for HP set to Auto. All TUX units are communicating. Pumps are back to following schedule.	2/10/2022	Hall ES	X
Pump dP setpoint was reset from 10 to 25 psi. This has caused pump speed to increase from roughly 85-90% up to 100%. Recommend resetting value back to previous value or having TAB conducted to determine flow requirements. 2/10/22: dP lowered to 18psig, having a minimal impact on pump speed.	2/10/2022	Hall ES	X
Both CHWP1 and CHWP2 are operating during occupied hours. Recommend reviewing pump performance to determine if both pumps are required to operate. 2/10/22: Pumps were in alarm. It was found that trending data was command, not status. Both pumps were being commanded to run, but no evidence to support both pumps actually operating. Alarm was cleared - no savings.	2/10/2022	Bennett ES	X
Multipurpose room south unit control mode is overridden to occupied (See screenshot). Recommend removing override and allowing unit to follow schedule. Override was causing units to operate 24/7 and maintain occupied setpoints. 2/10/22: Override removed, unit following schedule. Override was placed on 6/21/21.	2/10/2022	Greenbrae ES	X
School is in manual override mode. School was placed in manual override for freeze protection on 2/22 and override was not removed as of 4/12. Most other schools had freeze protection removed 3/2.	4/13/2022	Sepulveda ES	X
Tower Pump in Alarm	12/15/2021	Westergard ES	X
Replace OSA Temp Sensor	5/31/2022	Beck ES	X
Enable Trends / Investigate High Usage	4/29/2022	Silver Lake ES	X
Remove Manual Override	4/13/2022	Warner ES	X
Caughlin Ranch ES - On During UnOcc and Excessive Run Time - whole school	3/2/2022	Caughlin Ranch ES	X
Add cooling and heating OA lockouts	6/14/2022	Brown ES	X



Add VFDs to pump motors	6/14/2022	Donner Springs ES	X
Add heating and cooling OA lockouts	2/9/2022	Dodson ES	X
Add VFDs to pump motors	6/14/2022	Double Diamond ES	X
Add DCV to multipurpose room and stage	6/14/2022	Hidden Valley ES	X
Add DCV to various areas	6/14/2022	Huffaker ES	X
Add heating and cooling OA lockouts	2/9/2022	Huffaker ES	X
Add DCV to various areas	6/14/2022	Hunsberger ES	X
Add heating and cooling OA lockouts	2/9/2022	Mathews ES	X
Add DCV to various areas	6/14/2022	Mathews ES	X
Add kitchen hood exhaust control	2/9/2022	Mathews ES	X
Add DCV to various areas	6/14/2022	Moss ES	X
Optimize heating and cooling OA lockout setpoints	6/14/2022	Moss ES	X
Add DCV to various areas	6/14/2022	Picollo ES	X
Chilled Water System Control Improvements	6/14/2022	Double Diamond ES	X
Chilled Water System Control Improvements	6/14/2022	Donner Springs ES	X
Trouble shoot loss of control communication	9/27/2022	Hidden Valley ES	X
Use Heating Setback Temperatures	12/15/2021	Smithridge ES	X
BAS Network Communication	9/1/2022	Moss ES	X
Remove Manual Overrides	4/13/2022	Elmcrest ES	X
Alice Smith ES - D-10 Office - High Supply Temp Issue	7/14/2023	Alice Smith ES	X
Remove Manual Override	1/31/2023	Gomm ES	X
Multiple schools went into "arctic mode" - heat pump schools that had to be manually turned off, extra load on sites	1/9/2023	Multiple	X
The 2nd half of '22 is higher than previous years. Not sure what is causing this increased usage across the district.	1/31/2023	Lemon Valley ES	



Another heat pump school with failing controllers. Oscillations in savings are due to controllers coming in and out of communication.	1/31/2023	Huffaker ES	X
Units have been <NR> periodically. CWP's are currently running 24/7, unsure why. On list to discuss with district.	5/1/2023	Huffaker ES	X
This site has a lot of modular and portable classroom units. These units were taken off the network last summer and only put back on in Jan/Feb of 2023. During that time, they were typically not running per schedule. Should continue to monitor this site.	5/15/2023	Lemon Valley ES	X
In manual override from 4/28 to 7/19.	4/28/2023	Lemon Valley ES	X
Mitchell ES: Program MAT setpoint to track SAT in AHUs	3/6/2024	Mitchell ES	X
Alice Smith ES: Upgrade TUX controllers to prevent <NR> units from keeping CWP's running 24/7.	2/27/2024	Alice Smith ES	X
Taylor ES: Add freezestat or temp sensor to attic and reduce OAT setpoint to reduce CWP pump runtimes	2/14/2024	Taylor ES	X

MIDDLE SCHOOL SEM PROJECT LIST

Project Description	Completed	Location	Still in Effect
Billinghurst MS: Simultaneous Heating/Cooling of CW Loop. The boilers and cooling tower are currently operating simultaneously. This is causing the building loop to be cooled by the cooling tower then reheated by the boiler prior to being supplied to the building. See attachment.	10/5/2021	Billinghurst MS	X
Clayton MS: 10/13/21: Manual overrides were removed from equipment. Several operational issues were observed in the chilled water plant including: 1. Chiller command manually set to "Day" mode 2. Chiller running longer than expected (running until ~10PM) 3. CHWPs appear to be running 24/7. It is recommended that the manual day override be reset to allow the chiller to follow a schedule and only operate during occupied hours. Additionally, it is recommended that the CHWPs only run during occupied hours. 10/13/21: CHWP overrides were removed and chiller schedule override was removed. Chiller and pumps will now only operate when OSA temperature is above 50F.	10/13/2021	Clayton MS	X
Depoali MS: Zac removed manual overrides and reset equipment to follow schedule. Most HPs in the school started operating 24/7 on July 13th and continue to do so as of 9/2/21. Units are mostly in manual override (see screenshot). Override done in the priority array and were removed.	10/14/2021	Depoali MS	X
Herz MS: ERVs Operating 24/7 10/20/21: ERV fans running 24/7. It is recommended that the control sequences be reviewed to determine what is causing ERVs B1, C1, C2, D2 to run 24/7. 10/27/21: Zac removed overrides.	10/27/2021	Herz MS	X



Sparks MS: HP running constantly corrected. HP N-11 appears to be running 24/7 based on space temperature trends from 10/26/21. Recommend investigating cause of HP running excessively. Savings from HP, plus CWP having to operate as well. 10/27/21: Unit was forced on in priority array. Zac corrected.	10/27/2021	Sparks MS	X
Many older Heat Pump schools do not have control valves on the heat pumps, leading to the CWPs running at full speed. Most pumps are 25 hp. It is recommended that control valves be installed at the heat pumps and VFDs be installed on the main CWPs. See individual school BIM items for savings calcs. Applies to: A Smith, Caughlin Ranch, Westergard, Silver Lake, Glenn Hare	1/13/2022	Multiple Sites	X
Many older Heat Pump schools do not have control valves on the heat pumps, leading to the CWPs running at full speed. Most pumps are 25 hp. It is recommended that control valves be installed at the heat pumps and VFDs be installed on the main CWPs. Applies to: Brown, Huffaker, Hidden Valley, Moss,	1/13/2022	Multiple Sites	X
RCx Study - EUI is highest among all Middle Schools. Recommend an RCx study to determine the cause of high usage and recommend improvements. Included in FY23 CIP	5/10/2022	Vaughn MS	X
Add heating and cooling OA lockouts	2/9/2022	Depoali MS	X
Add DCV to various areas	6/14/2022	Mendive MS	X
Optimize heating and cooling OA lockout setpoints	2/9/2022	Mendive MS	X
Add DCV to various areas	6/14/2022	Vaughn MS	X
Chilled Water System Control Improvements	6/14/2022	Mendive MS	X
Chilled Water System Control Improvements	6/14/2022	Vaughn MS	X
MDF Room Schedules	12/15/2021	Herz MS	X
Entire school has been in manual override, causing 24/7 operation from August 2022 through January 2023.	2/28/2023	Sparks MS	X
Multiple schools went into "arctic mode" - heat pump schools that had to be manually turned off, extra load on sites	1/9/2023		X
AHUs have been forced on since January with manual override from 3/27-5/17	5/15/2023	Traner MS	X
This is one of the sites that had wet bulb control added to the chilled water plant. This allows changeover from mechanical cooling to free cooling based on wetbulb temp instead of dry bulb. This extends the free cooling hours. It also had a VFD installed on the chilled water pumps.	2/1/2023	Mendive MS	X
Depoali MS: Optimize ERV operations to prevent 24/7 or overnight runtimes	3/6/2024	Depoali MS	X

HIGH SCHOOL SEM PROJECT LIST

Project Description	Completed	Location	Still in Effect



Many older Heat Pump schools do not have control valves on the heat pumps, leading to the CWP's running at full speed. Most pumps are 25 hp. It is recommended that control valves be installed at the heat pumps and VFDs be installed on the main CWP's. Applies to: Allen, Taylor, Shaw, Sparks MS, Risley.	1/13/2022	All Sites	X
Both CWP 3 and 4 are operating at 100% with a "Lag override" alarm on. This alarm is due to the lead pump not being able to maintain dP. Recommend investigating cause of alarm.	1/20/2022	AACT HS (Edison Admin, Warehouse)	X
Elementary schools schedule is 0700-1900 M-F, longer hours than the typical 0800-1600 for the rest of the district. Recommend reviewing spaces assigned to this extended schedule to determine if all spaces are necessary. Extended schedules are due to the community library and afterschool program. Item closed.	1/25/2022	Gerlach HS (K- 12)	X
Chilled water plant is operating 24/7. Central plant has been operating 24/7 starting in August 2021, with a short period September when the plant went back to operating per schedule. See attached plot for whole building kW and CHWP status to see when plant was operating excessively.	2/15/2022	Spanish Springs HS	X
HW Valve at AHU-8 is failed open, overheating supply air temperature. Recommend replacing/repairing valve.	2/16/2022	McQueen HS	X
AC-7 possible leaking HWV. With valve commanded closed, SAT was higher than MAT, causing overheating of the space and forcing mechanical cooling to be enabled. See attached.	2/17/2022	McQueen HS	X
Failed supply air temperature sensor in kitchen AC unit. Supply temp of 17F on 2/17/22.	2/17/2022	McQueen HS	X
AC-4 heating and cooling setpoints are not per district standards. Unit has a 1F heating offset and a 0F cooling offset which will cause cycling between heating and cooling. Recommend adjusting setpoints to within district standards.	2/17/2022	McQueen HS	X
Raise IDF room setpoints. Current cooling setpoints are below recommended levels for IDF and electrical rooms. It is recommended that these be increased to 80F. See EBCxreport for more information.	3/15/2022	North Valleys HS/Completed	X
Recommend RCx/TAB study to identify potential energy savings and comfort issues.	5/2/2022	Galena HS	X
AC-1 (Theater) unit OSA appears to have a failed osa damper actuator. With OSA temp of 49F, and economizer open to 80%, return and supply air temperatures are the same at 68.7F. Recommend repair/replacement of damper actuator.	5/3/2022	Wooster HS	X



Add VFDs to large spaces with varying loads (Theater 7.5 hp, GYM 2x20hp, and small gym 20hp). Use VFD to vary flowrate depending on heating/cooling demands. Fan ramps to full speed as heating or cooling is required and slows down during ventilation only mode.	5/3/2022	Spanish Springs HS	X
Theater AHU performance: Investigate performance of little theater unit (see attachment). OSA damper and CHWV both commanded to 100% open, but SAT is at 89F. Indicating potentially failed actuators and/or leaking HWV. Space temperatures are outside of typical district settings. Heating setpoint of 60F, cooling of 65F. Recommend leaving heating setpoint at 60F unless space will be occupied and increasing cooling setpoint to 74F.	5/3/2022	Wooster HS	X
Implement Duct Static Pressure Reset Schedule for VAV units. DSP reset should increase DSP setpoint during high load periods and reduce DSP setpoint during low load periods. Development of this will likely require verification and fine tuning of setpoint ranges based on VAV damper positions.	5/9/2022	McQueen HS	X
Implement Duct Static Pressure Reset Schedule for VAV units. DSP reset should increase DSP setpoint during high load periods and reduce DSP setpoint during low load periods. Development of this will likely require verification and fine tuning of setpoint ranges based on VAV damper positions.	5/9/2022	Galena HS	X
Spanish Springs HS: rental chiller running 24/7 due to no connection to controls	5/30/2022	Spanish Springs HS	X
Both chilled water and heating hot water dP sensors in the 2006 addition are reading 0 psi, causing secondary pumps to operate at 100% speed. Recommend repair/replacement of the sensor to allow pumps to modulate. dP sensors repaired in June 2022.	6/10/2022	North Valleys HS/Completed	X
Spanish Springs HS: Rental chiller offline, new permanent chiller online, went from 90 ton to 110 ton	9/16/2022	Spanish Springs HS	X
MAU-1, MAU-2 (Locker Rooms), and Big Gym AH-1/2 are all forced into manual occupied mode, causing units to run 24/7.	11/14/2022	Spanish Springs HS	X
AC-2 Duct static pressure sensor reading negative pressure causing fan speed to remain at 100%.	5/3/2022	Galena HS	X



Conduct an RCx/TAB study. Based on reviews of AHUs and VAV performance, it is recommended that an RCx/TAB study be conducted for the school. Included in FY23 list.	5/3/2022	Galena HS	X
AHUs are allowing simultaneous heating and cooling to occur. When cooling stages on and SAT decreases to below setpoint, the heating water valve opens at the same time. It is recommended that the heating valve be disabled if cooling stages are enabled.	5/3/2022	Galena HS	X
OSA/RA damper calibration: Several AC units are operating with 100% OSA, but SAT is 10F or more higher than OSA. Recommend investigating OSA/RA damper positions to ensure economizers are operating properly.	5/3/2022	Galena HS	
Add VFDs to Theater and Gym AHUs. Use VFDs to stage fan based on heating/cooling calls. As heating or cooling call increases, fan speed increases. When no heating/cooling call is present, fan slows down to minimum ventilation only speed. Included in FY23 CIP list	5/3/2022	Galena HS	X
Replace controller for HP 3-1. Unit is regularly <NR>, causing CWP to run 24/7. All other controllers do not have communication issues. Recommend replacement of this controller. In FY23 CIP list	5/3/2022	AACT HS (Edison Admin, Warehouse)	X
Entire site has lost communication with BAS network. This loss of communication has disabled analytics and prevents identification of energy efficiency opportunities. Recommend having BCS troubleshoot and get system back online ASAP. This has also prevented updating schedules, causing equipment to operate excessively.	1/7/2022	Hug HS	X
Many older Heat Pump schools do not have control valves on the heat pumps, leading to the CWPs running at full speed. Most pumps are 25 hp. It is recommended that control valves be installed at the heat pumps and VFDs be installed on the main CWPs. See individual school BIM items for savings calcs. Applies to: A Smith, Caughlin Ranch, Westergard, Silver Lake, Glenn Hare	1/13/2022	Multiple Sites	X
North Valley HS - Excessive Runtime Fault for Agriculture Lab. Cannot find Agriculture lab in control system - need to locate unit. Excessive runtime is limited to winter months - may be greenhouse.	2/4/2022	North Valleys HS	X
Add demand-controlled ventilation to Auditorium (AC-2) and Commons Areas (FC-20,21,22,23,24,25,26).	2/23/2022	North Valleys HS	X



Existing heating hot water system requires two pumps to run 24/7 due to excessive water flow being bypassed in 3- way valves throughout the building. It is recommended that this system be converted to a variable primary system with reduced flow through 3-way bypass valves and VFDs on the HW pumps.	4/29/2022	North Valleys HS	X

9 APPENDIX B: 2025 ENERGY SAVING INITIATIVES

2025 Elementary School Project List

Description	Completed	Location
Removed override causing 24/7 pump run; host/device recreation after ACM upgrade to restore trends	3/5/2025	Hall ES
Raised MDF setpoints; investigated high electric use; forced schedule compliance; host fix in progress	3/5/2025	Sepulveda ES
Corrected units not following global MDF setpoints (80°F)	3/5/2025	Cold Springs ES
Identified NR devices; flagged need for programming to prevent 24/7 pump operation	3/5/2025	Caughlin ES
Identified NR devices; flagged need for programming to prevent 24/7 pump operation	3/5/2025	Silver Lake ES
Resolved 'Arctic mode' override; pump 24/7; control replacement scheduled via CIP	3/5/2025	Huffaker ES
Leak repair; confirmed new boiler; reviewed high water/gas usage	5/21/2025	Dunn ES
Replace Isolation Valves	8/1/2025	Hunter Lake
Replace Water Heaters	8/1/2025	Moss
Replace Electrical Panels	8/1/2025	Lenz
Washer/Dryer Installs	12/31/2025	Pleasant Valley
Washer/Dryer Installs	12/31/2025	Smithridge
HVAC Controls & Associated Equipment	8/1/2025	Allen
HVAC Controls & Associated Equipment	8/1/2025	Bohach
HVAC Controls & Associated Equipment	8/1/2025	Brown
HVAC Controls & Associated Equipment	8/1/2025	Caughlin Ranch
HVAC Controls & Associated Equipment	8/1/2025	Hall



HVAC Controls & Associated Equipment	8/1/2025	Hiddin Valley
HVAC Controls & Associated Equipment	8/1/2025	Huffaker
HVAC Controls & Associated Equipment	8/1/2025	Poulikidas
HVAC Controls & Associated Equipment	8/1/2025	Sepulveda
HVAC Controls & Associated Equipment	8/1/2025	Silver Lake
HVAC Controls & Associated Equipment	8/1/2025	Alice Smith
HVAC Controls & Associated Equipment	8/1/2025	Taylor
HVAC Controls & Associated Equipment	8/1/2025	Westergard
HVAC Controls & Associated Equipment	8/1/2025	Natchez
HVAC Data Room cooling/split system	1/3/2025	Hall
HVAC Data Room cooling/split system	1/3/2025	Sepulveda
Rebuild Switch Gear	8/1/2025	Mount Rose
HVAC Controller upgrade	4/30/2025	Lois Allen
HVAC Controller upgrade	4/30/2025	Anderson
HVAC Controller upgrade	4/30/2025	Beasley
HVAC Controller upgrade	4/30/2025	Jesse Beck
HVAC Controller upgrade	4/30/2025	Bennet
HVAC Controller upgrade	4/30/2025	Booth
HVAC Controller upgrade	4/30/2025	Cannan
HVAC Controller upgrade	4/30/2025	Caughlin Ranch
HVAC Controller upgrade	4/30/2025	Corbett
HVAC Controller upgrade	4/30/2025	Desert Heights
HVAC Controller upgrade	4/30/2025	Dodson
HVAC Controller upgrade	4/30/2025	Drake
HVAC Controller upgrade	4/30/2025	Duncan
HVAC Controller upgrade	4/30/2025	Dunn
HVAC Controller upgrade	4/30/2025	Elmcrest
HVAC Controller upgrade	4/30/2025	Greenbrae



HVAC Controller upgrade	4/30/2025	Gomes
HVAC Controller upgrade	4/30/2025	Huffaker
HVAC Controller upgrade	4/30/2025	Hunter Lake
HVAC Controller upgrade	4/30/2025	Hunsberger
HVAC Controller upgrade	4/30/2025	Incline
HVAC Controller upgrade	4/30/2025	Juniper
HVAC Controller upgrade	4/30/2025	Lemmon Valley
HVAC Controller upgrade	4/30/2025	Lenz
HVAC Controller upgrade	4/30/2025	Lincoln Park
HVAC Controller upgrade	4/30/2025	Echo Loder
HVAC Controller upgrade	4/30/2025	Maxwell
HVAC Controller upgrade	4/30/2025	Mitchell
HVAC Controller upgrade	4/30/2025	Moss
HVAC Controller upgrade	4/30/2025	Mt Rose
HVAC Controller upgrade	4/30/2025	Natchez
HVAC Controller upgrade	4/30/2025	Palmer
HVAC Controller upgrade	4/30/2025	Peavine
HVAC Controller upgrade	4/30/2025	Picollo
HVAC Controller upgrade	4/30/2025	Pleasant Valley
HVAC Controller upgrade	4/30/2025	Donner Springs
HVAC Controller upgrade	4/30/2025	Lemelson
HVAC Controller upgrade	4/30/2025	Kate Smith
HVAC Controller upgrade	4/30/2025	Smithridge
HVAC Controller upgrade	4/30/2025	Spanish Springs
HVAC Controller upgrade	4/30/2025	Stead
HVAC Controller upgrade	4/30/2025	Sun Valley
HVAC Controller upgrade	4/30/2025	Alyce Taylor
HVAC Controller upgrade	4/30/2025	Towles



HVAC Controller upgrade	4/30/2025	Verdi
HVAC Controller upgrade	4/30/2025	Warner
HVAC Controller upgrade	4/30/2025	Westergard
HVAC Controller upgrade	4/30/2025	Whitehead
HVAC Controller upgrade	4/30/2025	Winnemucca
HVAC Controller upgrade	4/30/2025	Melton
HVAC Controller upgrade	4/30/2025	Van Gorder
HVAC Controller upgrade	4/30/2025	Double Diamond
HVAC Controller upgrade	4/30/2025	Sepulveda
HVAC Controller upgrade	4/30/2025	Hall
HVAC Controller upgrade	4/30/2025	Gerlach
Washer/Dryer Installs	2/7/2025	Warner
Washer/Dryer Installs	2/8/2025	Hunter Lake
Washer/Dryer Installs	2/9/2025	Peavine
Washer/Dryer Installs	2/10/2025	Lemmon Valley
Boiler Room Conversion	2/26/2025	Stead
Single Point Entry Window Film	1/3/2025	Stead
Single Point Entry Window Film	1/3/2025	Beck
Single Point Entry Window Film	1/3/2025	Drake
Single Point Entry Window Film	1/3/2025	Peavine
Single Point Entry Window Film	1/3/2025	Pleasant Valley
Single Point Entry Window Film	1/3/2025	Warner
Single Point Entry Window Film	1/3/2025	Gomm
Single Point Entry Window Film	1/3/2025	Juniper
Single Point Entry Window Film	1/3/2025	Towels
Single Point Entry Window Film	1/3/2025	Allen
Single Point Entry Window Film	1/3/2025	Bennett
Single Point Entry Window Film	1/3/2025	Mathews



Single Point Entry Window Film	1/3/2025	Silver Lake
Single Point Entry Window Film	1/3/2025	Westergard
Single Point Entry Window Film	1/3/2025	Gomes
Single Point Entry Window Film	1/3/2025	Palmer
Single Point Entry Window Film	1/3/2025	Kate Smith
Single Point Entry Window Film	1/3/2025	Sun Valley
Single Point Entry Window Film	1/3/2025	Greenbrae
Single Point Entry Window Film	1/3/2025	Lemelson
Single Point Entry Window Film	1/3/2025	Verdi
Single Point Entry Window Film	1/3/2025	Mt. Rose
Single Point Entry Window Film	1/3/2025	Gerlach
Single Point Entry Window Film	1/3/2025	Natchez

2025 Middle School Projects

Description	Completed	Location
4 units offline; high nightly demand; planned heat pump replacements	Mar 5, Apr 9	Sparks MS
Corrected address in plans; documentation for NVE energization	Mar 12, Jun 4	O'Brien MS
Emergency Chiller Replacement		Dilworth
Replace Isolation Valves	8/1/2025	Dilworth
HVAC Controls & Associated Equipment	8/1/2025	Herz
HVAC Controls & Associated Equipment	8/1/2025	Billinghurst
HVAC Controls & Associated Equipment	8/1/2025	Traner
HVAC Controls & Associated Equipment	8/1/2025	Cold Springs
HVAC Controls & Associated Equipment	8/1/2025	Desert Skies
HVAC Controls & Associated Equipment	8/1/2025	Depoali
HVAC Controls & Associated Equipment	8/1/2025	Shaw
HVAC Controls & Associated Equipment	8/1/2025	Sky Ranch



HVAC Controls & Associated Equipment	8/1/2025	Sparks
HVAC Controller upgrade	4/30/2025	Clayton
HVAC Controller upgrade	4/30/2025	Dilworth
HVAC Controller upgrade	4/30/2025	Mendive
HVAC Controller upgrade	4/30/2025	Pine
HVAC Controller upgrade	4/30/2025	Sparks
HVAC Controller upgrade	4/30/2025	Traner
HVAC Controller upgrade	4/30/2025	Shaw
HVAC Controller upgrade	4/30/2025	Depoali
HVAC Controller upgrade	4/30/2025	Cold Springs
Single Point Entry Window Film	1/3/2025	Dilworth
Single Point Entry Window Film	1/3/2025	Sparks
Single Point Entry Window Film	1/3/2025	Traner
Single Point Entry Window Film	1/3/2025	Cold Springs
Single Point Entry Window Film	1/3/2025	Billinghurst
Single Point Entry Window Film	1/3/2025	Mendive
Single Point Entry Window Film	1/3/2025	Shaw
Single Point Entry Window Film	1/3/2025	Incline
Single Point Entry Window Film	1/3/2025	Pine

2025 High School Projects

Description	Completed	Location
Override removal after frozen coil; expansion completed; dashboard update needed	4/9/2025	Incline HS
Chiller repairs complete; condenser water valve sticking; pump staging and G36 programming	3/5/2025	Spanish Springs HS
Chiller/free-cool settings; tower fan VFD tripping; intermittent performance; recommended review	3/5/2025	NVHS
CIP project window	6/9/2025	Reno HS



CIP project window	6/9/2025	Traner
VFD installation	7/14/2025	Galena HS
MDF room setpoint adjustment; frequent pump cycling; trend monitoring	4/9/2025	Desert Skies
Free cooling temp set negative; repairs complete	6/4/2025	SSHS
Window/Door Frames Phase II	12/31/2025	Damonte Ranch
Electric Panel Upgrade Transformer	8/1/2025	Wooster
HVAC Controls & Associated Equipment	8/1/2025	Galena
HVAC Controls & Associated Equipment	8/1/2025	Glenn Hare
HVAC Controls & Associated Equipment	8/1/2025	North Valleys
HVAC Controls & Associated Equipment	8/1/2025	Reno
HVAC Controls & Associated Equipment	8/1/2025	Sparks
Replace Water Heaters	8/1/2025	Damonte Ranch
Replace Theater Lighting	8/1/2025	Reed
Replace Theater Lighting	8/1/2025	Galena
Replace Theater Lighting	8/1/2025	McQueen
HVAC Controller upgrade	4/30/2025	Galena
HVAC Controller upgrade	4/30/2025	Reno
HVAC Controller upgrade	4/30/2025	Inspire
HVAC Controller upgrade	4/30/2025	Innovations
HVAC Controller upgrade	4/30/2025	Wooster
HVAC Controller upgrade	4/30/2025	Glen Hare
HVAC Controller upgrade	4/30/2025	Spanish Springs
HVAC Controller upgrade	4/30/2025	North Valleys
HVAC Controller upgrade	4/30/2025	AACT
IT Infrastructure Upgrade	1/6/2025	Spanish Springs



IT Infrastructure Refresh	1/6/2025	Damonte Ranch
HVAC Controls Modifications	4/30/2025	Spanish Springs
HVAC Controls Modifications	4/30/2025	North Valley
Replace Rooftop Units (11 units)	1/2/2025	Reed

2025 Administration Buildings

Description	Completed	Location
HVAC Controller upgrade	4/30/2025	Brown Center
HVAC Controller upgrade	4/30/2025	S. Trans
HVAC Controller upgrade	4/30/2025	N. Trans

11 APPENDIX F: “MEASUREMENT AND VERIFICATION REPORT STRATEGIC ENERGY MANAGEMENT (SEM)” PREPARED BY THE IMPLEMENTER FOR CARSON CITY SCHOOL DISTRICT

The following report, which was created by the 2025 ESS Program’s implementation contractor, was prepared for Carson City School District (**15** pages including the title page)

WHEN TRUST MATTERS

DNV

MEASUREMENT AND VERIFICATION REPORT STRATEGIC ENERGY MANAGEMENT (SEM)

ENERGY SMART SCHOOLS PROGRAM

PREPARED FOR



SPONSORED BY





Contents

1 INTRODUCTION 3

2 SEM SCOPE OF WORK.....3

3 ENGAGEMENT AND ENERGY SAVING ACTIONS 3

4 BASELINE MODEL AND MEASURED SAVINGS.....4

5 SEM PROJECTS 6

6 CONCLUSION 6



1 INTRODUCTION

In April 2021, NV Energy's Energy Smart Schools program partnered with Carson City School District (CCSD) to launch a Strategic Energy Management (SEM) initiative. The program demonstrated significant energy savings through low-cost/no-cost operational improvements, leveraging best practices from other Nevada school districts. Following the successful pilot, NV Energy approved continued SEM funding at no cost to CCSD to sustain savings and complement the district's energy management systems.

In 2025, DNV became the new implementer for Energy Smart Schools. DNV updated its support plan for CCSD to focus on reducing energy consumption through collaborative strategies. The team held regular meetings with CCSD's Director of Operations, Virgil Berry, and their Chief Financial and Operations Officer, Spencer Winward, to reinforce low-cost/no-cost measures and ensure consistent maintenance practices. In 2025, CCSD severed its partnership with McKinstry, which had been overseeing the portfolio of energy management and providing information to the school district that its facility personnel would perform the on-site efforts.

2 SEM SCOPE OF WORK

The SEM program emphasizes operational and behavioral improvements to achieve energy savings. The Energy Smart Schools team engages district personnel to implement these changes, identify low-cost/no-cost opportunities, and recommend process efficiencies. Technical assistance from DNV helps offset staffing limitations within school facilities teams.

In 2025, all partners collaborated to build on prior successes, focusing on energy use reduction through projects, strategies, and behavioral changes. The program team guided behavioral practices, suggested equipment upgrades, and supplemental support.

To maintain momentum, the program team held recurring monthly check-ins with CCSD starting in August. These sessions addressed challenges, identified new opportunities for energy savings, and verified previous energy-saving tactics were still in use.

3 ENGAGEMENT AND ENERGY SAVING ACTIONS

DNV built a relationship with the CCSD team during monthly meetings to discuss opportunities for strategic energy management, as well as upcoming capital improvement projects, and the best practices for future energy-saving. The meetings included Matthew Albanese, Energy Engineer, who provided expertise on capital-improvement projects; David Wyllie, Senior Energy Engineer, who offered strategic energy-management and building-management recommendations; Crystal Troiano, Program Manager, who provided regular communications showcasing low-cost and no-cost suggestions; and Billie Augustine, NV Energy Major Account Executive, who assisted with questions related to meters and general energy topics.

Program team support included:

- Reviewed projects (historical, current, and future) for potential incentives
- Brainstorming options and strategies to further reduce energy use
- Implementation of energy-saving tactics at specific locations
- Investigating potential energy-saving projects for program incentives



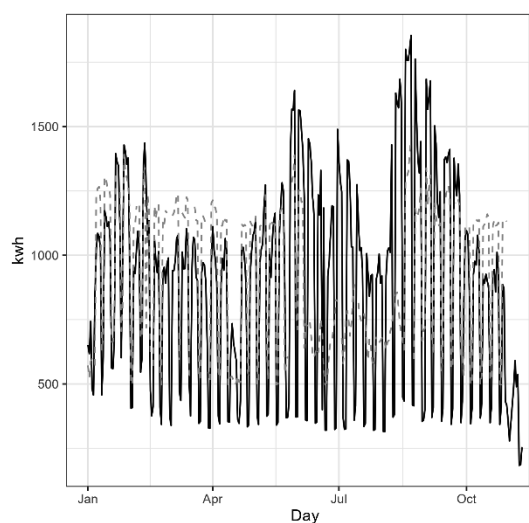
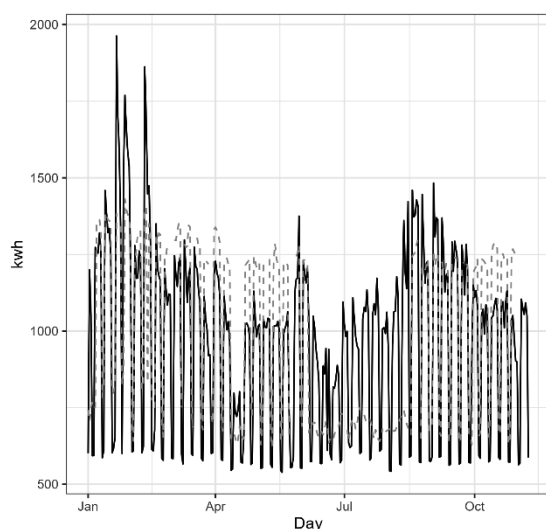
DNV engaged the school district to verify the continuation of the energy-saving strategies and measures implemented in previous years. This allowed DNV to verify the measures previously implemented by comparing them against the 2019 baseline to verify energy savings. The facilities department of the school district worked to implement previous measures such as adjusting controls for HVAC and chillers, adjusting setback points, and checking that schedules were being followed at the schools. Virgil Berry and Spencer Winward collaborated with the facilities personnel to deliver recommended behavioral and engineering modifications for the schools in their district. This collaborative approach delivered substantial benefits for CCSD and strengthened support from the program team.

4 BASELINE MODEL AND MEASURED SAVINGS

SEM savings are determined using statistical energy models. These whole-building linear regression models use facility meter data, local weather, and school calendar data to isolate the change in energy usage between the baseline (2019) and reporting (2025) periods. Data scientists pooled individual schools into separate models, grouped by school type (elementary, middle, high, or administrative). This is consistent with previous evaluation methods. For CCSD, which had limited sites, we fit models to individual schools. We considered information about new construction and major renovations when determining modeling exclusions, in addition to standard exclusions like outlier usage and missing data.

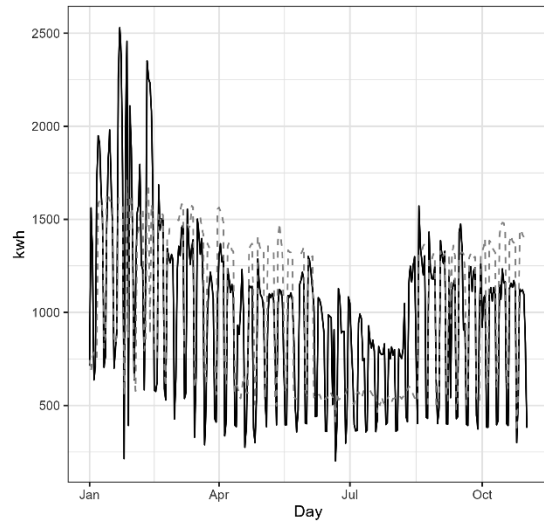
The analysis was initiated with 13 locations in the initial data collection, and then eight locations were excluded in alignment with the 2024 analysis. A total of five locations were produced in the final analysis, including Empire Elementary, Fritsch Elementary, Mark Twain Elementary, Gleason Training Facility, and the Transportation Facility. Final SEM savings were calculated at 67,293.

Shown below are visuals showing the actual consumption (black line) against the predicted baseline (red dashed line) to identify deviations.

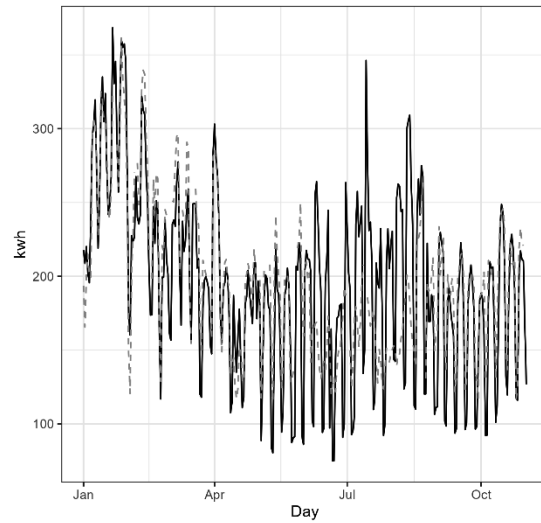




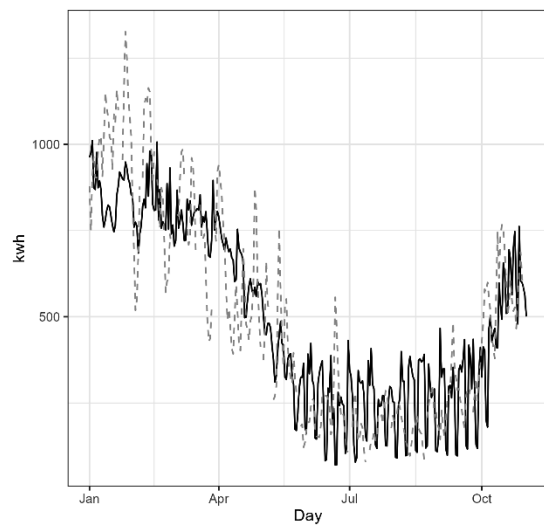
Empire Elementary School



Fritsch Elementary School



Mark Twain Elementary School



Gleason Training Facility

Transportation Facility



5 SEM PROJECTS

As part of the SEM engagement, it was crucial to verify that the previously initiated tactics were still in effect and contributing to the overall energy savings in the school district. The list developed by the previous implementation was utilized to ensure that all measures were still in effect and that the overall themes of those measures were still being implemented. These measures can be seen below. The themes include, but are not limited to, monitoring schedules, HVAC controls with overrides and schedules, pump schedules, school break setback schedules, and more. See full list in [Appendix A: Previously Implemented Projects](#).

During regular conversations with CCSD, it was expressed that they were working to maintain the measures previously implemented in all locations. This list will continue to drive conversations and ensure that previously successful measures are extended to drive savings in future years.

6 CONCLUSION

2025 was a successful year for the Carson City School District in terms of energy management and savings. Through the collaborative efforts of the school district and the Energy Smart Schools Program, the district achieved a total energy savings of 67,293 kWh compared to the 2019 baseline. This accomplishment reflects not only the effectiveness of strategic energy management practices but also the strong partnerships and ongoing engagement among all stakeholders.

The district's commitment to maintaining and enhancing energy-saving measures, supported by regular communication, technical expertise, and data-driven decision-making, has resulted in measurable improvements across elementary, middle, high school, and administrative sites. The use of advanced monitoring tools, timely interventions, and continuous feedback loops ensured that operational and behavioral changes translated into sustained savings.

CCSD's engagement with the Energy Smart Schools Program demonstrates a dedication to long-term sustainability and operational excellence. The energy-saving dedication throughout the years has strengthened the district's capacity to identify opportunities, address challenges proactively, and support ongoing improvements. These efforts not only reduced energy consumption and costs but also positioned CCSD as a leader in energy stewardship within Nevada's educational community.



7 APPENDIX A: PREVIOUSLY IMPLEMENTED PROJECTS

Opportunity Location	Opportunity System	Project Type	Recommended Project	Existing Condition / System Description	Project Details and Next Steps
CHS Main Building	HVAC	Occupancy control of VAV	Speculative Measure: Consider controlling ventilation rate and temperature setpoint by occupancy sensor or schedule (particularly 100% outside air applications)	An occupancy sensor is available or easy to install in the space and a BAS is present.	If not already implemented: Obtain a vendor cost quotation for integrating occupancy signal into an algorithm to reset the minimum VAV position and (if air handler is dedicated to this space) outside air damper position based on occupancy.
CHS Main Building	HVAC	Stretch the set point interval	Speculative Measure: Use wider temperature settings (such as 68°F for heating and 78°F for cooling) for areas with inconsistent and intermittent occupancy (e.g., hallways, lobbies, break rooms and copy/print rooms, etc.).	Hallways and other "walk-through" spaces are held at the same temperatures as continuously occupied spaces.	Determine setpoints for areas with inconsistent and intermittent occupancy. If these spaces are on a tighter temperature range, issue a work order or otherwise assign staff to revise these setpoints. Pilot in selected areas, and consider adjusting in small increments over time rather than all at once.
CHS Main Building	HVAC	HVAC scheduling	Speculative Measure: Develop a process to ensure that holidays get scheduled as unoccupied days so systems aren't running when not needed.	Holidays are not systematically scheduled in the BAS.	If not already implemented, schedule a PM work order to do this on regular basis
CHS Main Building	HVAC	HVAC AHU scheduling	Speculative Measure: Schedule air handlers according to occupancy (either off or set to cycle for temperature) rather than letting them run continuously. Close fresh air dampers during morning warmup or cooldown.	HVAC fans run continuously with standard minimum outside air fractions during some or all unoccupied hours. Temperatures are not set back significantly during some or all unoccupied times.	If not already implemented: Assign internal staff to revise unoccupied mode operating parameters in the BAS and revise schedules in the BAS. If internal staff need support to accomplish this, contact a vendor for a cost quotation. Use night walks or remote system status checks to confirm the effectiveness of the revisions.



CHS Main Building	HVAC	Optimal Stop/Coast down	Speculative Measure: Consider widening setpoints or locking out heating and cooling 30 minutes before systems go unoccupied (but still let the fans continue to run to ventilate during this time)	Setpoints are consistent for every minute of unoccupied time. Setpoints are only allowed to drift after occupied hours end.	If not already implemented: Assign internal staff to revise these schedules in the BAS. If internal staff need support to accomplish this, contact a vendor for a cost quotation. After implementation, check actual equipment status during this time to confirm the effectiveness of the revisions.
CHS Main Building	HVAC	Optimal Start	Speculative Measure: Use optimal start features to make sure that the temperature reaches the occupancy temperature setpoint by the time that the occupants arrive in the morning. Make sure that the early start accommodates the changes in the weather and seasonality.	BAS has optimum start capability but this is not known to be utilized.	If not already implemented: Utilize any trending features in the BAS to confirm that the OSA dampers remain commanded shut during the warm-up period. Verify with physical inspection if needed.
CHS Main Building	HVAC	HVAC setbacks	Speculative Measure: Schedule space temperature setbacks and minimum outside air percentage based on occupancy	An occupancy sensor is available or easy to install in the space and a BAS is present.	If not already implemented: Obtain a vendor cost quotation for integrating occupancy signal into an algorithm to reset the minimum VAV position and (if air handler is dedicated to this space) outside air damper position based on occupancy.
CHS Main Building	HVAC	Use Occupancy Override Buttons	Consider installing "Occupancy Override" buttons on local thermostats, to allow a temporary (e.g., 1 hour) activation of the HVAC systems if occupants are working after-hours or on holidays and need conditioned air. Set spaces to unoccupied mode after hours.	HVAC systems have the potential to often be operated with extended hours in case after-hours events or occupancy occur.	Obtain a vendor cost quotation for implementation. Assess simple payback period and schedule implementation if favorable.



CHS Main Building	HVAC	Change HVAC belt types	In areas that still use smooth V-belts, begin using notched V-belts rather than smooth V-belts for garden-variety belt-driven HVAC applications.	Mix of belt types, largely smooth V.	Order notched equivalents when restocking belts. Notched belts can be installed on the regular belt replacement schedule without pulley/sheave changes. Savings are typically 2-3%. For more information: https://www.nrel.gov/docs/fy13osti/56012.pdf
CHS Main Building	HVAC	Change HVAC belt types	Overall: Begin specifying synchronous rather than V-belts for belt-driven air handlers undergoing sheave and pulley replacements.	System does not need slip for start-up and pulleys/sheaves are older or in need of replacement.	Obtain vendor cost quotation.
CHS Main Building	HVAC	Demand controlled ventilation	Consider implementing demand control ventilation (e.g., using CO2 levels in return air to control fraction of outside air introduced to the space)	Some large variable-occupancy spaces operate with a fixed outside air fraction. Significant amounts of outside air are preheated or precooled even when no one is present.	Identify target air handlers, typically those that are dedicated to large areas like gyms and cafeterias that have big occupancy swings. (While multi-zone AHUs can use DCV, more sensors may be required to accurately represent CO2 levels in all spaces.) Obtain vendor cost quotations and schedule implementation based on simple payback.
CHS Main Building	HVAC	Demand controlled ventilation	Speculative Measure: Check accuracy of the CO2 sensor on a regular basis.	CO2 sensors are not regularly checked for accuracy.	Once Demand Control Ventilation is implemented: Schedule checks for these sensors in your maintenance management system, prioritizing those sensors that control the greatest air volumes (e.g., check gymnasiums before conference rooms). Connect with a vendor if needed.
CHS Main Building	HVAC	Demand controlled kitchen ventilation	Implement automatic hood controls (based on opacity or heat) in kitchen and cooking areas	Kitchen hoods are controlled manually, and tend to be left on when not cooking, or after hours.	Obtain a vendor cost quotation.



CHS Main Building	HVAC	Reduce kitchen hood run time	Run a behavior based campaign to minimize the time the kitchen hoods are on unnecessarily.	Kitchen hoods are controlled manually, and may be left on when not cooking, or after hours.	Work with your SEM coach to plan an awareness campaign and standard procedures for when hoods are to be turned on and off. It is possible to trigger fire suppression systems if cooking takes place without hoods on, so startup and shutdown are equally important. Regularly inspect results and recognize individuals that do a good job keeping the hoods off when not needed.
CHS Main Building	HVAC	Service and enable air side economizers	Service and enable air side economizers	Air-side economizers may not have received regular attention, or may be locked out or set to narrow operating ranges.	Check if the AHU/RTU/MAU economizers are enabled and perform PM to ensure they are operable. Review setpoints. If they are disabled or operate with a very conservative range, determine the root cause (e.g., humidity concerns or comfort complaints) and determine the best way to address it. Repair and recommission all air side economizers and implement a regular preventative maintenance program.
CHS Main Building	HVAC	Move to enthalpy economizing	Speculative Measure: Move from a dry bulb temperature-based economizer changeover point to an enthalpy-based changeover point.	Economizer operation driven by dry bulb changeover temperatures.	If not already implemented: Obtain vendor cost quotation for installing enthalpy sensors and updating control algorithms. Enthalpy sensors are more prone to failure than temperature probes; recurring PMs for enthalpy sensor calibration should be set up if this measure is to reliably produce energy savings.
CHS Main Building	HVAC	Coil and condenser cleaning	Clean and service chilled and hot water coils, and condenser fins, if applicable (better heat transfer)	Coil cleanings may be scheduled but have proven difficult to keep up with, or may not be integrated in regular PM checklist.	If maintenance hours are extremely limited, consider contracting out HVAC PMs. If kept in-house, prioritize areas for coil cleaning based on typical rates of dirt and debris accumulation. Work within PM system to prioritize cleanings. Randomly inspect the results of PMs if



					needed to ensure process is not being "pencil whipped."
CHS Main Building	HVAC	Tune OA fraction	Test outside air fraction and ensure that minimum fresh air damper position is set to code value if appropriate. Outside air fractions greater than this should be investigated to ensure they are necessary.	There may not be a known logic for the min. OA fractions in use. Actual vs. commanded OA fractions may not be regularly checked.	Obtain or make a list of AHUs and the space types that they serve. Work with EHS and/or an HVAC vendor to determine appropriate minimum OA fractions for each space. Review setpoints and test OA fractions (this can be done roughly by checking MAT, OAT, and RAT simultaneously) for each AHU. Adjust setpoints and service dampers as needed.
CHS Main Building	HVAC	Filter maintenance	Clean or change filters monthly, move to higher flow filters as possible (pleated style)	Filter changes may be scheduled but have proven difficult to keep up with. Filters may be older- style standard flow.	If maintenance hours are extremely limited, consider contracting out HVAC PMs. If kept in-house, prioritize areas for filter maintenance based on typical rates of dirt and debris accumulation. Work within PM system to prioritize filter changes and specify more efficient filter types for reorder. Randomly inspect the results of PMs if needed to ensure process is not being "pencil whipped."
CHS Main Building	HVAC	HVAC maintenance review	Review HVAC service contract to understand what maintenance is supposed to be performed, what is being performed, and whether energy efficiency could be improved through enhancements to the maintenance list.	Mechanical rooms were clean and staff indicated periodic service. Still recommend service contract reviews with CLEAResult to look for opportunities to implement new best practices.	Find a copy of your maintenance contract and meet with your SEM engineer and coach to review it together and identify any enhancements that may be needed for energy efficiency. Familiarize on-site maintenance staff with the items that are and are not in the HVAC contractor's scope, so that no maintenance items are missed and the on-site maintenance staff can spot check the contractor's work as needed. Refrigerant charge checks, coil/heat exchanger cleaning, and filter maintenance are the most critical efficiency items.



CHS Main Building	HVAC	Exhaust fan scheduling	Speculative Measure: Shut off toilet exhaust fans during unoccupied hours	Exhaust fans are connected to BAS or easy to integrate into BAS.	If not already implemented: Assign internal staff to revise or set up fan schedules in the BAS. If internal staff need support to accomplish this, contact a vendor for a cost quotation. Use physical inspection or remote system status checks to confirm the effectiveness of the revisions.
CHS Main Building	HVAC	Toilet lighting and fan controls	Speculative Measure: Control toilet exhaust fans and lighting with occupancy sensors	Exhaust fans are not connected to a BAS or easy to integrate into a BAS.	If not already implemented: This is an alternative to OR21. Obtain vendor cost quotation or schedule this project with internal staff. Follow up after implementation to ensure lighting and fans turn off and on when expected.
CHS Main Building	HVAC	Destratification fans	Consider installing destratification fans to heat the space evenly and reduce the system setpoint	Space heating setpoints are higher than necessary because hot air tends to pool at ceiling level.	Difficult to implement in gymnasium spaces due to potential damage from sports balls, but there may be fan options with protective caging. Obtain vendor cost quotation. Be sure that if the project is implemented, space heating setpoints are reduced to the extent possible; often, occupant comfort is achievable with a lower space heating setpoint due to better air distribution.
CHS Main Building	HVAC	BAS built-in features	Identify built-in features of the BAS that could help further energy saving, and use any BAS diagnostic tools to identify any unusual trends in the data.	A BAS is present, but the limits of its capabilities have not been fully explored.	Work with your BAS vendor to understand system capabilities. Common built-in energy savings features often include: Optimal Start, Warm-up Mode, Supply Air Reset, Supply Pressure Reset, Night Low Limit, Night High Limit, Night Economizer/Purge as well as the common diagnostic tools such as Quick Summary Reports, Trend graphing, Alarming of out of range values, Run-time logging, Automated VAV box CFM recalibration.



CHS Main Building	HVAC	Remote BAS review	Schedule a remote BAS review with an SEM HVAC specialist. (No charge!)	A BAS is present and could use a second set of eyes.	Work with your energy coach to schedule a review. You will screenshare your BAS interface with an SEM HVAC specialist who will identify problems and areas for improvement in real time. If you are unable to screenshare your BAS, saving screenshots is an option, too.
CHS Main Building	HVAC	Regular BAS checks	Implement monthly BAS "checkup" to make sure setpoints and schedules are correct and have not been overridden, no sensors are obviously failed	Operators may regularly use the BAS to address comfort complaints, but may not have time set aside to do a regular review focused on efficiency.	Identify a reviewer or a review team comfortable doing these checks on the BAS. Schedule a recurring PM or meeting to do this check. Utilize the BAS Screen Check Guide available from your energy coach to guide your review. If time is limited and a full review can't be completed every month, cycle through portions of the STEPS so that each of the STEPS is covered at least once every 2-3 months.
CHS Main Building	HVAC	Override timeouts	Set up an override "time out" so that any override expires after a certain amount of time (4-6 hours in some cases, 12-24 in others) and cannot remain in place indefinitely.	Overrides persist indefinitely and must be undone manually.	Work with BAS vendor to understand if this is possible with your software. If so, set the default override duration to the minimum practical time (often 1 hour) suitable for your site.
CHS Main Building	HVAC	BAS preventive maintenance	Set up a recurring PM to service and calibrate sensors, VFDs, and dampers.	PMs may not be formally scheduled, or may be scheduled but difficult to keep up with. Sensor calibration may not be part of PMs.	If maintenance hours are extremely limited, consider contracting out HVAC PMs. If kept in-house, prioritize areas for maintenance based on age of equipment and the overall impact on system efficiency if sensors drift or malfunction (e.g., OA sensors). Work within PM system to prioritize HVAC PMs. Randomly inspect the results of PMs if needed to ensure process is not being "pencil whipped."



CHS Main Building	HVAC	Supply air temperature reset	Speculative Measure: Reset supply air temperatures (either manually or automatically) during low-dewpoint periods to minimize the amount of unnecessary subcooling and corresponding reheat	Fixed SAT setpoints.	If not already implemented: Obtain a vendor cost quotation for setting up algorithms to reset SATs based on OATs or other inputs as desired. Because SATs can impact dehumidification effectiveness if SAT reset is not properly implemented, be cautious implementing this measure on your own without qualified HVAC staff involved.
CHS Main Building	HVAC	Heating and cooling system lockouts	Speculative Measures: Disable heating and cooling systems automatically based on outside air temperature.	Heating and cooling systems come on line solely based on calls for heating or cooling.	If not already implemented: Lock the boilers out during the summer, or specify a minimum number of calls for heat that must occur for the boiler to turn on. This will minimize the possibility of simultaneous heating and cooling. If cold complaints increase (after boilers turned off in summer) scrutinize the supply air temperatures and/or VAV box flow settings. Similarly, keep mechanical cooling locked out as long as possible by utilizing OSA economizer free cooling effectively.

