BEFORE THE PUBLIC SERVICE COMMISSION OF
THE STATEOF MISSOURI

In the Matter of Evergy Metro, Inc. d/b/a Evergy Missouri Metro's Request for Authority to Implement a General Rate Increase for Electric Service	))))	**Case No. ER-2022-0129**
In the Matter of Evergy Missouri West Inc. d/b/a Evergy Missouri West's Request for Authorization To Implement a General Rate Increase for Electric Service	))))	**Case No. ER-2022-0130**

EVERGY MISSOURI METRO'S AND EVERGY MISSOURI WEST'S
NOTICE OF COMPLIANCE FILING

COME NOW, Evergy Metro, Inc. d/b/a Evergy Missouri Metro ("EMM") and Evergy Missouri West, Inc. d/b/a Evergy Missouri West ("EMW") (collectively, "Evergy" or "the Company") and, for their *Notice of Compliance Filing* ("Notice"), states to the Missouri Public Service Commission ("Commission") as follows:

1. On September 6, 2022, the Company filed a *Stipulation and Agreement Regarding Programs and Electric Vehicle Charging Tariffs* ("Agreement") which was approved by the Commission's November 21, 2022 *Report and Order* and subsequent December 8, 2022 *Amended Report and Order.*

2. Pursuant to the provisions of the Agreement[1], the Company submits the attached *Residential Battery Energy Storage Pilot Final Evaluation Results*.

WHEREFORE, the Company submits the attached to the Commission pursuant to the Agreement.

[1] "The Company will file a report at the end of the first quarter of 2026 that outlines the results of the pilot and directly addresses the learning objectives that were initially identified." See, *Agreement*, § 5.C.3., p. 5.

Respectfully submitted,

/s/ Roger W. Steiner

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing document was served upon counsel for all parties on this 31st day of March 2026, by either e-mail or U.S. Mail, postage prepaid.

/s/ Roger W. Steiner

Roger W. Steiner

Evergy Missouri: Residential Battery Energy Storage Pilot

Final Evaluation Results

March 31, 2026

CADMUS

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Cover Letter

The Company developed the Missouri Residential Battery Energy Storage (RBES) pilot to understand how customer sited batteries could operate as flexible, distributed grid assets capable of reducing peak demand, supporting resilience, enhancing grid stability, and informing future cost-effective program designs.

As outlined in the enclosed RBES Final Evaluation Report, the pilot measured and quantified program impacts on customer bills, evaluated peak-demand reduction, assessed demand response performance, and gathered qualitative insights on the role of behind the meter (BTM) storage - both standalone and paired with solar as a scalable distributed energy resource (DER).

The pilot achieved improvements in operational performance: peak hour- discharge increased by approximately 50% from PY1 to PY3, batteries delivered reliable resilience during outages, and demand response events achieved an average of 86% participation within the first 15 minutes of dispatch[1]. These findings position the Company to design a permanent program grounded in actual customer performance, value drivers, and verifiable system benefits.

The Company sought to evaluate residential storage at this time because macro market drivers are rapidly accelerating DER adoption. National demand for residential storage is transitioning from early innovators to early adopters, driven by declining battery costs, evolving TOU and net metering rate designs, and extended federal tax incentives that reduce upfront costs for customers—including leased or third party owned systems.

The Company anticipates residential deployments will grow over the next several years at the same time as the Company anticipates significant load growth. Increasing load growth, paired with rising customer resilience expectations, makes distributed storage a strategic asset for both local distribution operations and the bulk electric system. With technology enhancements enabling real-time telemetry, integrated APIs, and Distributed Energy Resource Management Systems (DERMS) managed dispatch, behind the meter batteries are now capable of contributing meaningfully to peak shaving, event driven capacity needs, and future non-wires alternatives—roles historically filled by utility scale supply side assets.

The pilots' operational, customer experience, and integration findings provide the Company with robust evidence for a more scalable, cost-effective program design:

- Grid Value & Peak Reduction – The pilot demonstrated strong alignment of battery discharge with peak windows and confirmed statistically significant reductions in summer on -peak demand, growing from ~1.0 kW to ~1.5 kW per device [2] across the three pilot years. This validates the role

[1] Table 11. Demand Response Event Overall Battery Performance – Final Report pg. 26

[2] Table 12 Demand Response Event Summary Across Pilot Years - Final Report pg. 26

of aggregated behind-the-meter batteries as a dependable year-round capacity accreditation and load modifying resource that reduces stress on the electric system.

- Customer Economics & Rate Alignment – The pilot showed that customer bill savings depend heavily on rate design. High-differential- TOU rates generated 10–20% savings on average[3], whereas low differential residential peak adjustment (RPA) rates created minimal or negative savings for battery only- customers. These insights directly inform how the Company will frame participation requirements, customer education, and future TOU enrollment pathways.
- Customer Value – Participants consistently ranked backup power as the most valued feature, and most reported strong satisfaction with system performance. Permanent program designs must therefore preserve customer-controlled resilience while improving dispatch consistency and peak period utilization.

Together, these insights position the Company to design a permanent program that more reliably balances system value, customer value, and cost-effectiveness.

A permanent and scalable residential battery storage program must balance grid value, customer value, and overall cost-effectiveness. Customer-owned batteries reduce program costs for ratepayers. Marketplace-based installation pathways allow customers to select from pre-qualified technologies while ensuring dispatch visibility. Lease or Tolling model's lower upfront costs while enabling access to dispatchable capacity. These approaches offer alternatives to the utility owned program model deployed during the pilot program.

The Company envisions approaching scalable design options as outlined in Table 1-A[4] below as a least cost pathway to address near-term capacity needs and defer or avoid certain distribution investments through potential non-wires alternatives.

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[3] Table 8. Average TOU Arbitrage Electric Bill Savings by Rate and System Type – Final Report pg. 17

[4] Table 1-A Ownership Model Comparison Matrix

Table 1-A Ownership Model Comparison Matrix

Feature	Utility-Owned (Utility-Owned Model)	Bring Your Own Battery (Customer Owned)	Marketplace DIY (Customer Owned)	Tolling / Lease (Vendor-Owned)
Upfront Cost to Customer	Low (Small Monthly Fee)	High (Customer-Funded)	Moderate (Rebate-Supported)	Low (Small Upfront Customer Install & Monthly Fee)
Performance Consistency	High (Homogeneous OEM Devices) ~96% dispatch accuracy	Low–medium (Heterogeneous OEM Devices)	Low–Medium (Controlled OEM Device List)	High (Homogeneous OEM Devices) ~96% dispatch accuracy
Scalability	Low - Upfront capital expenditure and ongoing program costs	Low – Moderate	Low – Moderate	High — Low First Cost, Single OEM, Dedicated Outreach Team
Grid Value MW Certainty	High (Standardized Hardware)	Moderate (Varies by Device & Integration)	Moderate	High (Standardized Hardware, P4P Contract)
Customer Backup Power Value	High (20% SOC Reserve Under Program)	High (Customer-Owned Asset)	High (Customer-Owned Asset)	High (20% SOC Reserve Under Program)
Program Cost Effectiveness	Low UCT/TRC Due to ownership costs	High TRC Potential	Mid TRC	Highest UCT/TRC Due to Guaranteed MW
Risk Considerations	High - Ongoing maintenance and support	Low- Moderate-Integration, Performance Variability	Low-Moderate - Integration, Performance Variability	Lowest— Vendor Owns Asset and Carries Performance Risk

Marketplace Do It Yourself ("DIY") – Enrollment pathway where a customer selects, purchases and installs an eligible home battery system from an approved list of devices on the Company's website.

Bring Your Own Battery ("BYOB") – Enrollment pathway where a customer owns an eligible battery system from an approved list of devices on the Company's website and elects to enroll their battery system for participation in the program.

Tolling / Lease – Enrollment pathway where an approved third-party vendor offers an approved battery system through a monthly lease model allowing customers that may not be able or interested in making an upfront capital investment the opportunity to participate in the program.

Program Development Draft Timeline and Milestones

The Company's approach will follow the steps outlined below:

1. Program Design Development– Use decision matrices to evaluate incentive design, dispatch modes, TOU posture, OEM requirements, and M&V structure.
2. Stakeholder Engagement & Partner Feedback– Engage Stakeholders, OEMs, installers and large customers to validate design assumptions.
3. Regulatory Filing Preparation – Develop program outline, cost-effectiveness analysis, benefits narrative, and implementation plan.

This development process will ensure the final recommended program is transparent, grounded in evidence, and is designed to deliver year-round distributed grid value at the lowest reasonable cost for Missouri customers.

Introduction

In 2023, Evergy Services, Inc., began implementing its Residential Battery Energy Storage (RBES) pilot in its Missouri service areas, which ran for three years through the end of 2025. The RBES pilot involved field testing behind-the-meter battery energy storage systems as a distributed energy resource (DER) to better understand the benefits to Evergy and participant customers. Evergy contracted with Cadmus to explore the following research objectives:

- Assess battery system impacts on demand and customer energy bills (on- and off-peak)
- Understand how Evergy can use batteries to impact future grid impacts of behind-the-meter solar systems as a DER
- Understand battery capabilities as a demand response capacity resource
- Document the benefits and impacts of the pilot program and determine post-pilot recommendations

This report provides a final update on the pilot's progress since 2023, focusing on its third and final year. The report starts with an overview of the pilot, including electric rates offered, battery operation for program participants, and number of participants in the pilot and each demand response event. Following the overview, we present the program impact findings, participant survey results, and conclusions and recommendations, as well as a number of appendices including additional Evergy collected insights.

1.1. Pilot Overview

The Missouri Public Commission granted approval of the RBES pilot in September 2022 under Case No. ER-2022-0129 (Evergy Missouri Metro) and Case No. ER-2022-0130 (Evergy Missouri West). More than 200 Evergy customers expressed interest in participating in the pilot in an online form on Evergy's website.[5] Evergy conducted 100 on-site meetings at customer homes to confirm pilot eligibility and battery placement. In 2023, Evergy began installing batteries and testing their ability to manage system demand, including different demand response uses. By the end of October 2023, Evergy had recruited 50 pilot customers and installed batteries in their homes, meeting its target for pilot participation.
Evergy owns the battery systems and operates battery demand response events through its Web-based Demand Response Management System (DRMS) in collaboration with the implementer, Budderfly (Sunverge). In parallel, Evergy has been testing demand response events through its own Distributed Energy Resource Management System (DERMS) to validate end-to-end functionality—including asset enrollment, dispatch, and data reporting from the battery systems back into DERMS.[6] Evergy additionally

5 Customers were invited to respond to the online interest form via social media advertising and direct email communications.

6 See *Appendix H. Maintenance Issues* and Total Costs

began testing smart thermostat demand response and electric vehicle (EV) charging integration with the pilot in 2025.[7] At the conclusion of the pilot, Evergy offered each Missouri pilot participant the option to purchase their battery at a depreciable value or have it removed free of charge. As of January 23rd, 2026, 30 of the 50 pilot participants had elected to purchase their batteries.

Evergy originally designed the pilot so that participants with solar photovoltaic (PV) systems remained on standard (non-time-of-use [TOU]) rates for net metering, while battery-only participants switched to a high-differential TOU rate at enrollment. However, following the Missouri Public Service Commission's December 2022 decision to make TOU rates mandatory for residential electricity customers by the end of 2023, Evergy began moving its Missouri customers to a new default, low price differential TOU rate in

Appendix H provides the battery maintenance information Evergy provided to Cadmus in December 2025. Evergy reported that the total cost of maintenance for the 50 pilot batteries across the three pilot years was $7,500. Table 15 summarizes the maintenance issues that required field visits during the pilot.

Table 15. RBES Pilot Battery Maintenance Field Visits

System ID	Issue	Date
Evergy H8 046	Mislabeled Fuse	9/12/2025
Evergy H8 004	Site Electrical Issues	9/3/2025
Evergy H8 007	Sunverge Maintenance: Battery Recovery	5/20/2025
Evergy H8 044	Sunverge Maintenance: Internet Communication	3/5/2025
Evergy H8 027	Sunverge Maintenance: Restore LG System Internet	9/26/2024
Evergy H8 008	Lost Communication	8/5/2024
Evergy H8 019	Lost Communication: Power Outage	8/5/2024
Evergy H8 018	Lost Communication: Homeowner sold their home and electricity was disconnected	7/29/2024
Evergy H8 015	Can Bus Fault	1/23/2024
Evergy H8 016	SEB Replacement	1/3/2024
Evergy H8 020	LG System Fault	11/2/2023
Evergy H8 005	Battery Replacement	10/26/2023
Evergy H8 007	Customer PV Fault	10/18/2023
Evergy H8 008	Undersized breaker	10/12/2023
Evergy H8 006	SEB Fault	9/28/2023
Evergy H8 004	Loss of Wi-Fi	9/6/2023
Evergy H8 013	SEB Replacement	9/5/2023

Appendix I. DERMS Integration for more information.

7 See *Appendix J. EV Charger Integration* for more information.

October 2023. As of January 2024, each pilot participant was enrolled in one of four TOU rates[8] that Evergy offers to its Missouri customers:

- **The Default Time-Based Plan** (Schedule RPAS [Residential Peak Adjustment Service]; formerly RPKA; formerly the Peak Reward Saver Plan) is the default plan for all Evergy Missouri customers. At the time of the pilot launch, it was also the only plan that offered net metering for customers with solar PV systems. This plan offers a usage-based block-pricing rate with very low-differential TOU charges. For the Missouri Metro (West) service area, the 12 a.m. to 6 a.m. charge is just $0.01 ($0.01075) per kWh less than its midday rate, and its 4 p.m. to 8 p.m. peak charge is just $0.01 ($0.01075) per kWh over the midday charge in the summer (June through September) and just $0.0025 ($0.00269) per kWh more than the midday charge in the winter (October through May).

  As of November 2025, all 29 pilot participants with solar PV systems were enrolled in this rate, as well as seven of the 21 participants without solar PV systems (Table 1).

- **The Summer Peak Time-Based Plan** (Schedule RTOU-2; formerly the Standard Peak Saver Plan) is a two-period TOU plan. In the summer, peak charges of $0.38328/kWh to $0.34856/kWh (for Evergy's Missouri Metro and Missouri West service areas, respectively) apply from 4 p.m. to 8 p.m. on weekdays, and all other hours are $0.08714/kWh to $0.09582/kWh. In the winter, super-off-peak charges of $0.05656/kWh to $0.05090/kWh apply between midnight and 6 a.m. every day, and all other hours have charges of $0.10180/kWh to $0.11311/kWh.

  Seven of the 21 participants without solar PV systems chose this plan.

- **The Nights & Weekends Plan** (Schedule RTOU) is a three-period TOU plan. Electricity consumption during super-off-peak hours (from midnight to 6 a.m. every day) is charged at $0.04174/kWh to $0.05633/kWh, depending on service area and season. Peak charges of $0.24618/kWh to $0.33803/kWh apply from 4 p.m. to 8 p.m. on weekdays. All other hours are off-peak and are charged at $0.09933/kWh to $0.11268/kWh.

  One of the 21 participants without solar PV systems chose this plan.

- **The Nights & Weekends Max Plan** (Schedule RTOU-3; also known as Residential High Different Time of Use) is similar to the Nights & Weekends Plan, but targets EV drivers (though customers are not required to have an EV to enroll on this plan). The timing of the peak, off-peak, and super-off-peak charges is the same as that for the Nights & Weekends Plan, but the charges differ: super-off-peak charges are lower than those for the Nights & Weekends Plan year-round, but off-peak charges are higher in the summer and lower in the winter. Peak charges also differ from Nights & Weekends by season and by service area.

  Six of the 21 participants without solar PV systems chose this plan.

[8] Rates have been updated since participants' enrollment. Rate information is up to date as of December 2025.

While pilot participants with PV were limited to the Default Time-Based Plan for net metering, most battery-only participants chose to enroll in one of the high-differential TOU rates (Summer Peak Time-Based Plan, Nights & Weekends Plan, or Nights & Weekends Max Plan).

Additionally, Evergy created three battery operation programs for participants to choose from upon enrollment:

- The **Backup Power** program retains a 30% minimum state-of-charge.
- The **Cost Savings** program seeks to maximize cost savings by discharging a greater fraction of the battery's capacity every day on peak, down to a 10% minimum state-of-charge.
- The **Both Cost Savings and Backup Power** program seeks to find a balance between these objectives, reserving 20% minimum state-of-charge.

Table 1 shows the number of pilot customers in each battery program in PY3 by system type and rate.[9] Most participants, regardless of system type, chose the Both Cost Savings and Backup Power program.

Table 1. Number of Pilot Customers by System Type, Program, and Rate

Rate	Battery-Only Pilot Participants				PV Pilot Participants			
	Backup	Both	Cost Savings	Total	Backup	Both	Cost Savings	Total
RPAS	1	4	2	**7**	2	23	4	**29**
RTOU	1	0	0	**1**	0	0	0	**0**
RTOU-2	0	6	1	**7**	0	0	0	**0**
RTOU-3	0	3	3	**6**	0	0	0	**0**
Total	**2**	**13**	**6**	**21**	**2**	**23**	**4**	**29**

Evergy called seven demand response events between June 25, 2025, and August 19, 2025. All events took place between 4 p.m. and 6 p.m. Table 2 lists the demand response events and the number of pilot batteries that participated in each event out of the total 50 participants; some batteries did not participate in every event due to hardware or communication issues.

9 This table provides the participant counts (n) for each program, which serve as the basis for the impact evaluation findings reported in figures throughout this report.

Table 2. 2025 Residential Battery Energy Storage Demand Response Events

Event Date	Participating Pilot Batteries
June 25, 2025	50
July 16, 2025	50
July 22, 2025	49
July 28, 2025	49
July 29, 2025	50
August 18, 2025	49
August 19, 2025	49

Impact Evaluation Findings

Cadmus evaluated the battery systems' impacts on customer bills, experience, and peak demand using battery telemetry data. This section presents findings on typical daily battery operations, performance during power outages, and operations during the summer 2025 demand response events. The first section reviews impacts based on typical battery operations, while the final section discusses performance during demand response events.

1.2. Typical Battery Operations

Pilot batteries were programmed to charge overnight during off-peak periods and discharge during the on-peak period (4 p.m. to 8 p.m.), while allowing for flexibility in response to unexpected changes in home demand. Most battery systems run an artificial intelligence (AI) program that predicts the household's consumption at 15-minute intervals and determines how much to charge or discharge the battery to follow the home's anticipated load.[10] The batteries' predictive programming and TOU arbitrage (i.e., charging batteries during low-cost hours and using them during high-cost hours) are intended to help participants save on their electric bills and reduce peak demand on the grid.

This section presents the typical daily battery operations of the pilot in two ways: through battery stored energy and battery power flow. In their simplest definitions:

- **Battery stored energy** (or state of charge): Shows the amount of energy (in kWh) stored in the battery at any given time throughout the day. The amount of stored energy changes when the battery is charged or discharged.
- **Battery power flow:** Describes the rate of charging or discharging (in kW) in the battery.

We first examined stored energy for an overview of daily activity and then assessed battery power flow for more precise views of battery charging and discharging schedules.

Battery Stored Energy

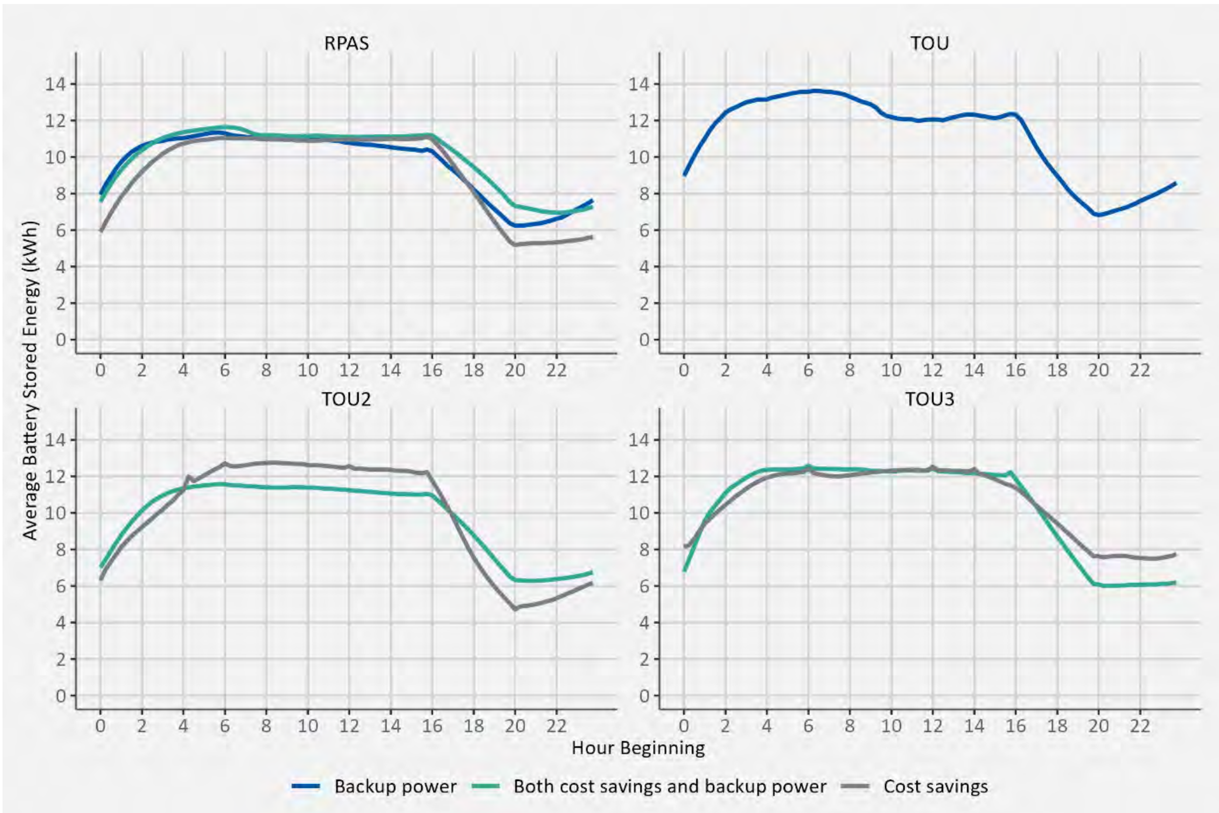
Cadmus examined typical battery operations by assessing the amount of energy stored in batteries throughout the day. Figure 1 and Figure 2 show the average hourly state-of-charge (stored energy) per participating battery on non-event, non-outage days by electric rate plan, by battery program (Backup Power, Cost Savings, or Both Cost Savings and Backup Power), and by system type (battery-only or PV-coupled). In the figures, the upward-sloped lines indicate battery charging (as the energy stored in the battery increases) and downward-sloped lines indicate battery discharging (as the energy stored in the battery decreases).

As shown in Figure 1, among participants with battery-only systems, average daily battery operations were consistent across rates and battery programs. Batteries charged from grid power overnight, with the

[10] Evergy explained during a project update that three customers opted out of the predictive AI programming for their batteries and that Evergy manually sets the charge-discharge cycles for these three batteries.

highest charging activity during the super-off-peak period from 12 a.m. to 6 a.m. Limited charging also occurred between 8 p.m. and 12 a.m. on the off-peak rate. Batteries discharged as scheduled during the on-peak period from 4 p.m. to 8 p.m., with little activity prior to the peak period once fully charged.

Figure 1. Average Hourly Battery Stored Energy for Battery-Only Participants by Rate and Program



The timing of battery charge and discharge was better aligned with Evergy's TOU periods as the pilot progressed from PY1 to PY3[11] across all four TOU rate options.

In PY3, battery charging behavior showed stronger alignment with TOU periods, reflecting meaningful progress from earlier program years. A few rate and battery program groups still displayed occasional charging outside the optimal midnight-to-6 a.m. super-off-peak window—such as brief charging after 6 a.m. or slightly before midnight—highlighting remaining opportunities to further enhance customer bill savings through continued optimization. These charging patterns may result from deviations in customer

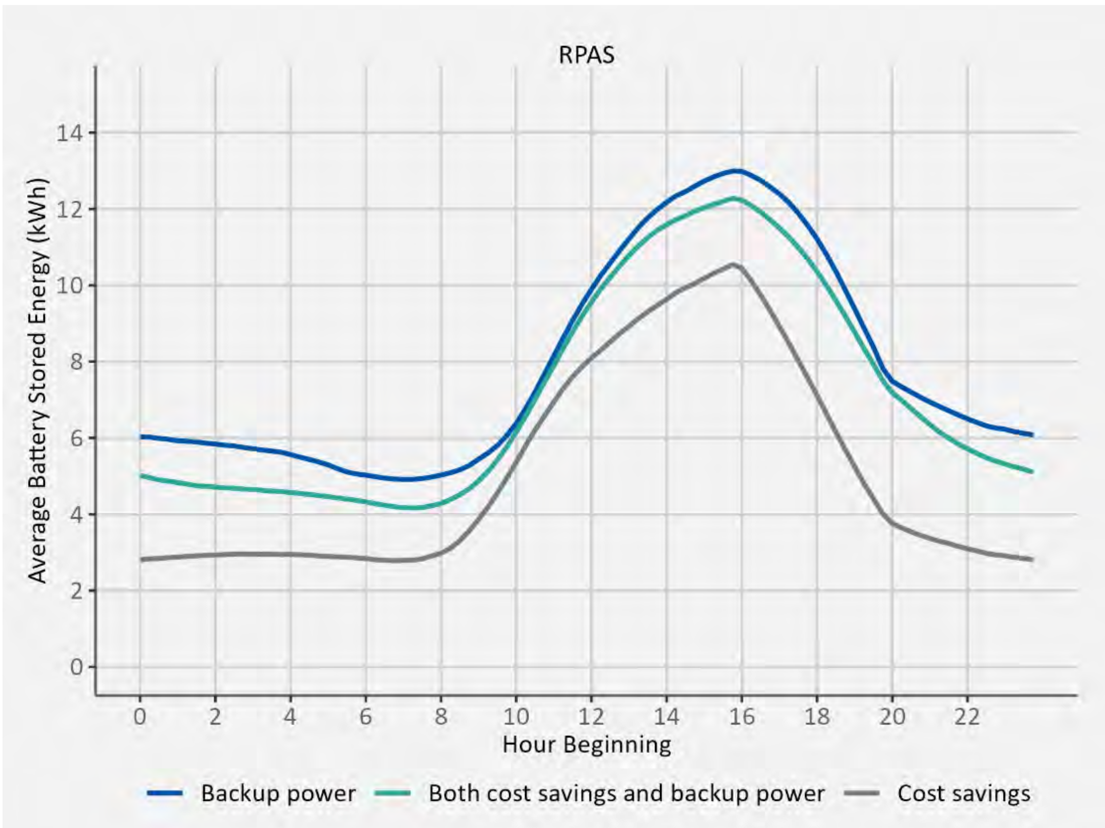
11 See Cadmus, Memorandum, January 2024; Cadmus, Memorandum, January 2025 for PY1 and PY2 comparisons, respectively.

consumption from the battery system's predictions, as the battery system also aims to maintain its minimum reserve power setting throughout the day.

As in previous years, battery-only RTOU-3 Cost Savings participants used significantly less battery capacity during the average peak period than other Cost Savings groups did, though peak discharge was markedly improved in PY3 relative to previous years.

In PY3, battery systems coupled with PV used different charge and discharge patterns to maximize solar generation benefits, as shown in Figure 2.

Figure 2. Average Hourly Battery Stored Energy for PV Participants by Program



Instead of charging overnight during the super-off-peak period, batteries with PV integration are programmed to charge during the day when solar is available. Charging the batteries from participants' own excess solar generation during the day helps mitigate the variability of midday solar overproduction and reduces participants' overall consumption from the grid.

Participants with PV systems charged significantly more during sunlight hours in PY3 than in previous years to maximize the benefits of solar production.[12]

Although daytime charging improved in PY3, discharge behavior remained consistent with prior years. Batteries paired with solar continued to show opportunities for further optimization, as many still discharged after 8 p.m. during off-peak hours rather than shifting discharge toward peak periods, where customer bill savings could be maximized.

Evergy's three battery programs had mixed results relative to their stated goals.

As designed, batteries in the Backup Power program are expected to discharge less energy than batteries in the other programs and retain more stored energy for power outages. Batteries in the Cost Savings program are expected to discharge the most, while batteries in the "Both" program fall somewhere in between. In PY3, Cadmus clearly observed the pattern for the batteries with PV, where Backup Power batteries retained almost twice as much energy in reserve at the end of the day as Cost Savings batteries (Figure 2). However, this effect is less apparent in the battery-only systems, where the end-of-day state-of-charge was very similar across programs (Figure 1).

Regardless of the program, batteries could be discharged more during peak hours.

Cadmus examined state-of-charge patterns to understand program influence. All pilot batteries had a nominal 14.4 kWh usable capacity, programmed to retain up to 30% of storage capacity (about 4.3 kWh) for backup power. Table 3 shows the expected and observed average battery state-of-charge at midnight, right before battery-only systems should begin charging, for each battery program group.

Table 3. Average Battery Stored Energy at 12 a.m.

Battery Program	Expected		Observed			
			Battery-only		PV-coupled	
	kWh	Capacity	kWh	Capacity	kWh	Capacity
Backup	4.3	30%	8.1	56%	6.1	42%
Both	2.9	20%	6.8	47%	5.1	35%
Cost Savings	1.4	10%	6.8	47%	2.8	20%

As noted, PV-coupled batteries get much closer to their programs' state-of-charge reserve target, but all groups showed room for greater discharge.

12 See *Appendix A. Battery Stored Energy by Month* for battery stored energy patterns across the three pilot years.

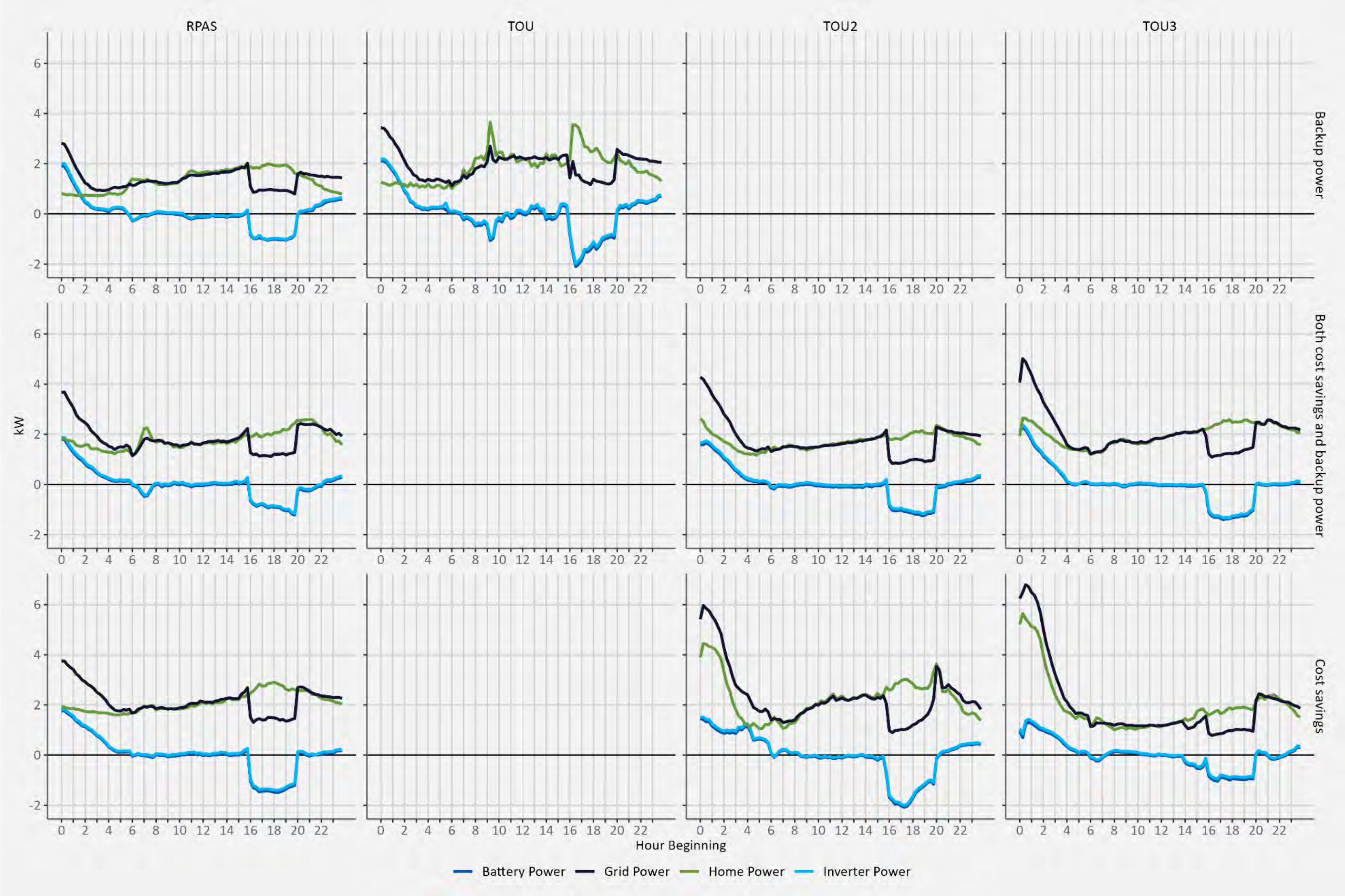
Battery Power Flow

Cadmus examined the pilot's typical operations by directly observing battery power charge and discharge activities. Figure 3 shows the following:

- **Battery power:** average power charged or discharged by each battery-only participant's battery
- **Inverter power:** how much of this power is captured by the battery's inverter; expected to be equivalent to battery power, except for any slight losses during inversion
- **Home power:** how much power the home end uses required, independent of battery operations
- **Grid power:** how much demand the home used from the grid, net of the battery; expected to be equivalent to the demand observed at the Evergy meter

The figure shows that for battery-only participants, grid power and home power are equal whenever the inverter power (the energy going into or out of the battery) is zero. Grid power and home power diverge whenever a battery's inverter is actively charging or discharging energy. Negative inverter power values represent battery discharge, while positive values represent battery charge.

Figure 3. Average Hourly System Power for Battery-Only Participants by Rate and Program



In comparison with previous years, battery discharge in PY3 was better aligned with Evergy's 4 p.m. to 8 p.m. on-peak period, maximizing potential bill savings for participants.

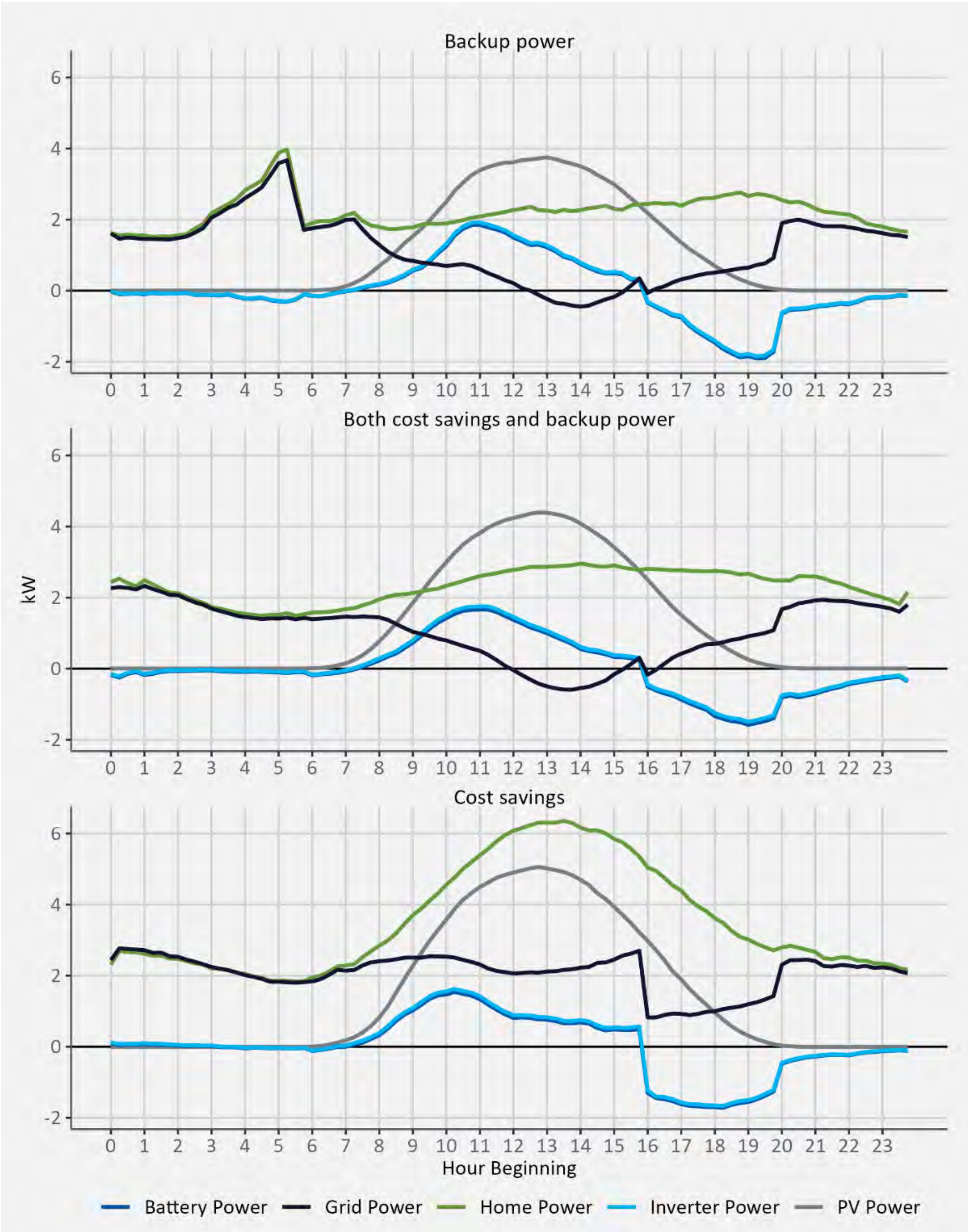
This alignment is critical because it maximizes participant bill savings by reducing their grid power demand when energy is most expensive. However, unlike PV participants, battery-only participants are not permitted to export power to the grid and do not receive net generation credits, so their battery discharge may not exceed their own homes' consumption at any time.

As in previous years, battery utilization could be increased during on-peak hours from 4 p.m. to 8 p.m., resulting in greater savings on participants' electric bills.

Based on manufacturer specifications (see *Appendix F. Battery Specifications Brochure*), a fully charged battery should be capable of discharging over 3 kW during each of the four on-peak hours. Most participant homes appear to use between 2 kW and 3 kW on average during the on-peak period, meaning batteries should, on average, fully meet the home's demand during the period. Instead, the batteries appear to supply about half of the home's demand at any given time during the on-peak period, letting the home draw the remaining half from the grid. This may be due to parameters in the AI predictive programming of the batteries, which seek to meet the anticipated load of the home based on 15-minute interval usage data. Discharging more power from the batteries during the 4 p.m. to 8 p.m. on-peak period would provide greater cost savings for participants and reduce peak demand on the grid.

Figure 4 shows the same power metrics as Figure 3 for participants with PV systems, along with their PV system power output. The figure shows that for PV participants, grid power and home power are equal whenever the inverter power and PV power are both zero. Grid power and home power diverge whenever a customer's PV panel generates energy or the battery charges or discharges energy.

Figure 4. Average System Power for PV Participants by Program



Like battery-only participants, PV participants consistently discharge their batteries during 4 p.m. to 8 p.m. on-peak period.

Like battery-only systems, PV participants' systems could discharge more during the on-peak period to generate greater cost savings to participants and reduce peak demand on the grid.

Battery programming in PY3 used the most solar power to charge PV-coupled batteries of any pilot year.

Each pilot year, programming has improved to increase the amount of PV-coupled battery charge coming from PV power rather than from the grid and decrease the variability of solar over-generation. There are two ways to consider battery PV charging: from a system (grid) perspective, or from a participant perspective.

- **From a System Perspective.** PV-coupled battery charge occurs any time PV output exceeds battery charge (i.e., any time the gray line exceeds the blue line in Figure 4 above). Battery charge can be attributed to PV power because PV output offsets the amount of power used to charge the battery, regardless of actual end use (home or battery).

  Battery charge is attributable to PV when PV production > battery use.

- **From a Participant Perspective.** Battery charging provides the greatest benefit when solar production exceeds the home's use (i.e., when the gray line exceeds the green line in Figure 4 above). At any other time of day, the participant pays full price to draw power from the grid, whether for the home's use or to charge the battery. When there is solar overproduction, however, the "cost" of charging the battery from the excess solar is only the lost benefit of solar sellback credit to the grid, which has a much lower per-kWh rate than the customer would otherwise pay to draw the same amount of power from the grid later in the day without storage.[13]

  Battery charge is attributable to PV when PV production > home use.

Based on either of these two perspectives, the amount of PV-coupled battery charge from solar has steadily increased over each of the three pilot years, as shown in Table 4.

Table 4. PV-Coupled Battery Charge Coming from Solar Generation

Perspective	PY1	PY2	PY3
System	34.8%	57.3%	87.8%
Participant	18.8%	24.0%	35.7%

13 Evergy. Accessed December 2025. *Solar & Net Metering Program Information*. See example on last page. https://www.evergy.com/-/media/documents/smart-energy/private-solar/solar-customer-interest-evergy.pdf

Over the pilot, as the amount of battery charge coming from solar production has increased, the amount of solar over-production exported back to the grid has decreased. This has provided a greater buffer for the grid against the variable output of PV during peak sunlight hours and the increase in demand as the sun goes down in the evening. Charging the batteries with excess solar midday has also improved their capacity to offset evening on-peak charges, resulting in participant bill savings.

Despite the differences in charging procedures, battery round-trip efficiency—defined as the percentage of energy consumed by the battery for charging that is later recovered when discharging—appears to be similar between battery-only and PV-coupled systems.

Battery-only and PV coupled systems had an average battery efficiency of 88.7% and 88.5%, respectively, which was relatively aligned with PY2 results.

Battery degradation and slight efficiency losses are expected over time, and Evergy's pilot has confirmed this. Table 5 presents the average round-trip efficiency of the pilot batteries by system configuration and pilot year.

Table 5. Battery Round-Trip Efficiency

System Type	PY1	PY2	PY3
Battery-only	91.3%	88.3%	88.7%
PV-coupled	94.0%	89.9%	88.5%

It is unclear whether the efficiency difference between system types is due to programmed battery behavior or other factors. The LG Energy Storage System (ESS) Home 8 batteries installed by the pilot are alternating-current-coupled, so the greater observed efficiency of the batteries among participants with PV systems in the first two years is not due to reduced inverter losses (as would be expected in a direct-current-coupled battery system).

Non-Event Peak Load Reduction

Cadmus analyzed the peak load reduction provided to the grid by the batteries' discharge during non-event, non-outage on-peak hours (4 p.m. to 8 p.m.) across the three pilot years. Since the grid system experiences the greatest benefit when load is reduced at times when demand is peaking, and Evergy is a summer-peaking utility, this analysis focuses on its summer months (June to September) across the three pilot years. This section presents the typical non-event peak load reduction provided by the pilot batteries, the estimated system impacts resulting from this peak load reduction, followed by estimates of the impact of the batteries' peak-load reduction on participants' energy bills in PY3.

On-Peak Battery Discharge Across Pilot Years

Table 6 shows the average inverter power during summer on-peak hours for each of the three pilot years by system type (negative power indicates battery discharge). Summer on-peak battery discharge increased from about 1 kW in PY1 to about 1.5 kW in PY3, or about 50% by the end of the pilot, a statistically significant increase. This increase is not attributable to any one subgroup: there was no significant difference in on-peak discharge, summer or year-round, among battery programs (Cost Savings, Backup Power, Both Cost Savings and Backup Power) or electric rates.

> Summer on-peak battery discharge had a **statistically significant increase** of about 50%
> (1 kW in PY1 to 1.5 kW in PY3).

Table 6. Average Summer On-Peak Inverter Power (kW)

System Type	PY1	PY2	PY3
Battery-only	-0.96	-1.12	-1.58
PV-coupled	-1.15	-1.22	-1.50

PV-coupled systems discharged more on average during on-peak hours than did battery-only systems, though the difference is statistically significant only when considering both summer and winter months, not summer alone. This may be because higher PV production in the summer meets more of the homes' demand, decreasing the need for battery discharge, whereas in the winter, solar energy is scarcer and PV-coupled systems may rely more heavily on battery discharge.

System Impacts

Peak demand reduction provides systemwide benefits across the electric grid. Consistent and reliable peak shaving during the highest-demand periods reduces the need for utilities to invest in additional generation capacity—costs that are typically borne by all ratepayers. By lowering or deferring these capacity investments, the resulting avoided costs flow through to all customers, regardless of whether they directly participate in a specific demand-reduction program.

To estimate the avoided cost of capacity achieved by the pilot, Cadmus applied Evergy-provided line losses and per-kW avoided cost of capacity to the batteries' summer on-peak discharge (Table 7).[14] The positive values for battery discharge correspond to negative values for inverter power, as shown in Table 6.

[14] Due to transmission and distribution line losses, 1 kW of reduced demand at the meter, or by a customer, provides greater than 1 kW of reduced demand at the generator, or to the grid.

Table 7. Avoided Costs of Capacity Achieved by Summer On-Peak Battery Discharge

Pilot Year	Number of Participating Batteries	Average Summer On-Peak Battery Discharge (kW)	Avoided Cost of Capacity Achieved, Total	Avoided Cost of Capacity Achieved, Per-Battery Average
PY1	35	1.05	$2,505	$71.6
PY2	49	1.17	$3,740	$76.3
PY3	50	1.53	$4,972	$99.4

The avoided costs of capacity achieved increased each year as more batteries were installed and battery programming improved to better align discharge with the on-peak periods. Across all three pilot years, the batteries avoided about $11,217 in capacity costs. While the pilot concluded at the end of PY3, the LG ESS Home 8 batteries have a nominal measure life of 15 years. Had the pilot continued for another 12 years (to the end of a typical battery's measure life), we would expect the batteries to continue to deliver non-event on-peak demand reduction similar to that of PY3. Using a 5% discount rate, this would be about $30,000 of present-value avoided capacity costs over the life of the batteries. However, as previously noted, battery programming left room for increased on-peak discharge, even with the constraint to follow the energy usage of the home.

> The avoided costs of capacity achieved **improved** each year.

In addition to avoided costs of capacity savings realized, the batteries deployed in the pilot delivered meaningful resilience benefits that extend beyond individual participants to the broader electric grid. While participating customers were able to maintain power to critical household equipment during grid outages, the collective presence of these distributed batteries strengthens overall grid resilience. As described later in this report, participant survey feedback confirms that backup power capability is the most valued feature of their battery systems; however, the resilience benefits they provide support reliability for all customers across the grid, not only those with onsite battery storage.

TOU Battery Operation Billing Impacts

As noted earlier, pilot batteries were programmed to discharge during on-peak hours to provide TOU cost savings to participants and reduce peak demand on the grid. Likewise, they were programmed to charge either from solar midday (if available) or from the grid during super-off-peak hours overnight for the same reasons. Cadmus investigated participants' PY3 energy bill savings from TOU arbitrage, or, in other words, programming batteries to store energy when it was inexpensive and discharge it for home use when prices were higher.

Cadmus used telemetry data to assess how much each customer's battery charged and discharged in each of that customer's TOU periods each month,[15] as well as their actual grid consumption and counterfactual grid consumption without the battery. We then modeled participants' electric bill savings as the difference

15 As noted in the *Pilot Overview*, TOU periods vary by rate (e.g., not all rates have on-peak periods in every season, on weekends, or on holidays).

between the cost of the actual and counterfactual grid consumption. We calculated the counterfactual grid consumption by netting the battery's charges and discharges out of grid consumption, so that less would have been consumed from the grid when the battery was charging and more when it was discharging. For solar customers, this often resulted in greater solar overproduction and increased solar sellback to the grid. Additionally, since all pilot solar customers had block pricing on the RPAS rate schedule, we accounted for net metering before price blocking in each TOU period. We then multiplied participants' actual and counterfactual usage by their respective billing rates by TOU period to estimate actual and counterfactual monthly electricity costs. We based these costs on usage alone and did not consider fees and other items that may normally appear on customer bills.

Batteries on high differential TOU rates **produced much higher arbitrage savings** than batteries on the low differential rate.

Table 8 shows the average estimated PY3 electric bill savings for each electric rate. Batteries on high differential TOU rates produced much higher arbitrage savings than batteries on the low differential RPAS rate. As discussed in the *Battery Power Flow* section, the charge and discharge cycles of all batteries, regardless of rate, were well aligned with the intended TOU periods. Therefore, differences in savings were mainly due to differences in the rate structures (i.e., the price differentials between TOU periods): if the price differential between TOU periods was not large enough to compensate for the roughly 10% efficiency loss to charge and discharge the battery, using the battery to shift the home's time of energy use did not produce electric bill savings.

Table 8. PY3 Average TOU Arbitrage Electric Bill Savings by Rate and System Type

Rate Schedule	System Type	Average TOU Savings (Percent of Total Home Use Cost)
RPAS	PV-coupled	$36.65 (5%)
RPAS	Battery-only	-$20.59 (-1%)
RTOU	Battery-only	$334.59 (15%)
RTOU-2	Battery-only	$167.37 (10%)
RTOU-3	Battery-only	$320.62 (18%)

Batteries on the high differential TOU rates produced substantial electric cost savings for participants through TOU arbitrage—from 10% to almost 20% of the home's electricity use cost on average, depending on the rate. Higher TOU differentials resulted in higher bill savings from TOU arbitrage: batteries on the Nights and Weekends Plan (RTOU) and Nights and Weekends Max Plan (RTOU-3), which had high differential TOU pricing year-round, produced about 50% higher savings on average than batteries on the Summer Peak Time-Based Plan (RTOU-2), which had high differential TOU pricing only during the summer.

Batteries on high differential TOU rates produced an average of 14% electric cost savings.

Similarly, batteries enrolled under the RPAS rate struggled to produce bill savings because the rate has an extremely low TOU differential year-round. PV-coupled batteries, which could charge from solar generation at a much lower cost than battery-only systems charging from the grid overnight, produced 5% in savings on average in PY3. However, battery-only systems actually increased costs by 1% on average. This indicates that the TOU pricing differential under the RPAS rate schedule was not enough to offset the batteries' roughly 10% round-trip energy loss.

Across all rates and system types, battery program priority (Backup Power, Cost Savings, or Both Backup Power and Cost Savings) mostly aligned with TOU arbitrage results.

Table 9 shows TOU arbitrage cost savings across the three battery programs for battery-only systems. Within the high differential TOU rates, batteries programmed to prioritize Backup Power produced the highest dollar amount of cost savings, but batteries prioritizing cost savings produced slightly higher savings as a percentage of the total home electricity use cost. Similarly, for battery-only systems on the low differential RPAS rate, batteries programmed to prioritize cost savings produced the greatest (least negative) savings overall.

Table 9. PY3 Average TOU Arbitrage Electric Bill Savings for Battery-Only Systems

Battery Program	Average TOU Savings (Percent of Total Home Use Cost)	
	High Differential Rate[1]	Low Differential Rate[2]
Backup	$334.59 (15%)	-$25.40 (-2%)
Both	$236.05 (13%)	-$22.02 (-1%)
Cost Savings	$242.70 (16%)	-$15.30 (-1%)

[1] RTOU, RTOU-2, and RTOU-3
[2] RPAS

Results varied more among battery programs for PV-coupled systems, all of which were on the low differential RPAS rate (Table 10). Batteries with Both Backup Power and Cost Savings programming produced the highest savings overall, with the Cost Savings group close behind. PV-coupled batteries programmed to prioritize backup power produced the lowest (and slightly negative) savings overall.

Table 10. PY3 Average TOU Arbitrage Electric Bill Savings for PV-Coupled Systems

Battery Program	Average TOU Savings (Percent of Total Home Use Cost)
Backup	-$16.71 (-1%)
Both	$41.10 (6%)
Cost Savings	$37.05 (4%)

1.3. Battery Operations During Grid Outages

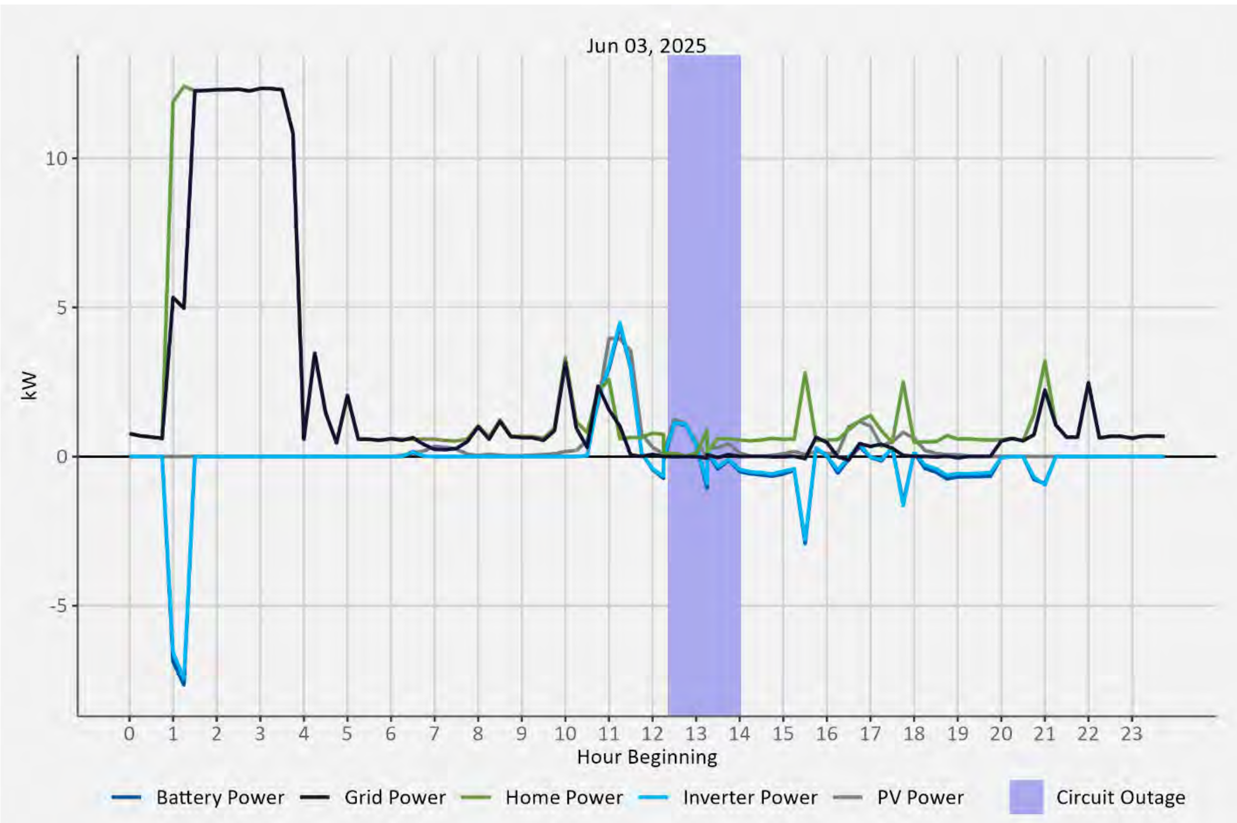
In addition to TOU rate arbitrage benefits, batteries also provided participants with backup power during grid outages. Eight of 40 pilot participants experienced outages in PY1, 28 of 49 experienced outages in

PY2, and 25 of 50 experienced outages in PY3. Some customers experienced multiple outages within a study period (see *Appendix B. Outages*). In PY1 and PY2, batteries provided backup power in almost all cases.[16] Based on the PY3 outages Evergy reported, Cadmus analyzed battery telemetry data to verify that the batteries provided backup power during outages.

As in previous years, batteries appeared to reliably provide backup power during PY3 grid outages.

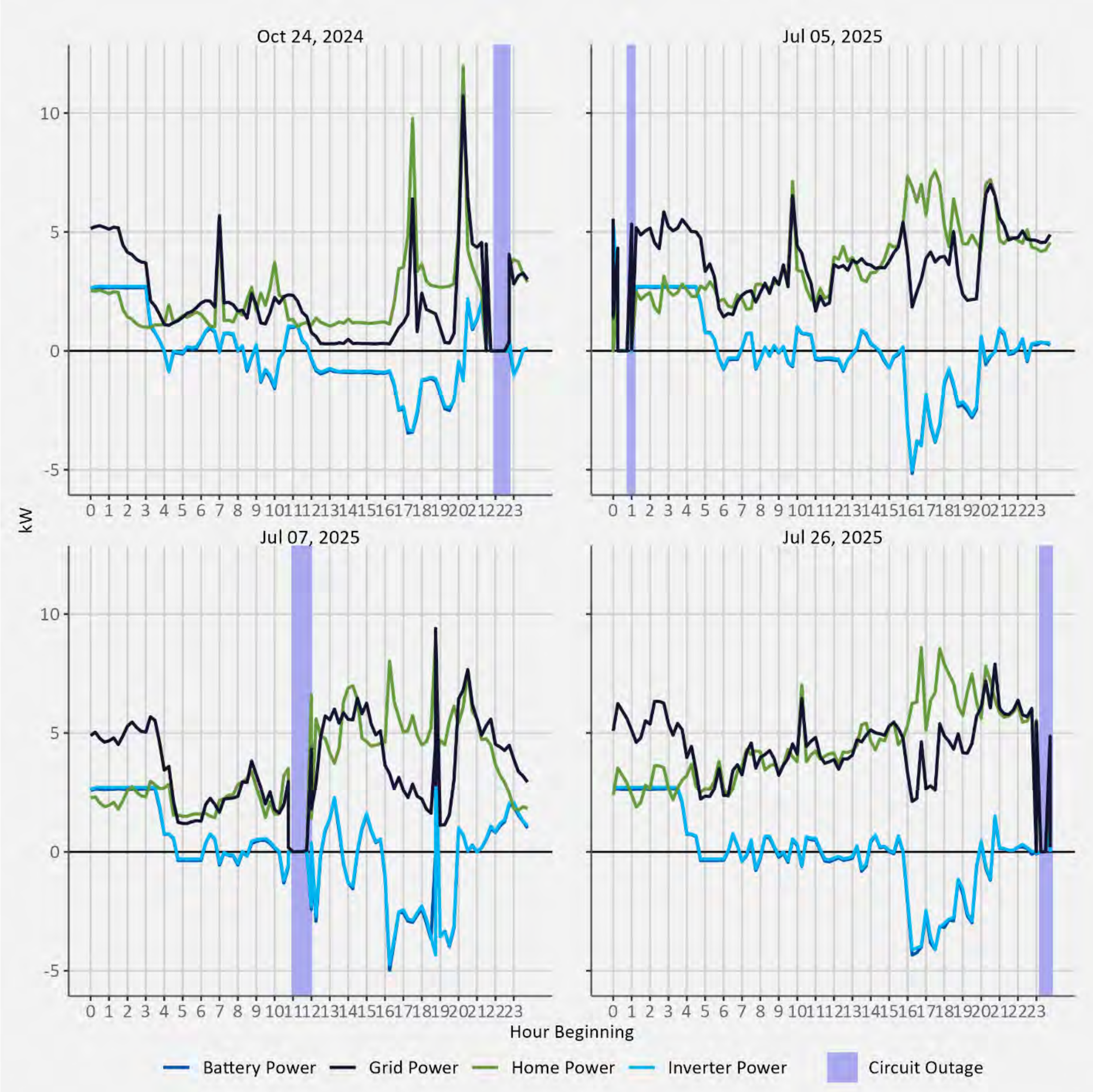
In almost all cases, batteries began discharging power to the home when the grid power outages began. Batteries provided backup power to the affected homes for the full duration of all outages. Exceptions (one shown in Figure 5) typically involved batteries not immediately discharging when grid power went out. In these cases, the home PV systems typically generated sufficient power to meet the home's demand during the beginning of that outage period, after which battery discharge continued as expected. We observed only one exception (shown in Figure 6) where a battery failed to discharge during outages.

Figure 5. Power Outages System ID Evergy H8 039



[16] In PY1, one participant experienced a multiday outage that depleted their battery over 17 hours.

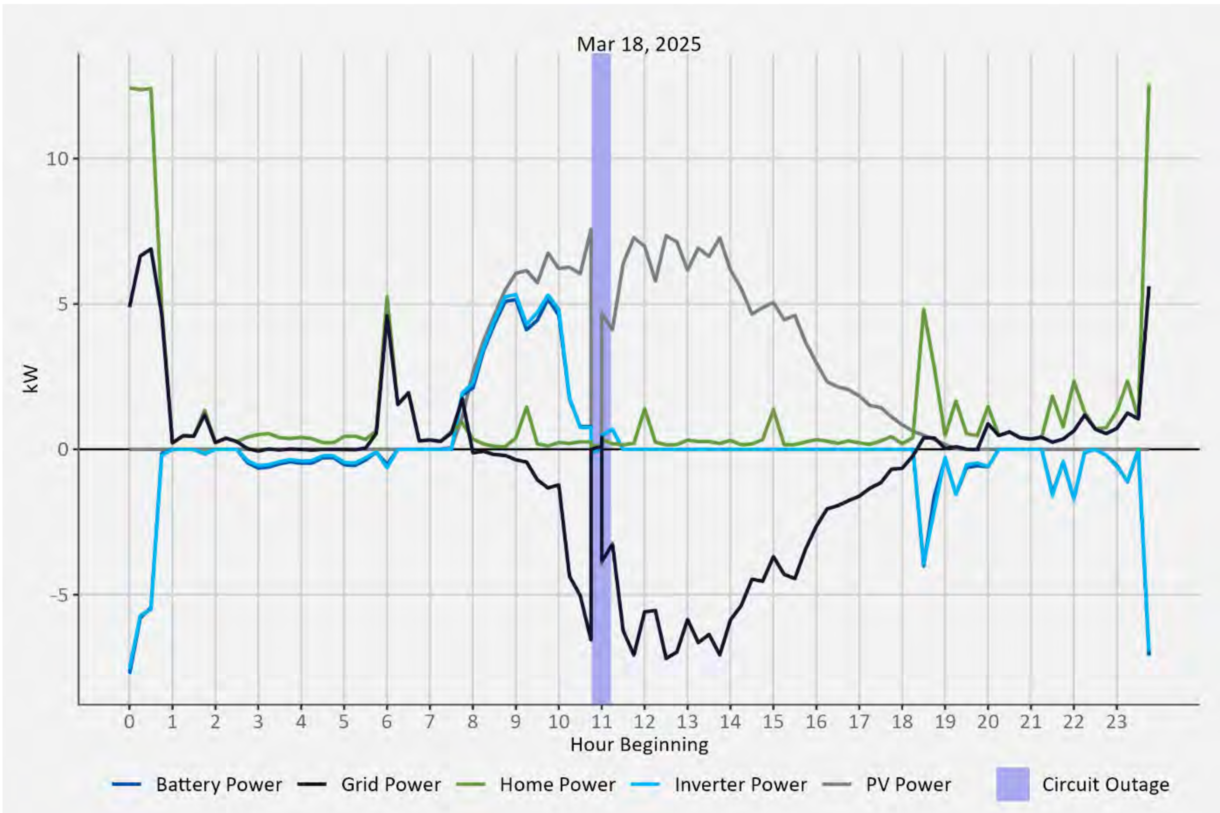
Figure 6. Power Outages System ID Evergy H8 020



Differences between Evergy's reported outage times and the battery telemetry data often arose because Evergy collects outage information first at the **distribution-circuit level** rather than at the individual customer level. Since portions of a circuit can lose power while other sections remain energized, there can be latency before customer-specific outages are detected and reported. As illustrated in Figure 5Figure 7, this delay can cause Evergy's reported outage start and end times to appear offset from the more immediate and localized outage indications captured in the battery telemetry.

Additionally, in a few cases, PV power fell to zero during outages, which may have occurred in front-coupled PV configurations (see Figure 7). In these configurations, the PV would have been connected to the utility side of the battery system's automatic transfer switch and the main load panel. Therefore, during a grid outage, front-coupled PV would have been isolated from the battery system and would not have generated power.

Figure 7. Power Outages System ID Evergy H8 015



A full catalog of PY3 outages is provided in *Appendix B. Outages*.

1.4. Battery Operations During Demand Response Events

In typical daily operation, pilot batteries used historical data to anticipate the home's daily demand load shape and maintain sufficient reserve power to follow the home's load throughout the day (including during both off-peak and on-peak hours). During demand response events, however, the battery programming changed. Instead of attempting to maintain enough power to follow the home's historical load after the event ends, the battery programming sought to discharge more power than usual between 4 p.m. and 6 p.m. This should have led to greater power being discharged during demand response events and benefited Evergy customers by reducing overall grid demand when necessary.

Battery discharge during demand response events improved in PY3 relative to previous years. On average, batteries maintained a higher charge during pre-event hours and discharged more power during event hours on event days than on non-event days.

Figure 8 shows an average of 1.5 kWh more in stored energy during pre-event hours on event days and a faster discharge during peak (event) hours. This is especially noticeable in Figure 9, with a much larger discharge spike from 4 p.m. to 6 p.m. (while the demand response events were active) on event days than non-event days, and elevated discharge (though at a lesser magnitude than during the event) from 6 p.m. to 8 p.m. after the demand response events ended. Similarly, Figure 10 shows participants' average grid energy demand fell to about 0.5 kW during the two event hours (4 p.m. to 6 p.m.), hovered between 2 kW and 2.5 kW for the two remaining on-peak hours following the event (6 p.m. to 8 p.m.), and increased to around 4 kW after the events ended.

Figure 8. Average Hourly Battery Stored Energy on Event Days

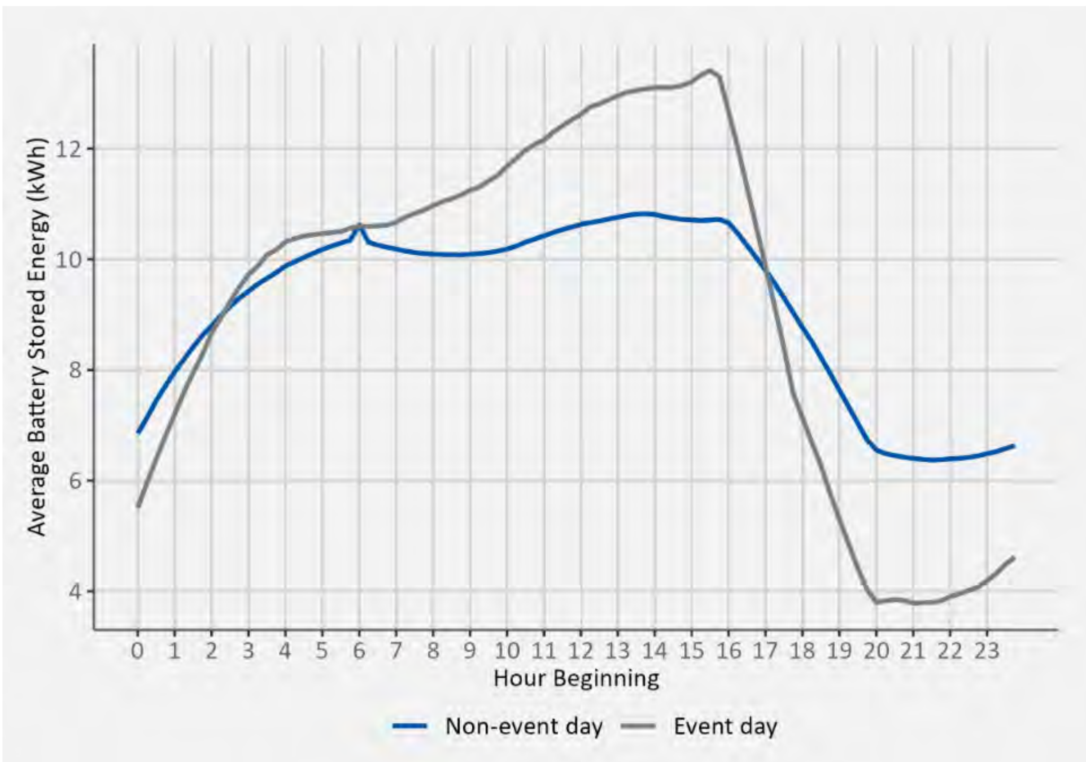


Figure 9. Average Hourly Battery Power on Event Days

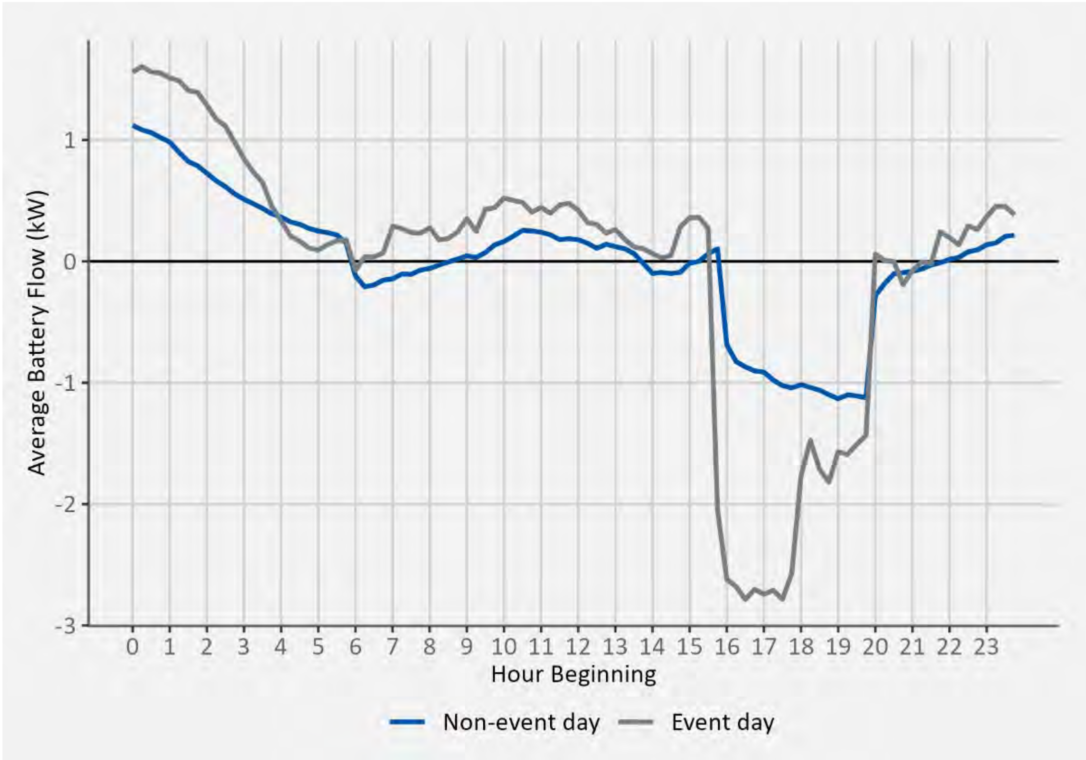


Figure 10. Average Hourly Grid Power on Event Days

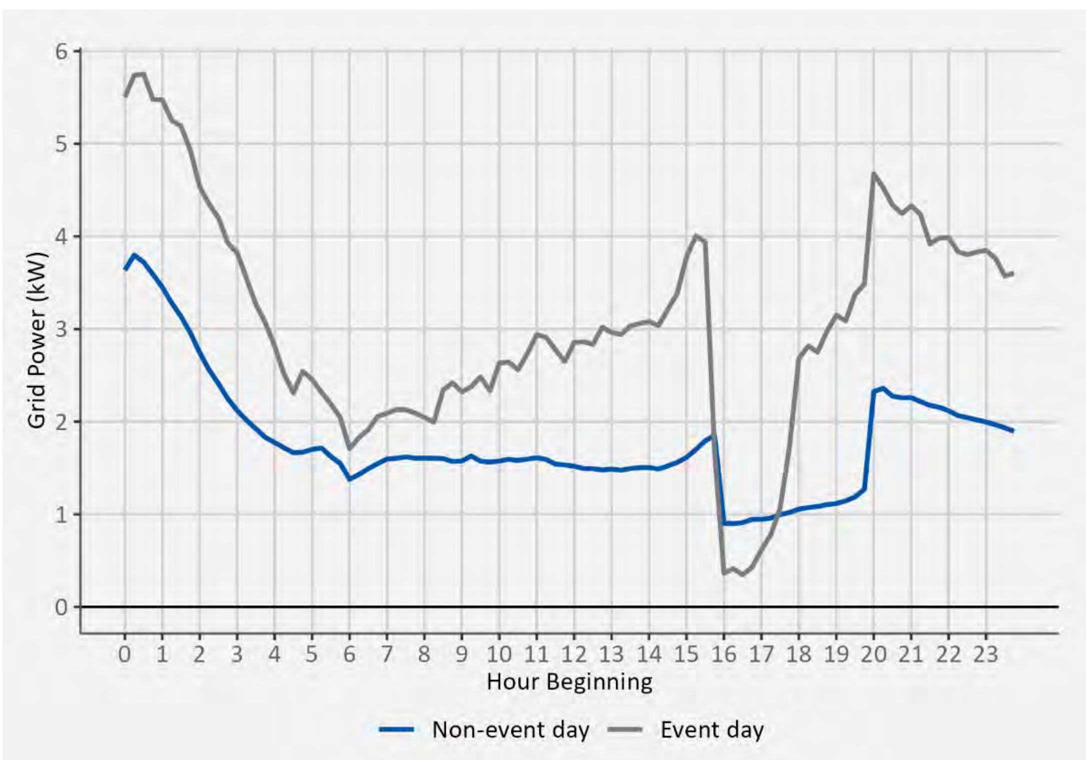


Table 11 below summarizes overall battery performance during events from June 2025 through August 2025. Battery performance was consistent across demand response events. Hourly average battery stored energy, battery power flow, and grid power flow for each event are provided in *Appendix C. Demand Response Events*.

In all events, over 80% of participating batteries discharged during the first 15-minute interval of the event, an improvement from PY2. Additionally, only one battery failed to discharge in the entire season, potentially due to very low demand at that home during that event.

Evergy noted during a project update that if a participant's home's total demand is below the threshold setting for the current demand response program[17] (0.3 kW) during a demand response event, the battery will not discharge during the event. This threshold prevents inadvertent exports to the grid for battery-only systems, which are not permitted to do so.

Following events, participant battery systems retained a significant amount of energy: between 8.2 kWh and 7.3 kWh.

Throughout the pilot, batteries retained a portion of their stored energy after events for multiple reasons. First, battery-only participants were not permitted to export energy to the grid, unlike participants with PV. Following Cadmus' recommendation in PY1, Evergy reported that it changed the battery programming to allow PV participants (whose rates allow net metering) to export to the grid from their batteries during demand response events. Second, the batteries retained energy to continue discharging during the remaining on-peak hours following an event (6 p.m. to 8 p.m.). Third, batteries retained stored energy to provide backup power in case of outages overnight.

The PY3 events achieved the greatest average battery discharge of any pilot year. However, there is still an opportunity for greater battery discharge during future demand response events.

During PY3 events, the average system's inverter discharge rate ranged from 2.02 kW to 2.36 kW, but homes continued to consume approximately 0.5 kW on average from the grid. For comparison, most system inverters were capable of outputting about 5 kW. This suggests that participant battery systems could potentially provide greater demand response impacts if required. However, retaining more energy following events provides more backup power in the case of grid outages, and, for battery-only participants (who do not have net metering), a reduction in on-peak energy charges (and potential demand snapback) during the two hours that follow each event.

Cadmus conducted a univariate regression analysis to estimate the impact of demand response events on battery energy flow from 4 to 6 p.m. and found that the results were statistically significant at the 90% confidence level.

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[17] This threshold was between 0 kW and 0.3 kW for each customer based on battery programming.

All events resulted in statistically significant increases in battery discharge to power the participants' homes. Impacts ranged from an additional 0.73 kW to 1.22 kW discharged on average over the event duration.

While the battery discharge during event hours was higher on average in PY3 than in any other year, the PY3 demand response impacts are lower than those observed in PY2 because participating batteries also had the highest baseline discharge (i.e., discharge during 4 p.m. to 6 p.m. on non-event days) in PY3 than in any other year (Table 12). This increased baseline performance is attributable to the greater alignment of battery discharge with the on-peak period in PY3 (refer to Table 6) and provided the greatest peak load reduction to the grid so far in the pilot for both event and non-event days.

Table 11. Demand Response Event Overall Battery Performance

Event Date	Batteries			Average Post-Demand Response Event Battery Stored Energy (kWh)	Average Demand Response Event Discharge (kW; 4 p.m. to 6 p.m.)	Average Baseline Discharge (kW; 4 p.m. to 6 p.m.)	Estimated Impact (kW) (90% Confidence Interval)
	Total	Discharged on Time	Did Not Discharge				
June 25, 2025	50	88%	0%	8.24	2.02	1.23	0.79 (0.64, 0.93)
July 16, 2025	50	92%	0%	7.74	2.26	1.36	0.91 (0.75, 1.06)
July 22, 2025	49	88%	0%	8.19	2.12	1.26	0.86 (0.71, 1.01)
July 28, 2025	49	82%	0%	7.84	2.26	1.11	1.16 (1.02, 1.30)
July 29, 2025	50	88%	2%	7.29	2.32	1.11	1.22 (1.08, 1.36)
August 18, 2025	49	86%	0%	7.59	2.36	1.5	0.86 (0.71, 1.01)
August 19, 2025	49	96%	0%	7.72	2.23	1.5	0.73 (0.59, 0.88)

Table 12. Demand Response Event Summary Across Pilot Years

Pilot Year	Weighted Average[1] Post-Demand Response Event Battery Stored Energy (kWh)	Weighted Average[1] Demand Response Event Discharge (kW; 4 p.m. to 6 p.m.)	Weighted Average[1] Baseline Discharge (kW; 4 p.m. to 6 p.m.)	Weighted Average[1] Estimated Impact (kW)
PY1	8.89	1.82	0.84	0.98
PY2	8.40	2.06	0.34	1.72
PY3	7.80	2.22	1.30	0.93

[1] Average across all events in each pilot year, weighted by the number of batteries participating in each event

Smart Thermostat Demand Response

In summer 2025, Evergy began testing smart thermostat integration and optimization with the battery pilot. Two pilot participants opted into the smart thermostat integration trial. It involved implementer control of smart thermostat setpoints on select demand response days, including precooling and curtailment hours. The thermostat curtailment often, but not always, coincided with battery demand response events (Table 13). Although customers retained the ability to override implementer-set thermostat setpoints, one participant opted back out of the trial after about two months of participation.

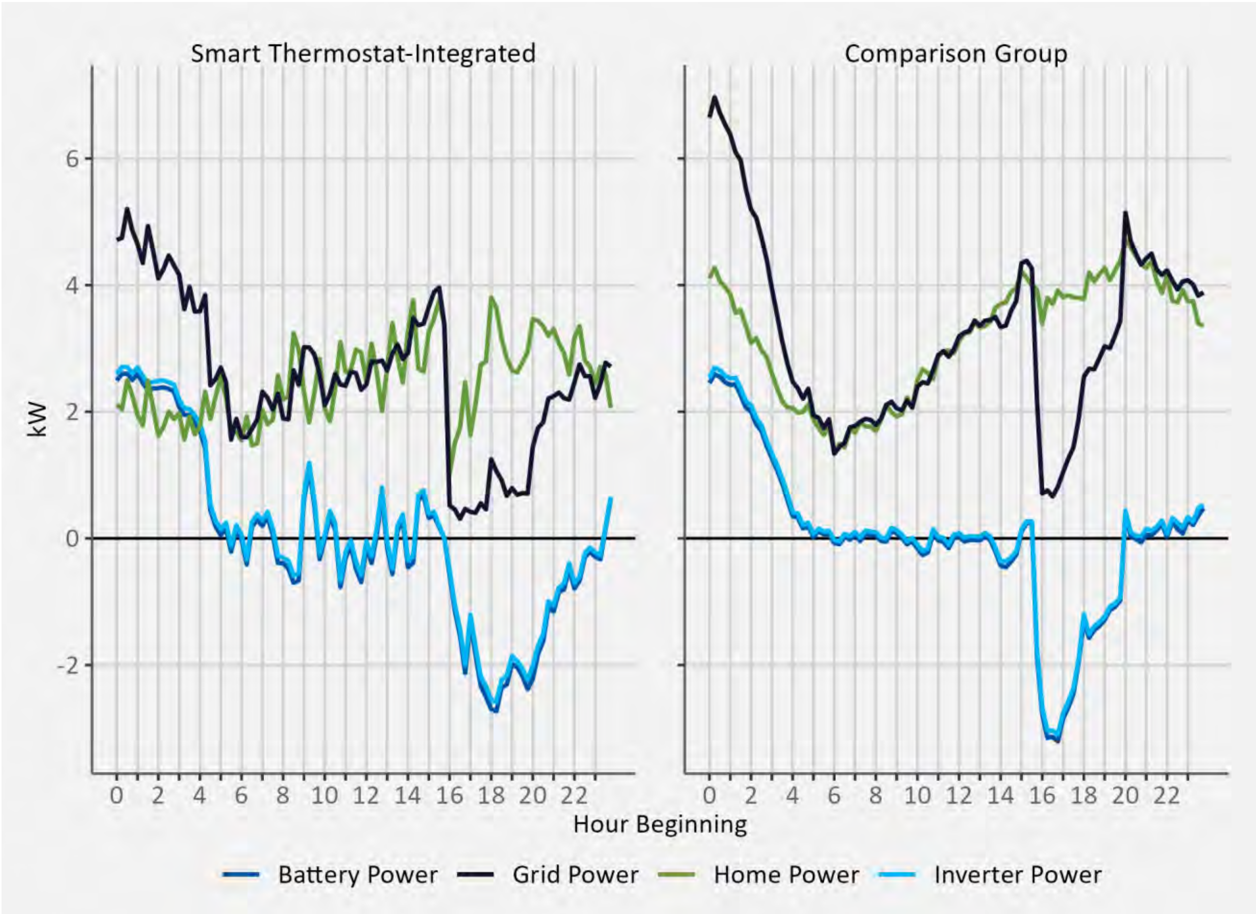
Table 13. Smart Thermostat Demand Response Events

Event Day	Participants	Precooling Hour	Curtailment Hours
June 19, 2025	2	3-4 p.m.	4-7 p.m.
June 25, 2025	2	3-4 p.m.	4-6 p.m.
July 16, 2025	2	3-4 p.m.	4-6 p.m.
July 22, 2025	2	3-4 p.m.	4-6 p.m.
July 28, 2025	1	3-4 p.m.	4-6 p.m.
July 29, 2025	1	3-4 p.m.	4-6 p.m.

To investigate the demand effect of implementer-controlled setpoints of pilot participants' smart thermostats, Cadmus compared battery system operations on thermostat event days between the thermostat-controlled customers and a comparison group of pilot participants with similar system configurations.[18] Figure 11 shows the average hourly home demand, battery power, and grid consumption of smart thermostat-integrated pilot participants and the comparison group on smart thermostat event days. While the trial group (n=2) was too small to allow for statistical interpretation, smart thermostat-integrated participants appeared to have lower home demand and thus lower grid consumption during curtailment hours (typically 4 p.m. to 6 p.m.). Additionally, because pilot batteries were programmed to discharge electricity based on home usage, smart thermostat-integrated batteries appeared to discharge less during the thermostat curtailment hours, which allowed for increased discharge in the second half of the on-peak period (6 p.m. to 8 p.m.).

[18] Both customers participating in smart thermostat integration had battery-only systems (no solar) but were on two different electric rates. Since the *Non-Event Peak Load Reduction* analysis showed a significant difference in average peak load reduction between solar and non-solar customers, but no statistical difference across electric rates or battery programs within the battery-only group, we constructed the comparison group for the smart thermostat-integrated customers from all other battery-only customers in the pilot.

Figure 11. Average Hourly System Power by Thermostat Group on Thermostat Event Days



Pilot Participant Survey Findings

This section provides findings from two surveys conducted by Evergy in 2024.

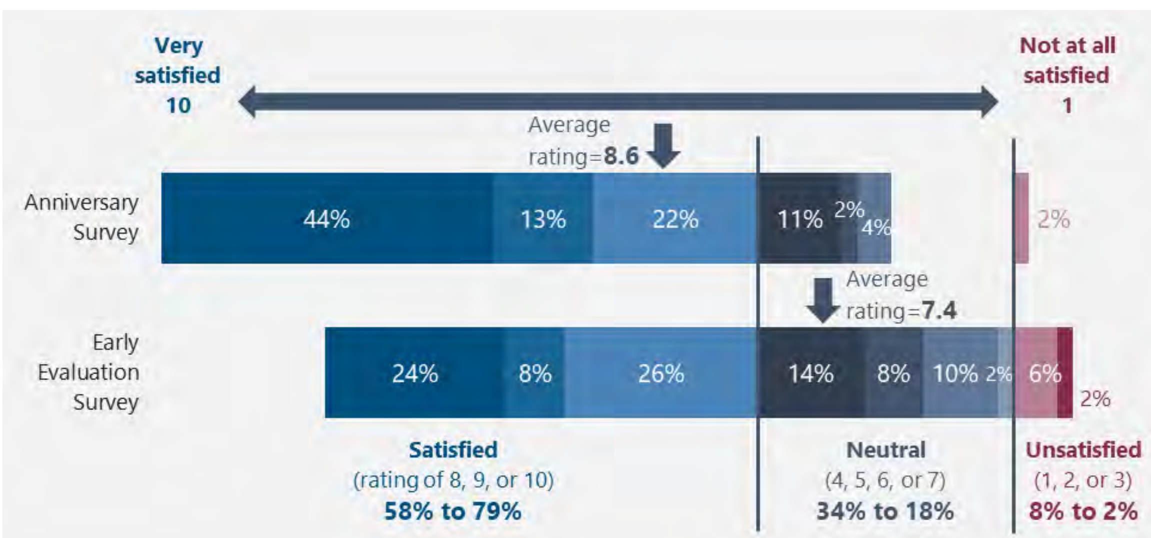
- **The Early Evaluation Online Survey** collected data from all 50 pilot participants (100% of the total) from March 7, 2024, to April 2, 2024. This survey consisted of 26 questions and is provided in *Appendix D. Battery Storage Pilot Early Evaluation Survey*.
- **The Anniversary Online Survey** collected data from 45 pilot participants (92% of total) from September 16, 2024, through October 1, 2024. This survey consisted of 21 questions and is provided in *Appendix E. Battery Storage Pilot Anniversary Survey*.

These surveys asked respondents about their overall pilot satisfaction, experience with battery storage systems, satisfaction with their TOU rate plan, and likelihood of recommending a battery storage system. The survey findings are presented below.

1.5. Overall Pilot Satisfaction

Survey respondents rated their overall satisfaction with the pilot on a 10-point scale (where 1 meant *not at all satisfied* and 10 meant *very satisfied*). The percentage of those who were satisfied (indicated by giving a rating of 8, 9, or 10) increased from 58% in the early evaluation survey to 79% in the anniversary survey (Figure 12). The average overall satisfaction rating increased from 7.4 in the early evaluation survey to 8.6 in the anniversary survey.

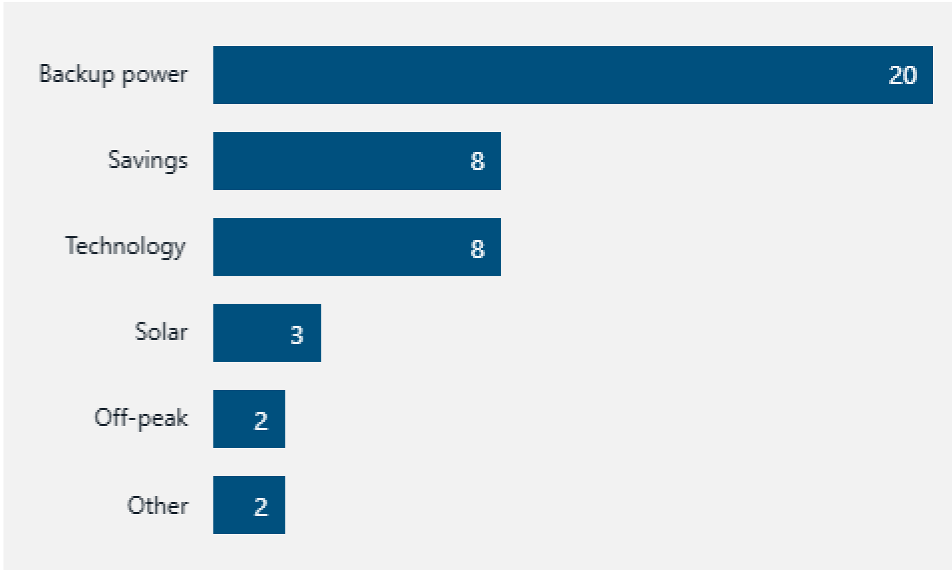
Figure 12. Satisfaction with Battery Storage Pilot



Source: Residential Battery Energy Storage Pilot Early Evaluation Survey Question 2 and Residential Battery Energy Storage Pilot Anniversary Survey Results Question 1. "Overall, how satisfied are you with the Battery Storage Pilot program so far?" (1=*not at all satisfied*; 10=*very satisfied*)

When asked what they like about the pilot, many respondents said they appreciate having backup power. Other themes included appreciation for the savings and the technology (Figure 13).

Figure 13. Likes about Battery Storage Pilot



Source: Residential Battery Energy Storage Pilot Anniversary Survey Results Question 2. "What do you especially like about being part of the Battery Storage Pilot?" (open-ended)

As shown in Figure 14, 71% of respondents said their perception of Evergy had improved as a result of participating in the Battery Storage pilot.

Figure 14. Perception of Evergy after Pilot Participation

Source: Residential Battery Energy Storage Pilot Early Evaluation Survey Question 4. "How has being part of Evergy's Battery Storage Pilot program changed your opinions of Evergy?"

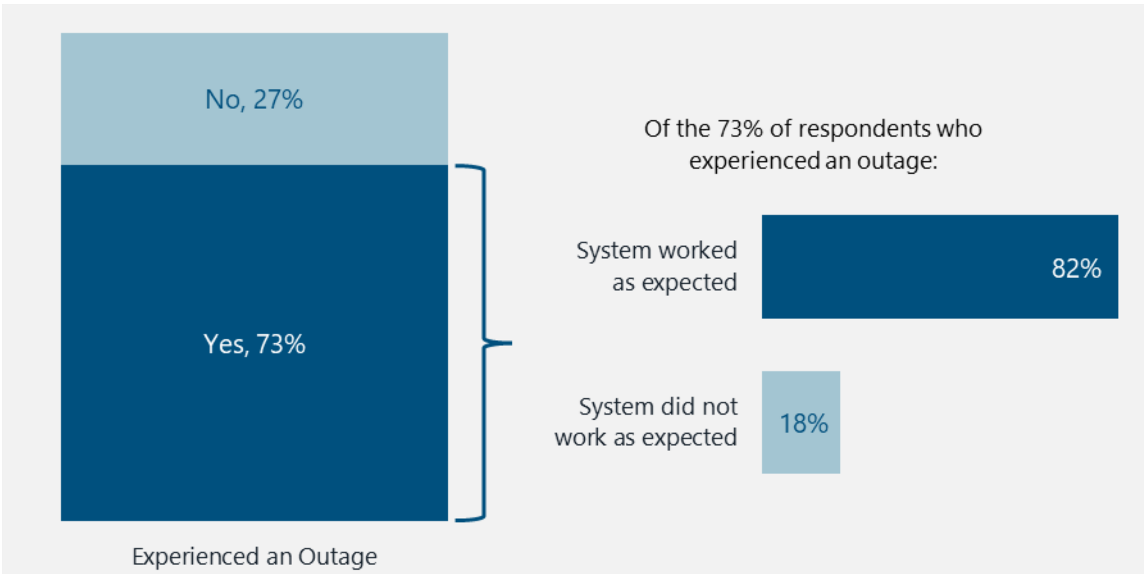
1.6. Experience with Battery Storage Systems

Most survey respondents (82%) reported understanding system benefits very well, providing a rating of 8, 9, or 10 on a 10-point scale (where 1 meant *don't understand at all* and 10 meant *understand completely*). The average rating of understanding across all respondents was 8.6.

In addition, 60% of survey respondents said the expected system benefits worked well, providing a rating of 8, 9, or 10 on a 10-point scale (where 1 meant *very poorly* and 10 meant *very well*). The average rating of system benefits across all respondents was 7.8.

Most respondents (73%) experienced a power outage at their home (Figure 15). Of those who experienced an outage, 82% said the battery storage equipment worked as expected and provided power to their critical household systems.

Figure 15. Experience with Outages and Battery Storage System

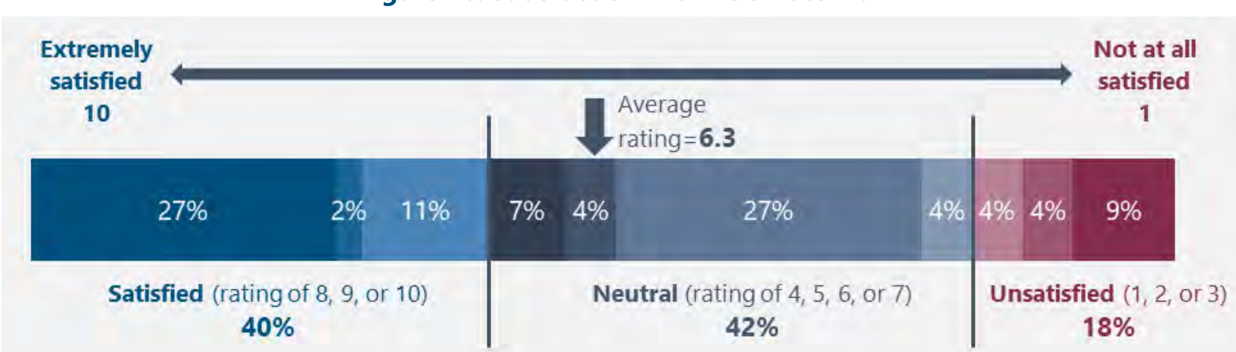


Source: Residential Battery Energy Storage Pilot Early Evaluation Survey Questions 11 and 12. "In the last year, have you had an outage at your home?" and (if yes) "Did the Battery Storage equipment works as expected, providing power to your critical household systems? Please tell us what happened."

1.7. Satisfaction with TOU Rate Plan

Survey respondents rated their satisfaction with their TOU rate plan as an average of 6.3 on a 10-point scale (where 1 meant *not at all satisfied* and 10 meant *extremely satisfied*). Only 40% gave a rating of 8, 9, or 10 on this scale (Figure 16).

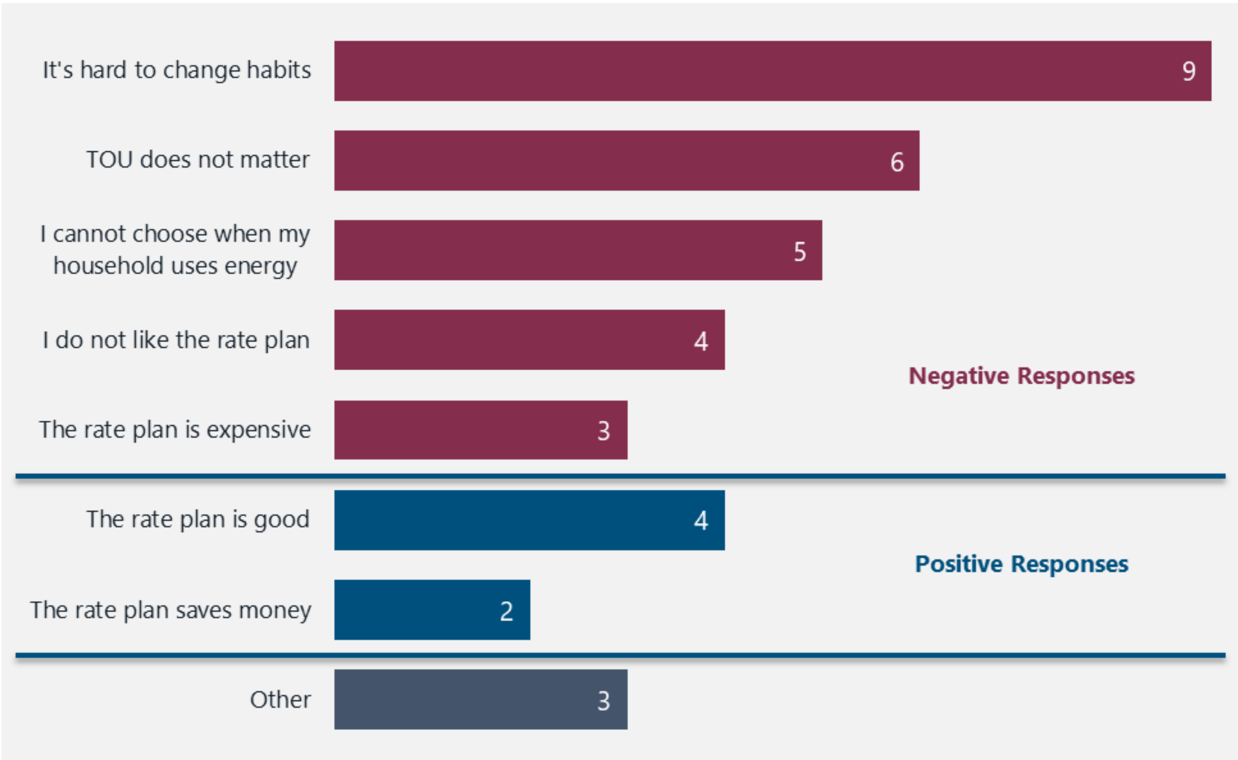
Figure 16. Satisfaction with TOU Rate Plan



Source: Residential Battery Energy Storage Pilot Anniversary Survey Results Question 15. "How satisfied are you with your time-of-use rate plan?" (1=*not at all satisfied*; 10=*extremely satisfied*)

When asked why they provided the rating for satisfaction with the TOU rate plan, nine participants said it was difficult to change their habits, while six said that time of use does not matter. The full list of reasons, both positive and negative, is shown in Figure 17.

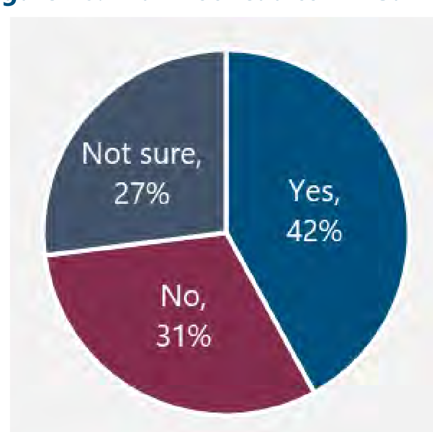
Figure 17. Reason for Rating of Satisfaction with TOU Rate Plan



Source: Residential Battery Energy Storage Pilot Anniversary Survey Results Question 16.
"Why do you say that?" (in response to satisfaction with time-of-use rate plan)

Only 42% of survey respondents said they saved money as a result of participating in the pilot, while 31% said they did not save money, and 27% were unsure (see Figure 18).

Figure 18. Did Pilot Lead to Bill Savings

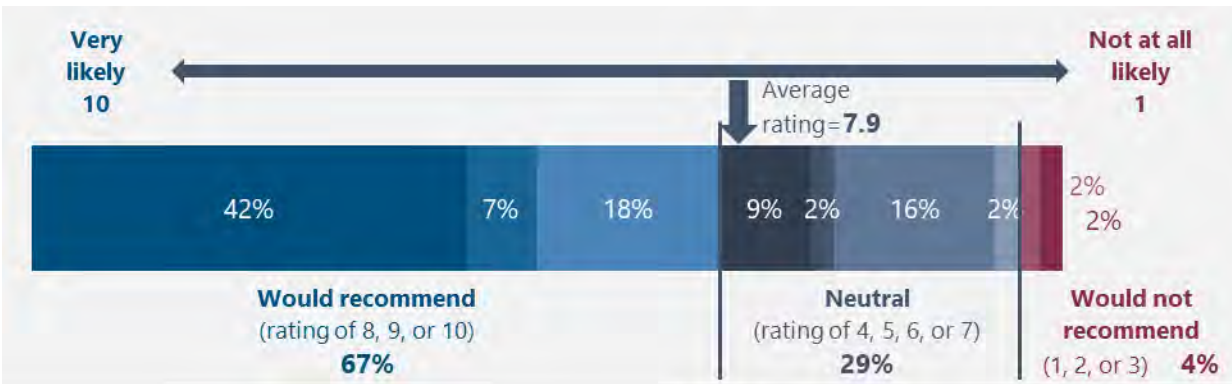


Source: Residential Battery Energy Storage Pilot Early Evaluation Survey Question 17. "In your opinion, has your participation in Evergy's Battery Storage Pilot allowed you to save money on your monthly electric bills?"

1.8. Likelihood to Recommend a Battery Storage System

Most survey respondents (67%) said they were likely to recommend a battery storage system to a friend or relative, providing a rating of 8, 9, or 10 on a 10-point scale (where 1 meant *not at all likely* and 10 meant *very likely*). The average rating for likelihood to recommend a battery storage system across all respondents was 7.9 (Figure 19).

Figure 19. Likelihood to Recommend a Battery Storage System



Source: Residential Battery Energy Storage Pilot Anniversary Survey Results Question Q20. "Having used your system for about a year, how likely are you to recommend a Battery Storage system to a friend or relative?" (1=*not at all likely*; 10=*very likely*)

Conclusions and Recommendations

Drawing on Cadmus' PY3 impact evaluation findings, a comparison with the pilot's first two years of operation, and Evergy's participant survey results, we present several conclusions from the pilot and recommendations for future programs. Table 14 maps each conclusion to the relevant research objectives defined in the *Introduction*.[19]

Table 14. Research Objectives and Conclusions

Research Objective	Conclusion 1	Conclusion 2	Conclusion 3	Conclusion 4
1. Assess battery system impacts on demand and customer energy bills	✓	✓	✓	
2. Understand how Evergy can use batteries to impact future grid impacts of behind-the-meter solar systems as a DER		✓	✓	
3. Understand battery capabilities as a demand response capacity resource	✓	✓		
4. Document the benefits and impacts of the pilot program and determine post-pilot recommendations	✓	✓	✓	✓

[19] *Appendix K. Pilot Learning Objectives* maps the learning objectives of the pilot to the sections of the report where they are explored.

CONCLUSION	1. **Evergy has substantially improved battery programming throughout the pilot, increasing peak load reduction to the grid and electric bill savings to participants.**

Following Cadmus' recommendations from PY1 and PY2, Evergy repeatedly modified battery programming for PV systems to charge more during the day from the participants' own solar generation than from the grid overnight. This substantially reduced PV participants' excess midday solar generation in PY2, allowing them to use that energy later in the evening as the sun set. In PY3, additional modifications further reduced midday power exports and overnight charging from the grid down to almost none (as seen in Figure 4), supporting Evergy's goal of smoothing variable solar output on the grid.

Similarly, Evergy's continuously evolving battery programming has improved the timing, amount, and consistency of battery discharge since PY1. In PY3, battery discharge was well aligned with the 4 p.m. to 8 p.m. on-peak period, battery-only systems charged mainly during the 12 p.m. to 6 a.m. super-off-peak period, and PV-coupled batteries charged the most from solar generation of any pilot year (as shown in Figure 3). In addition to better alignment with the peak period, batteries also maintained a higher rate of on-peak discharge in PY3 than in PY2 and especially in PY1. Demand response events also achieved the greatest battery discharge in PY3 of any pilot year. Increased discharge during on-peak hours provided both greater cost savings to participants and reduced peak demand on the grid, generating higher system benefits such as avoided cost of capacity.

CONCLUSION	2. **Batteries could likely be discharged more during peak periods to further reduce grid peak load and increase participant TOU savings. However, participants highly favor the backup power capability provided by the batteries.**

An ongoing concern throughout the pilot was how to balance the batteries' potential to reduce peak demand with their potential to provide backup power during outages. None of the battery program groups reached their designated minimum state-of-charge (usually hovering around double the threshold; see Table 3), but the additional energy retained meant batteries could power participants' critical load panels for longer in the event of any grid outages. While pilot batteries not coupled with PV were load-constrained to the home and could not export power to the grid, home consumption exceeded on-peak battery discharge on average across all systems but fell well within the batteries' discharge capacity. This means batteries could have discharged more on average to participants' homes during peak hours, providing both greater savings for participants and reducing peak demand on the grid.

RECOMMENDATION	**In potential future battery programs, consider either of these options:** **2.1. Discharging utility-owned batteries to their stated minimum backup reserve (10% to 30%) to maximize peak demand reduction to the grid, avoided cost of capacity, and utility cost-effectiveness** **2.2. A bring-your-own battery design where backup power can be more cost-effectively prioritized**

The batteries in this pilot were utility-owned and installed at no cost to participants (participants paid a $10 monthly fee for the batteries). If in a future program the aim is to maximize cost-effectiveness, consider deprioritizing participant-specific benefits like backup power and instead discharge batteries to their maximum capabilities during peak hours in order to maximize peak demand reduction for the grid. If participant benefits are the priority, switch to a bring-your-own battery design, in which participants finance their own batteries. This would significantly reduce ratepayer costs while still delivering peak demand reduction potential to the grid and backup power capability to participants.

CONCLUSION	3. Program batteries produced higher cost savings from TOU arbitrage when enrolled in electric rates with higher TOU pricing differentials.

The LG ESS H8 batteries are about 90% round-trip efficient (Table 5; *Appendix F. Battery Specifications Brochure*), meaning there is about 10% energy loss between charging and discharging. For a battery to save a participant money on their electric bill with TOU arbitrage (charging in super-off-peak hours when the price per kWh is lower and discharging in on-peak hours when the price per kWh is higher), the price differential between TOU periods has to be large enough to compensate for the round-trip energy loss. If energy is not sufficiently cheaper in off-peak hours, shifting load away from peak hours will not produce savings for the customer.

RECOMMENDATION	3.1. Consider enrolling future battery program participants in TOU rates with a high differential to maximize the benefits of battery TOU arbitrage.

To individually incentivize peak load management in future programs, enroll battery participants in a high differential TOU rate to closely align participant benefits (TOU cost savings) with system benefits (peak demand reduction). Note that batteries on the high differential TOU rates produced higher electric bill savings (Table 8) without sacrificing backup power capabilities: all non-PV batteries, regardless of rate, ended each day with around 50% capacity remaining.[20] Additionally, while participants were overall neutral regarding TOU rates, the most common negative response had to do with the difficulty of changing consumption patterns (Figure 16 and Figure 17). If batteries were discharged to fully meet home loads during peak hours, participants would not need to worry about shifting consumption habits to avoid paying the higher peak rates.

[20] Table 3 shows the PY3 average end-of-day state-of-charge by battery program and system type. The average for battery-only systems by rate plan was as follows: RPAS – 48%; RTOU – 60%; RTOU-2 – 46%; RTOU-3 – 48%. The average for PV-coupled systems (all of which were enrolled in RPAS) was 34%.

CONCLUSION	4. **Participants were *very satisfied* with the battery pilot overall, and their opinions of Evergy tended to improve as a result of participating.**

Finally, Evergy's pilot participant surveys showed that participants were highly satisfied with the pilot overall (Figure 12). Their favorite attribute was the backup power provided by the batteries, followed by electric bill savings and technology (Figure 13). Three in four said their opinion of Evergy had improved as a result of participating in the pilot, and two-thirds said they would recommend a battery system to others (Figure 14 and Figure 19).

Appendix A. Battery Stored Energy by Month

Appendix A provides the average battery stored energy by month, program, and system configuration across the three pilot years. Figure 20 and Figure 21 show increasingly better alignment between battery discharge timing and the TOU on-peak period as the pilot progressed, as well as the switch from overnight to midday charging for PV-coupled batteries in May 2024. The monthly breakout additionally highlights the seasonal differences in battery behavior: batteries appear to charge and discharge less in the winter months than in summer, especially when not coupled with PV.

Figure 20. Average Battery Stored Energy for Battery-Only Participants by Month and Program Across the Three Pilot Years

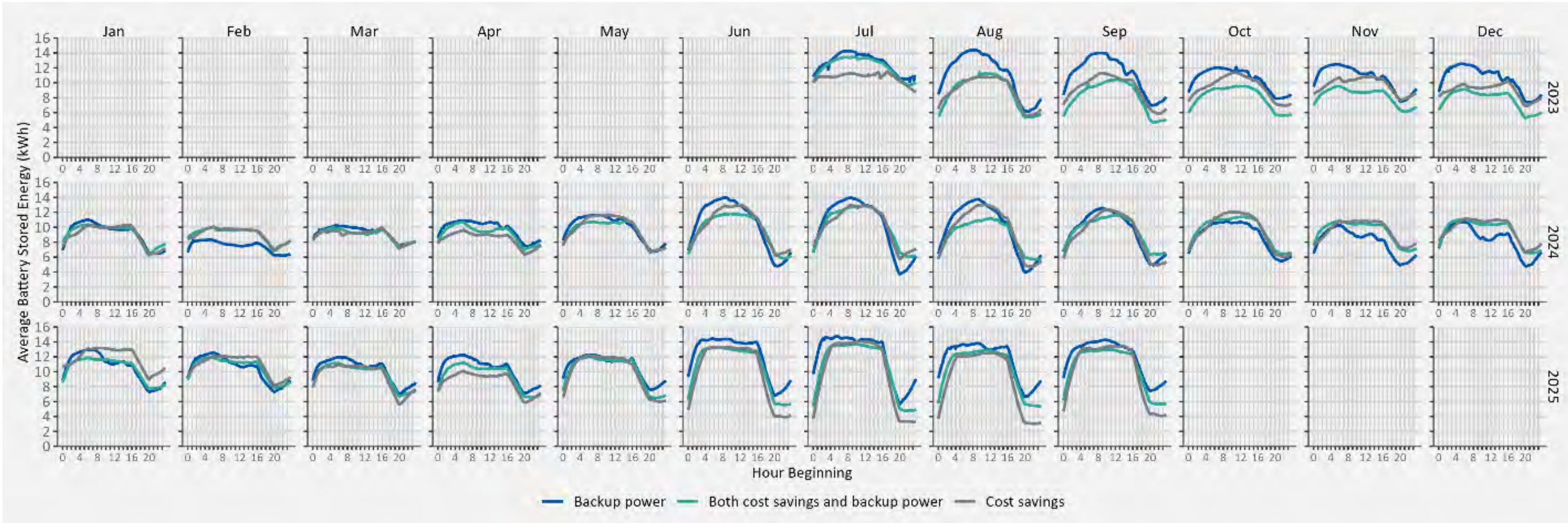
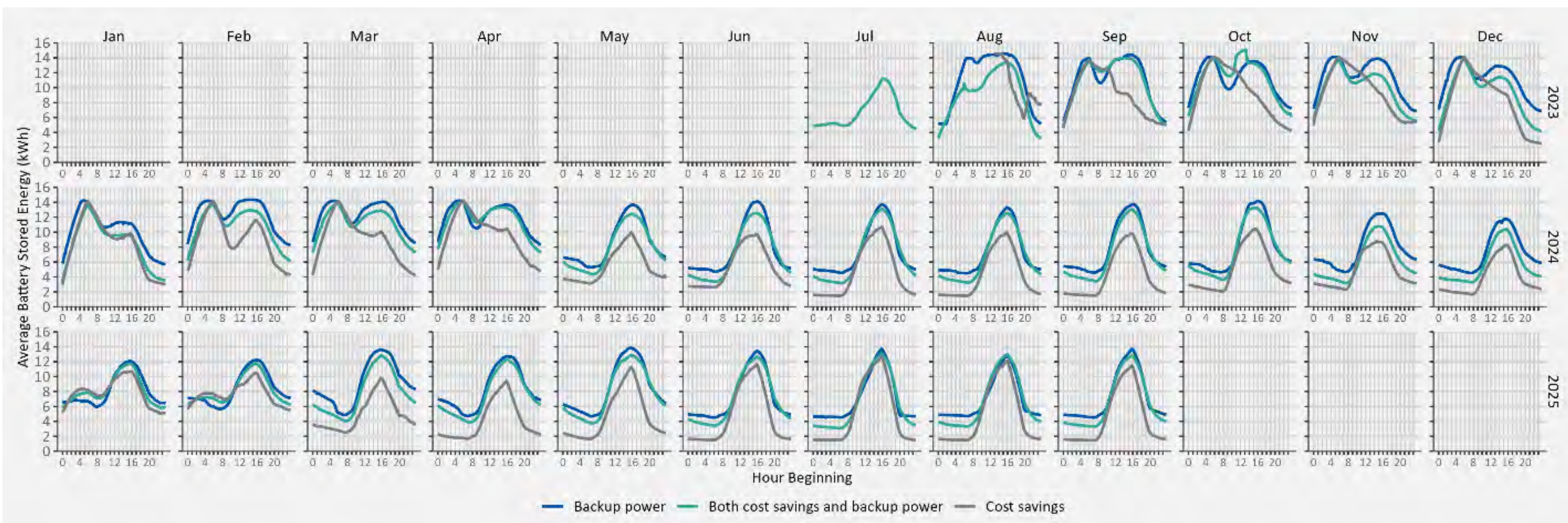


Figure 21. Average Battery Stored Energy for PV Participants by Month and Program Across Pilot Years



Appendix B. Outages

Appendix B provides a catalog of all PY3 power outages experienced by pilot participants.

Figure 22. Power Outages System ID Evergy H8 002

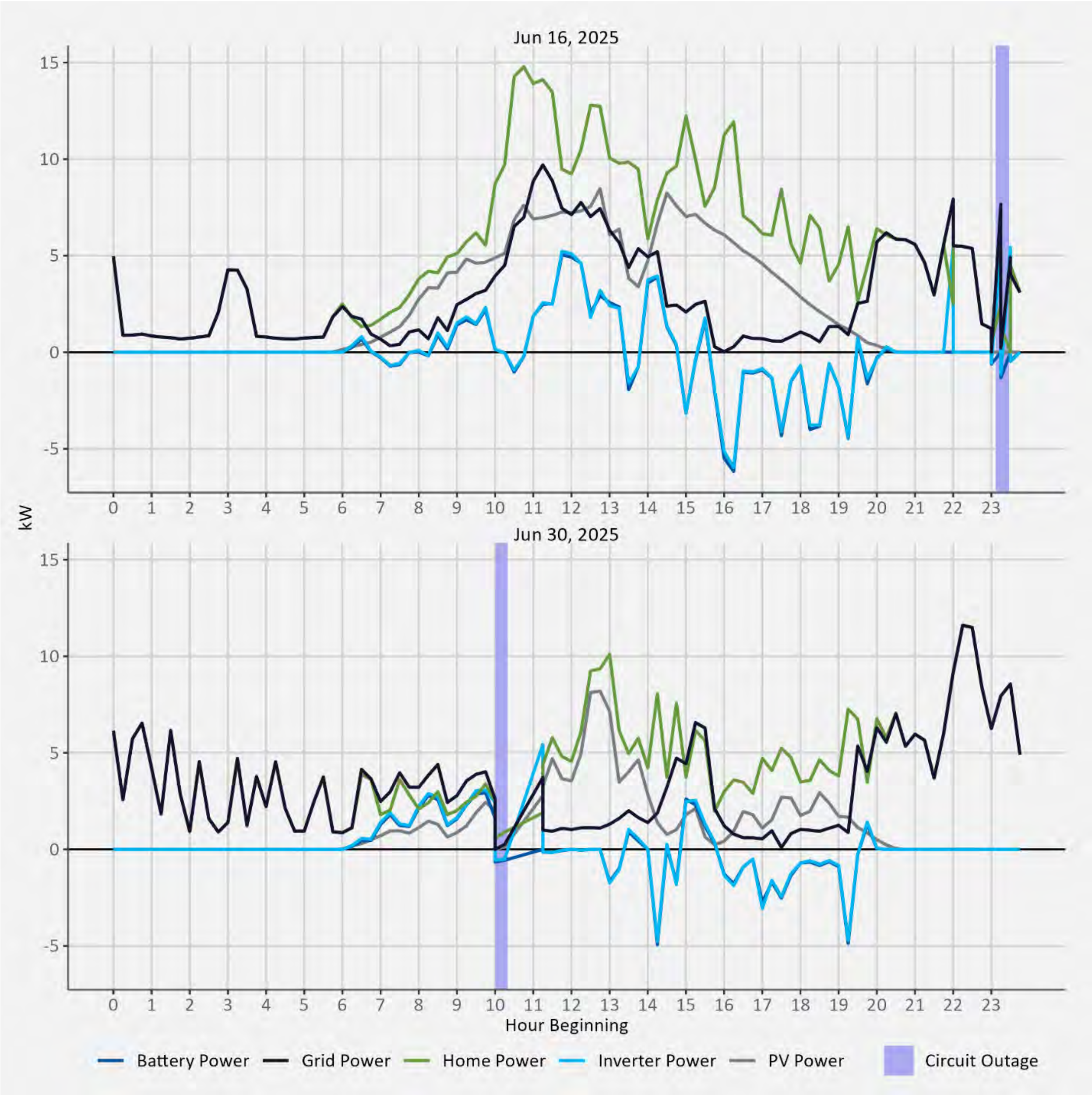


Figure 23. Power Outages System ID Evergy H8 003

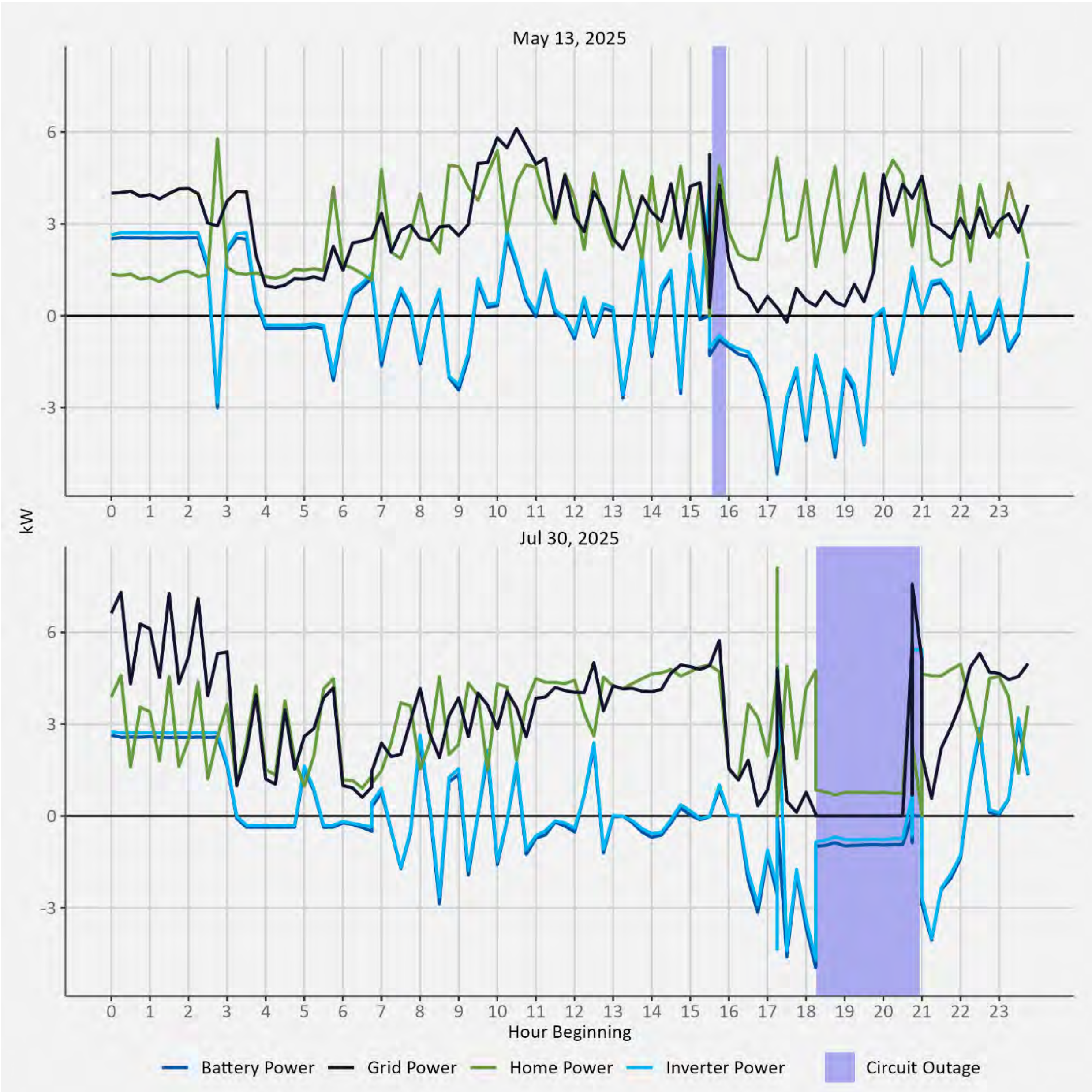


Figure 24. Power Outages System ID Evergy H8 004

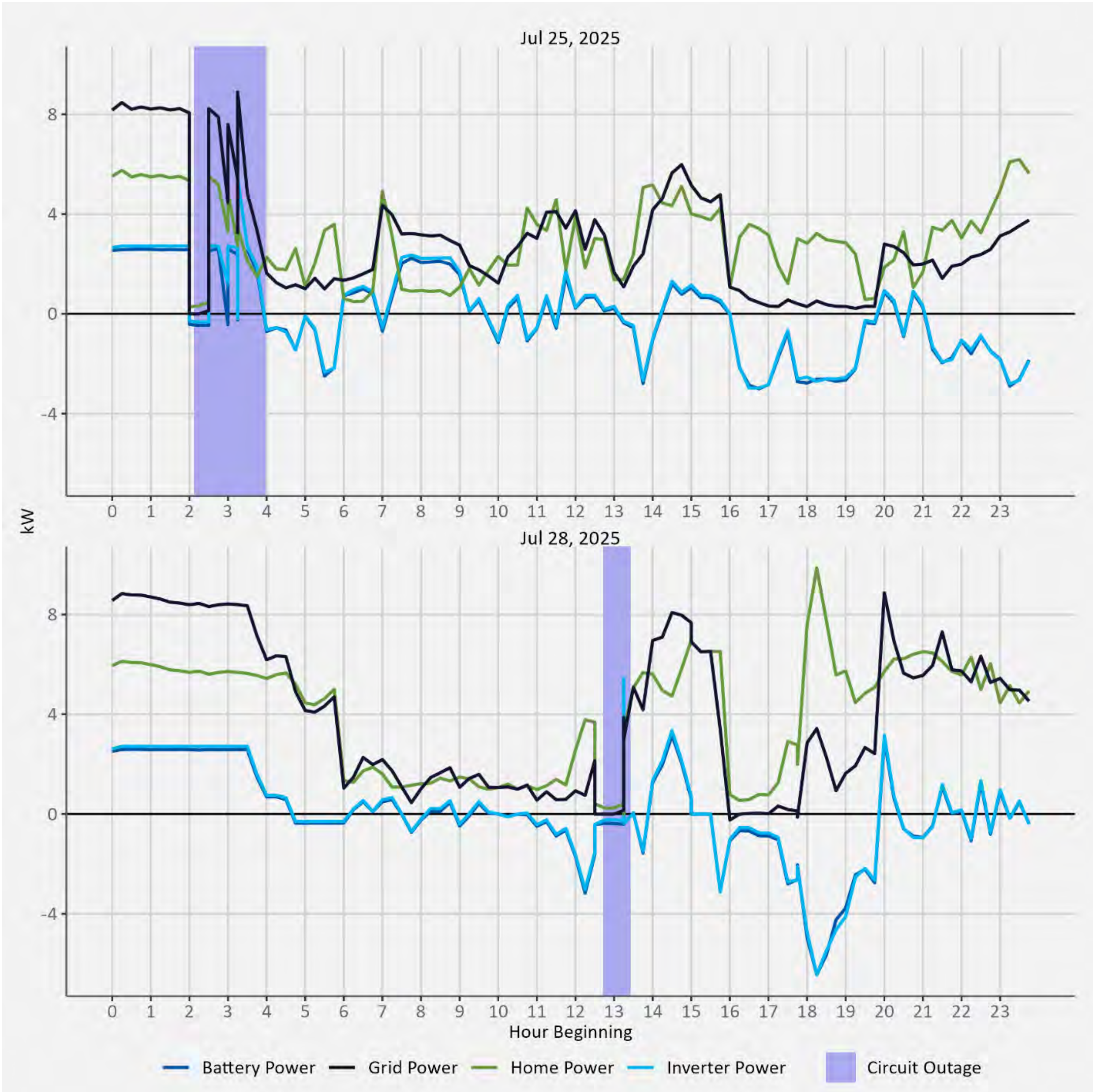


Figure 25. Power Outages System ID Evergy H8 005

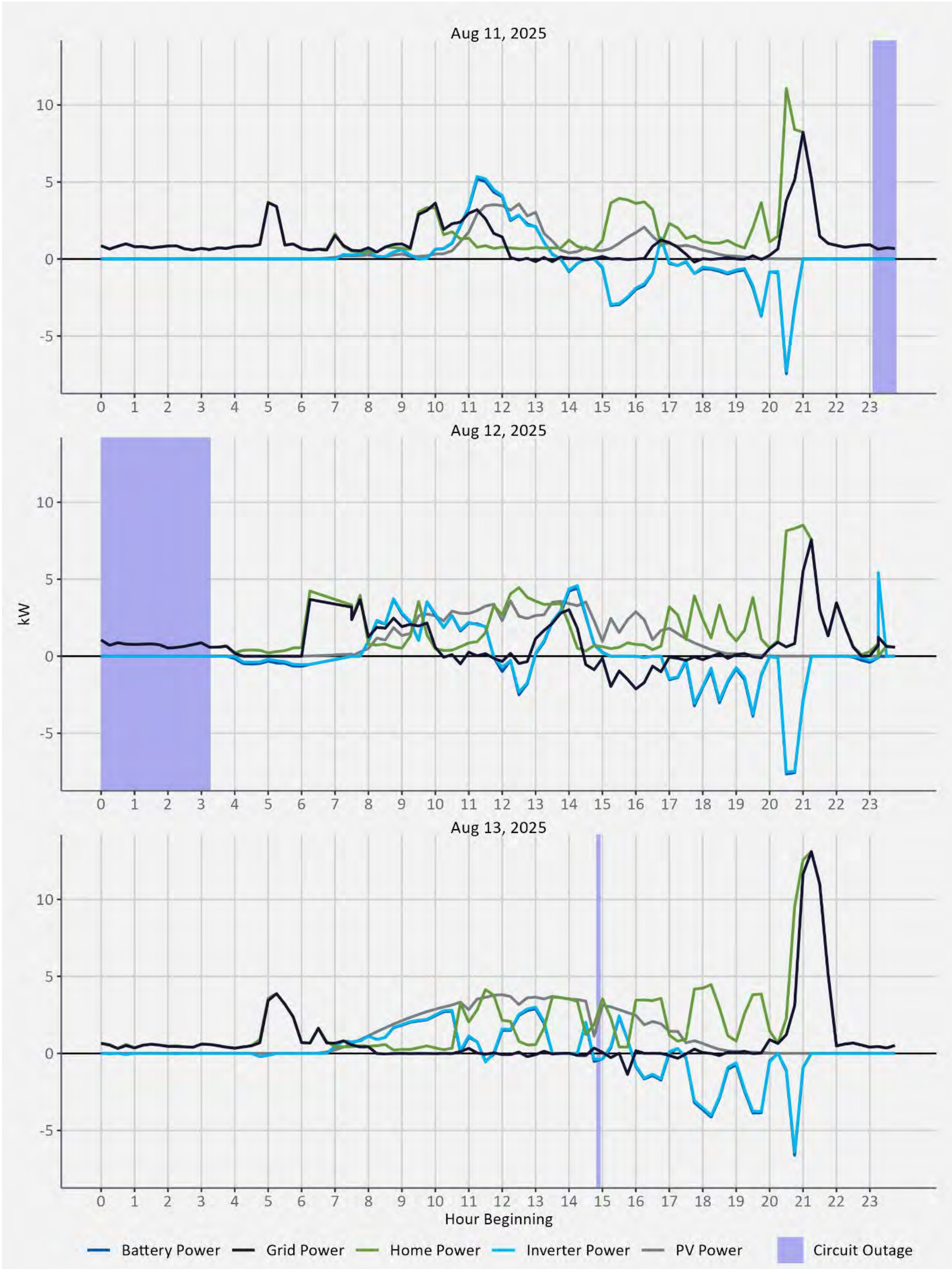


Figure 26. Power Outages System ID Evergy H8 008

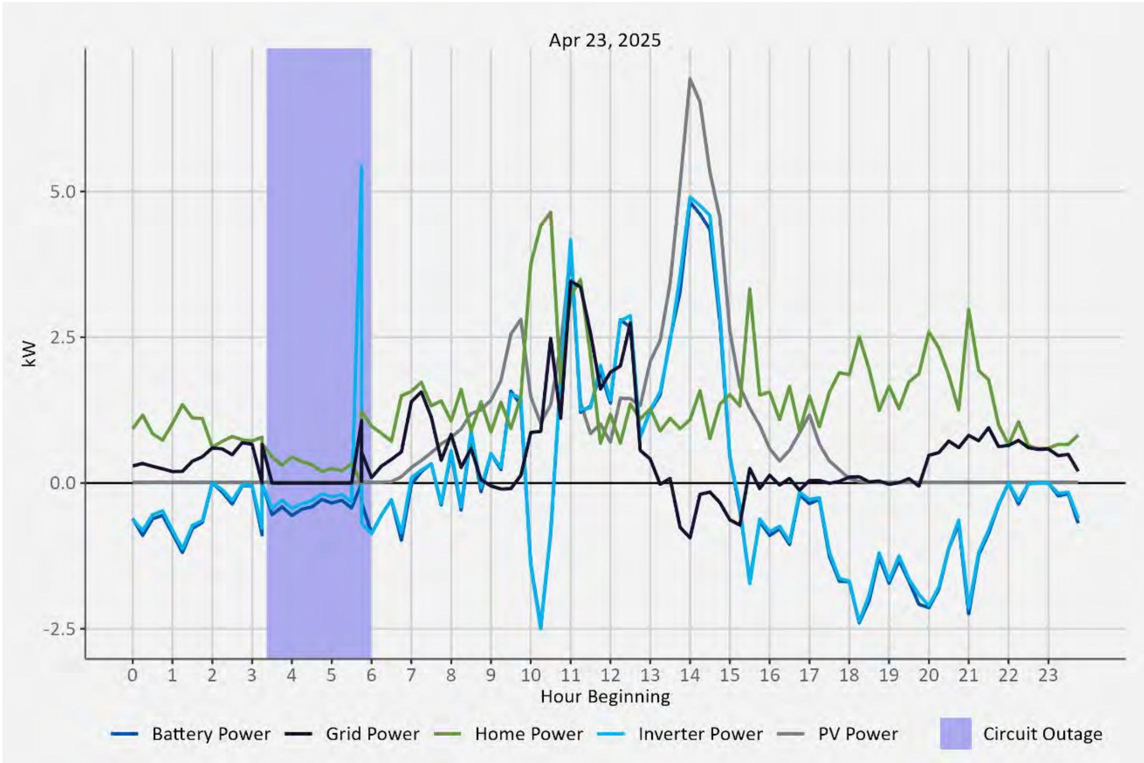


Figure 27. Power Outages System ID Evergy H8 009

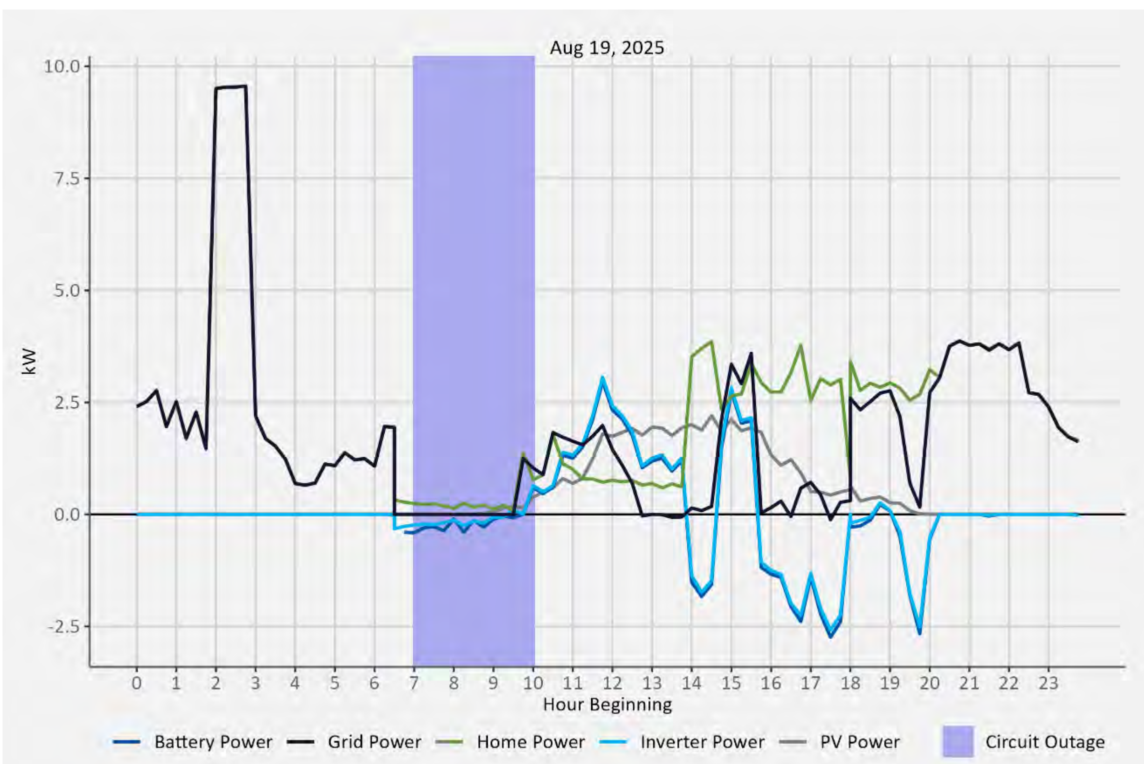


Figure 28. Power Outages System ID Evergy H8 010

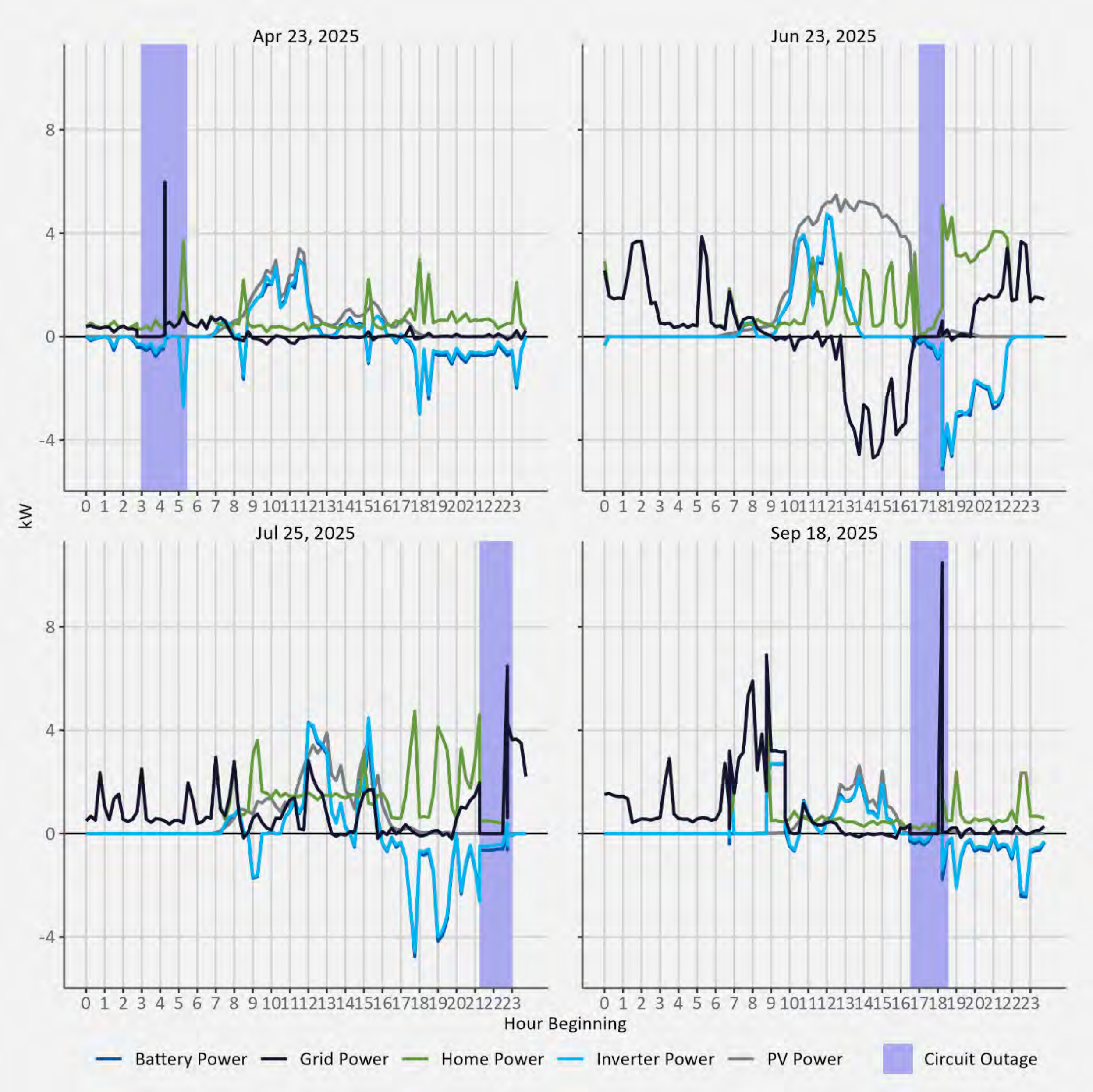


Figure 29. Power Outages System ID Evergy H8 015

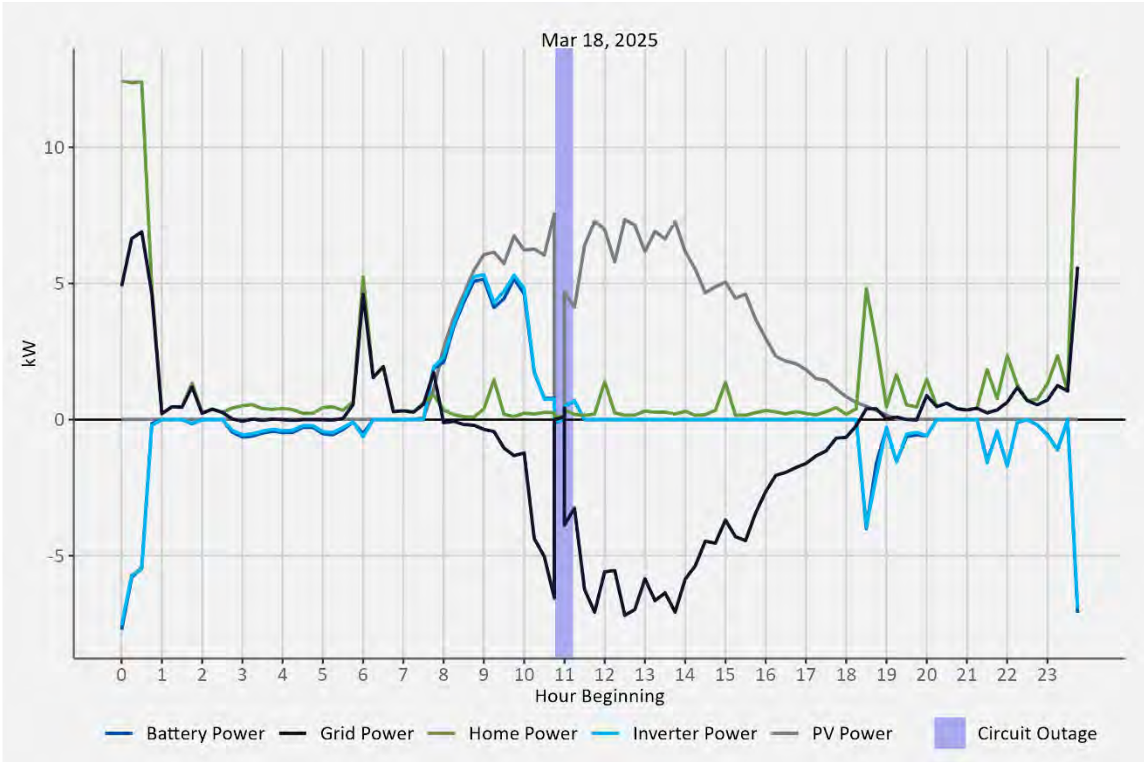


Figure 30. Power Outages System ID Evergy H8 017

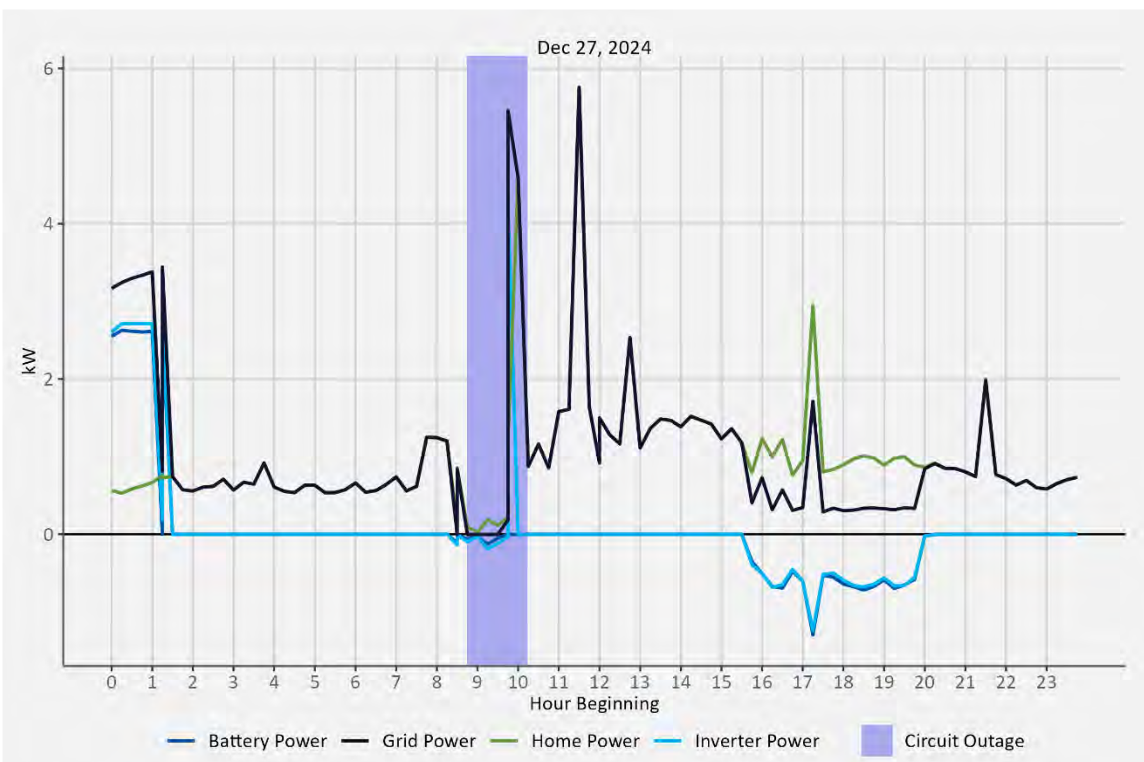


Figure 31. Power Outages System ID Evergy H8 018

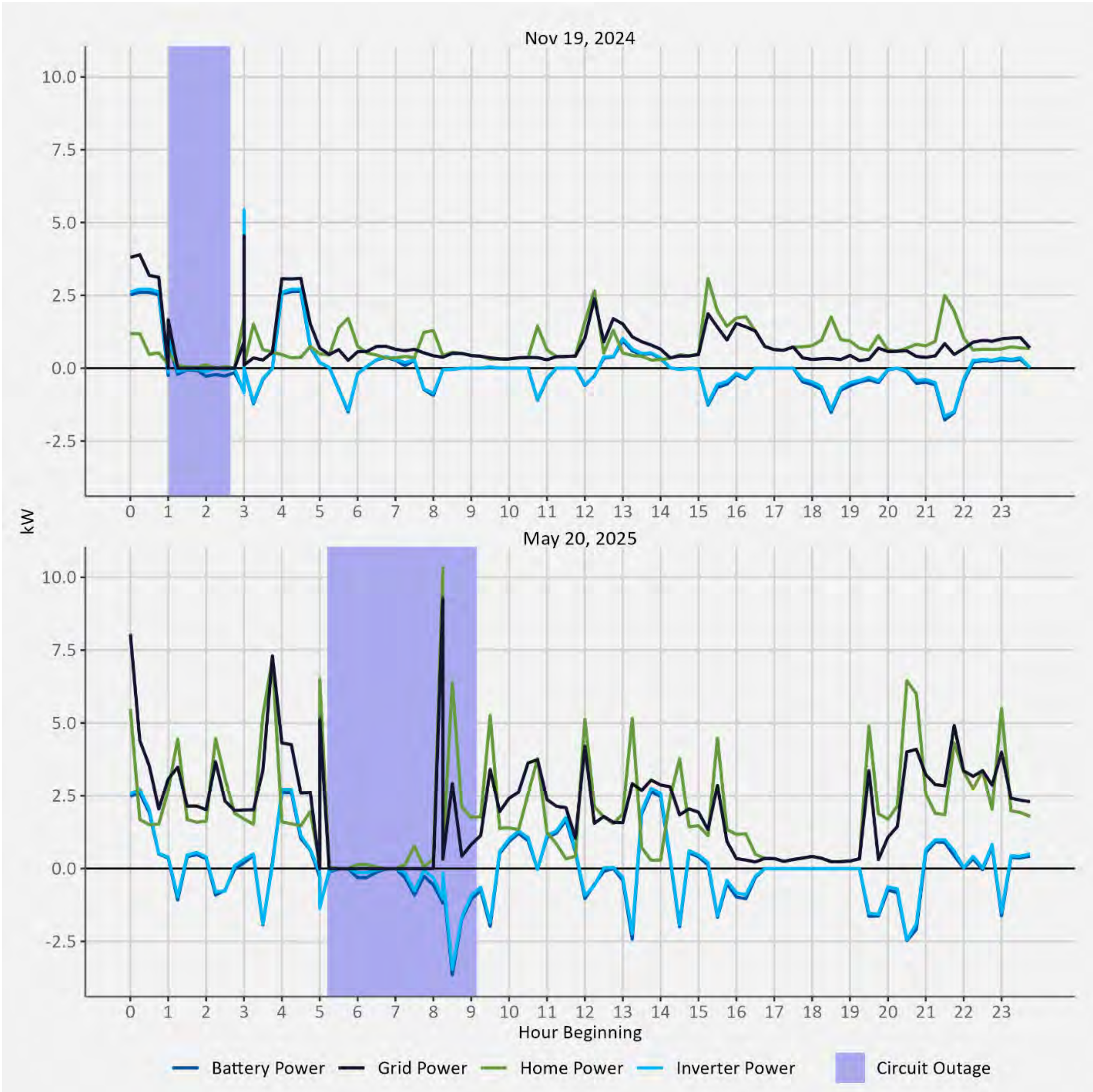


Figure 32. Power Outages System ID Evergy H8 020

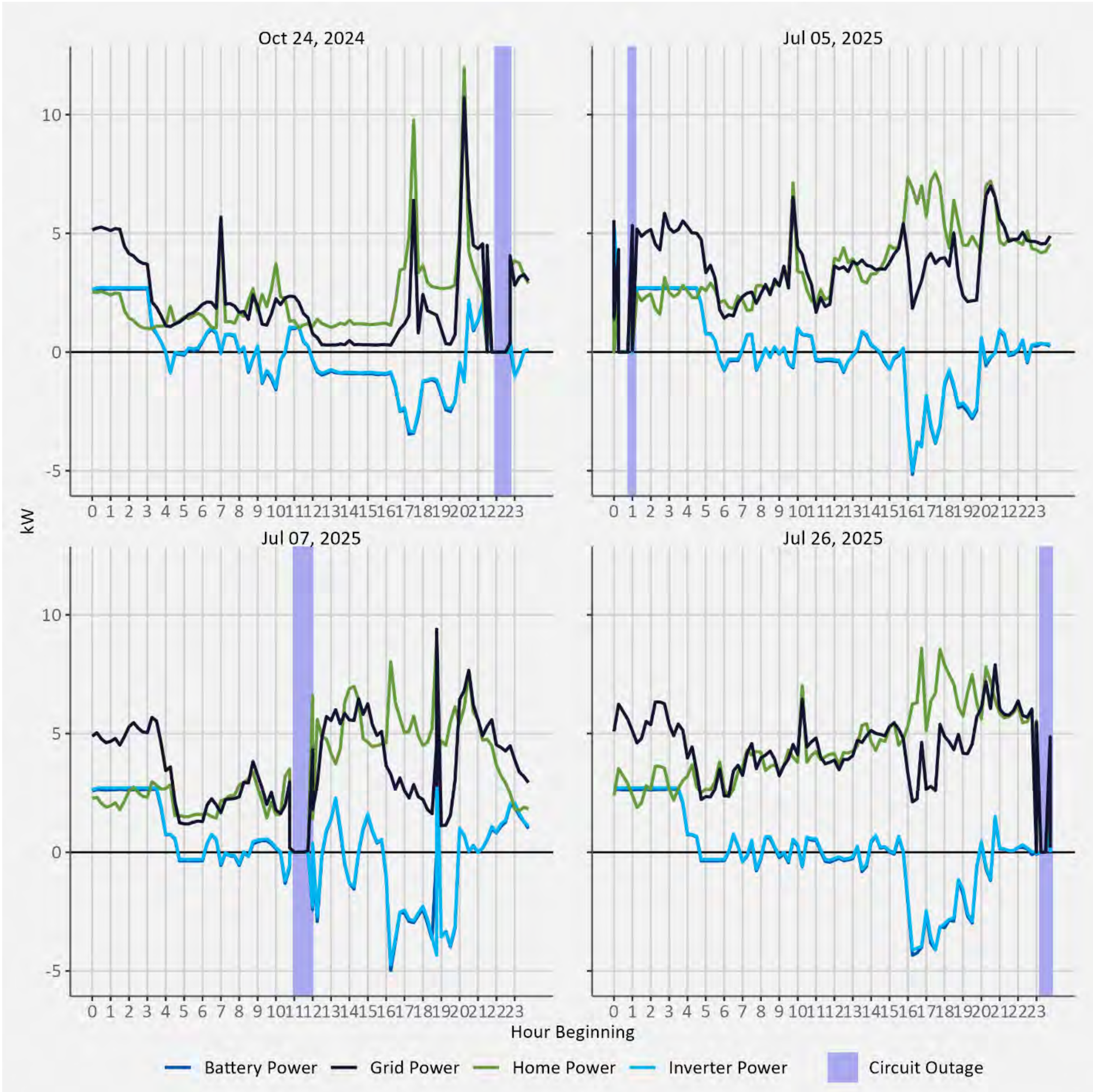


Figure 33. Power Outages System ID Evergy H8 021

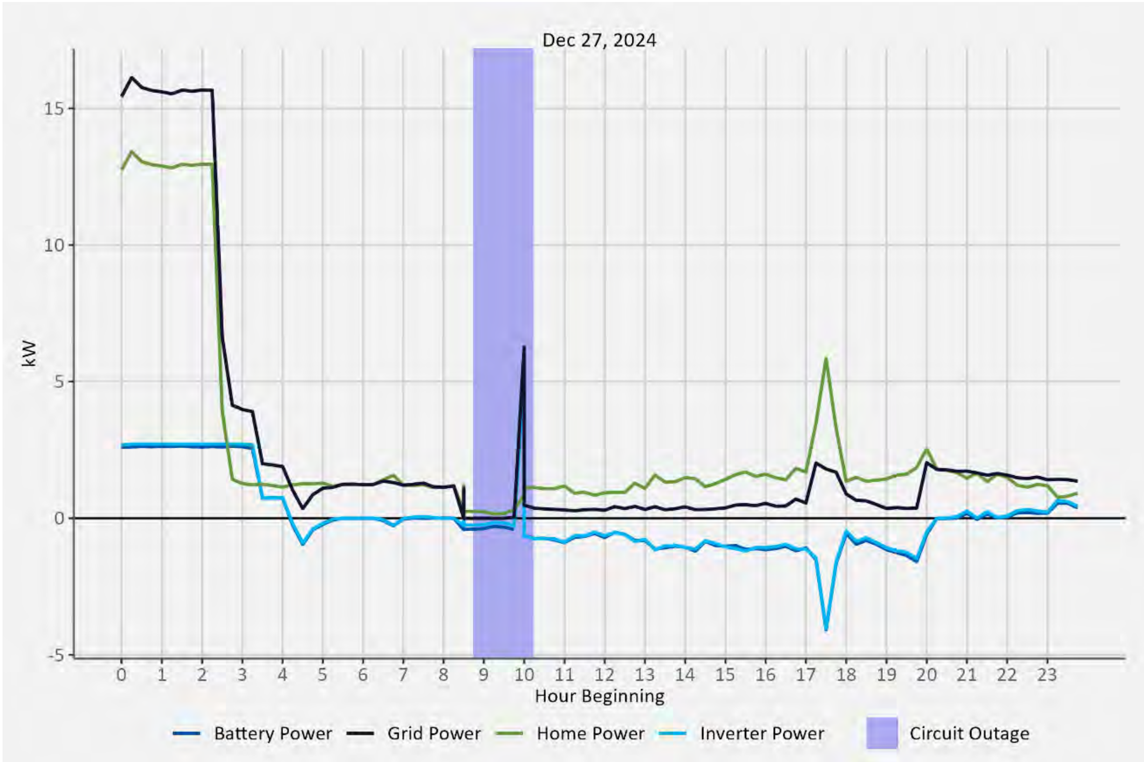


Figure 34. Power Outages System ID Evergy H8 022

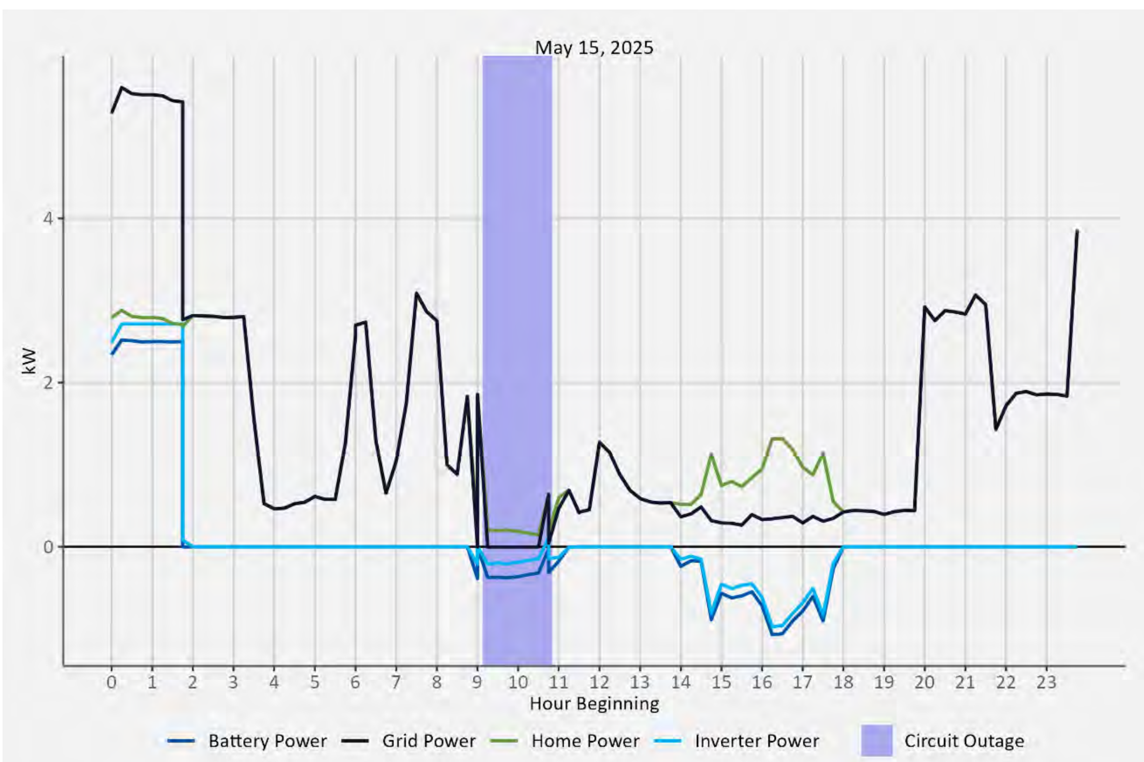


Figure 35. Power Outages System ID Evergy H8 024

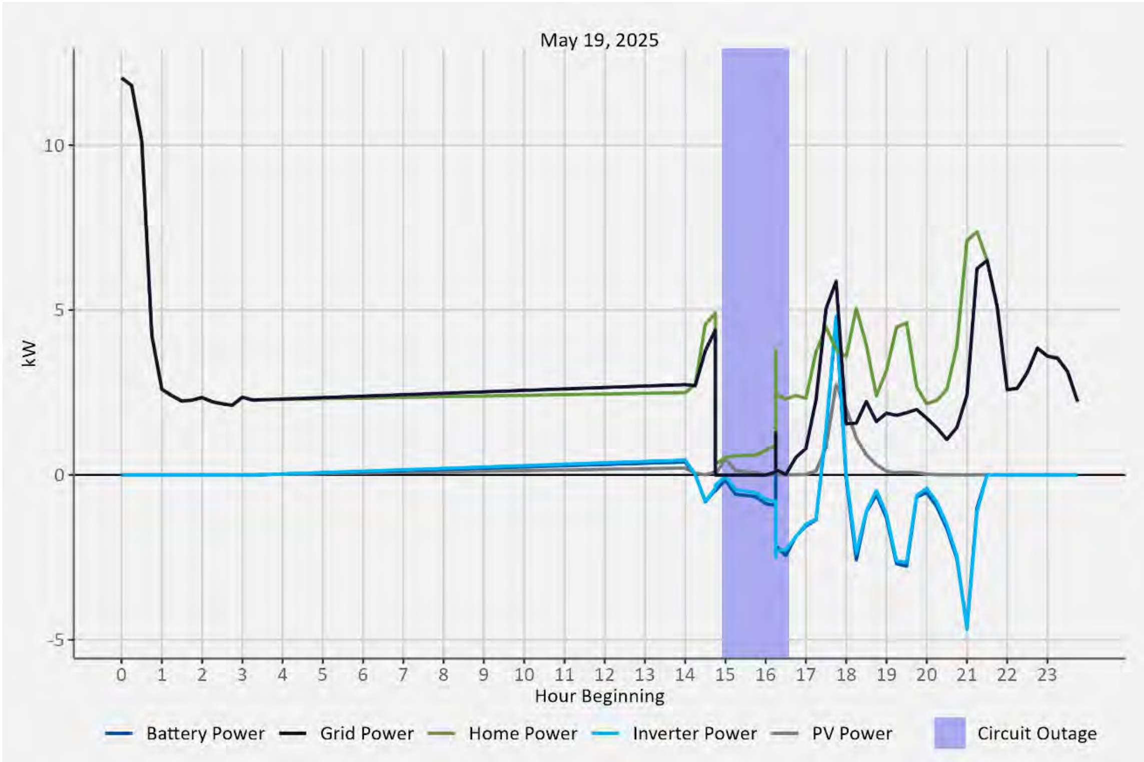


Figure 36. Power Outages System ID Evergy H8 027

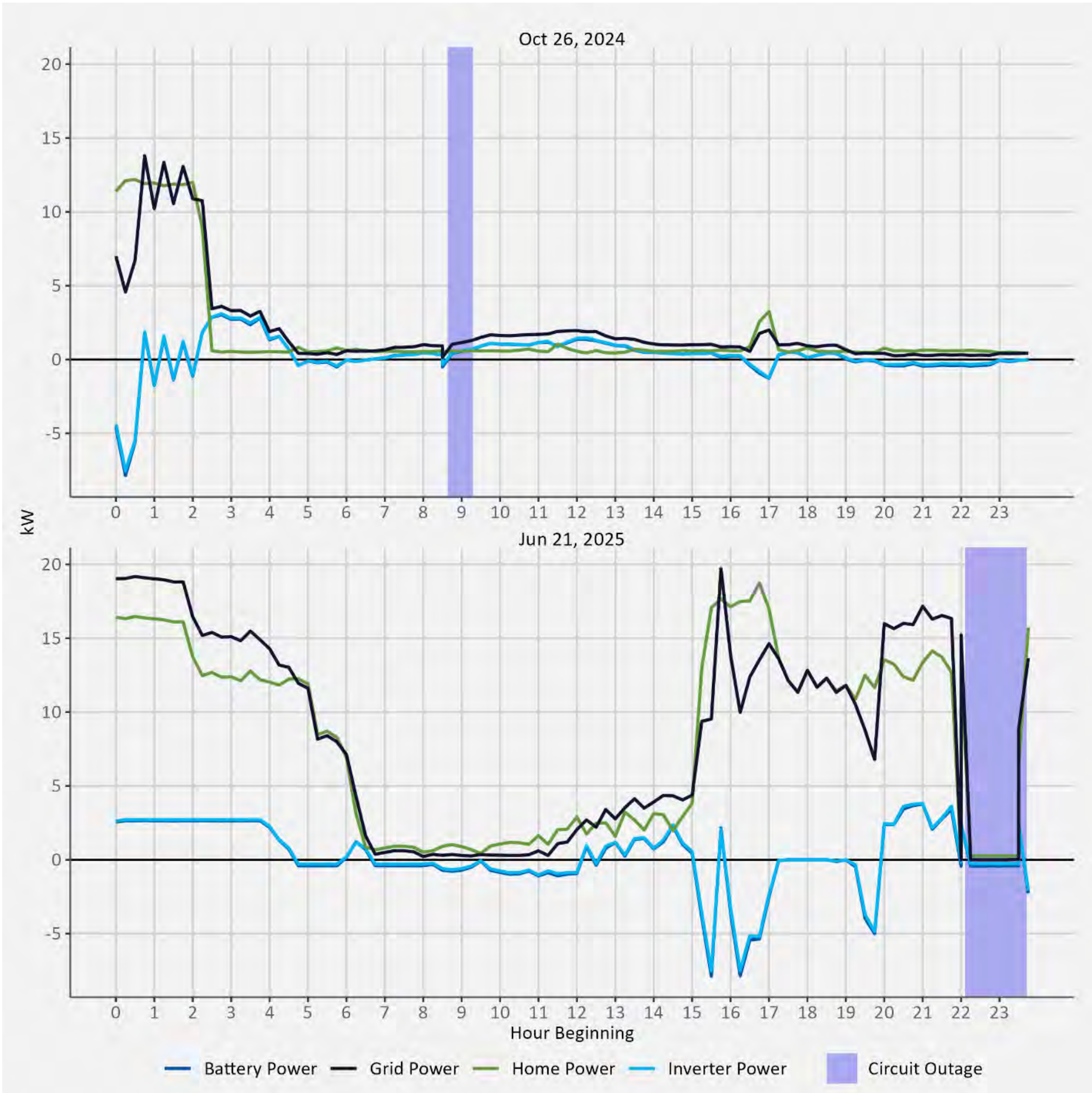


Figure 37. Power Outages System ID Evergy H8 035

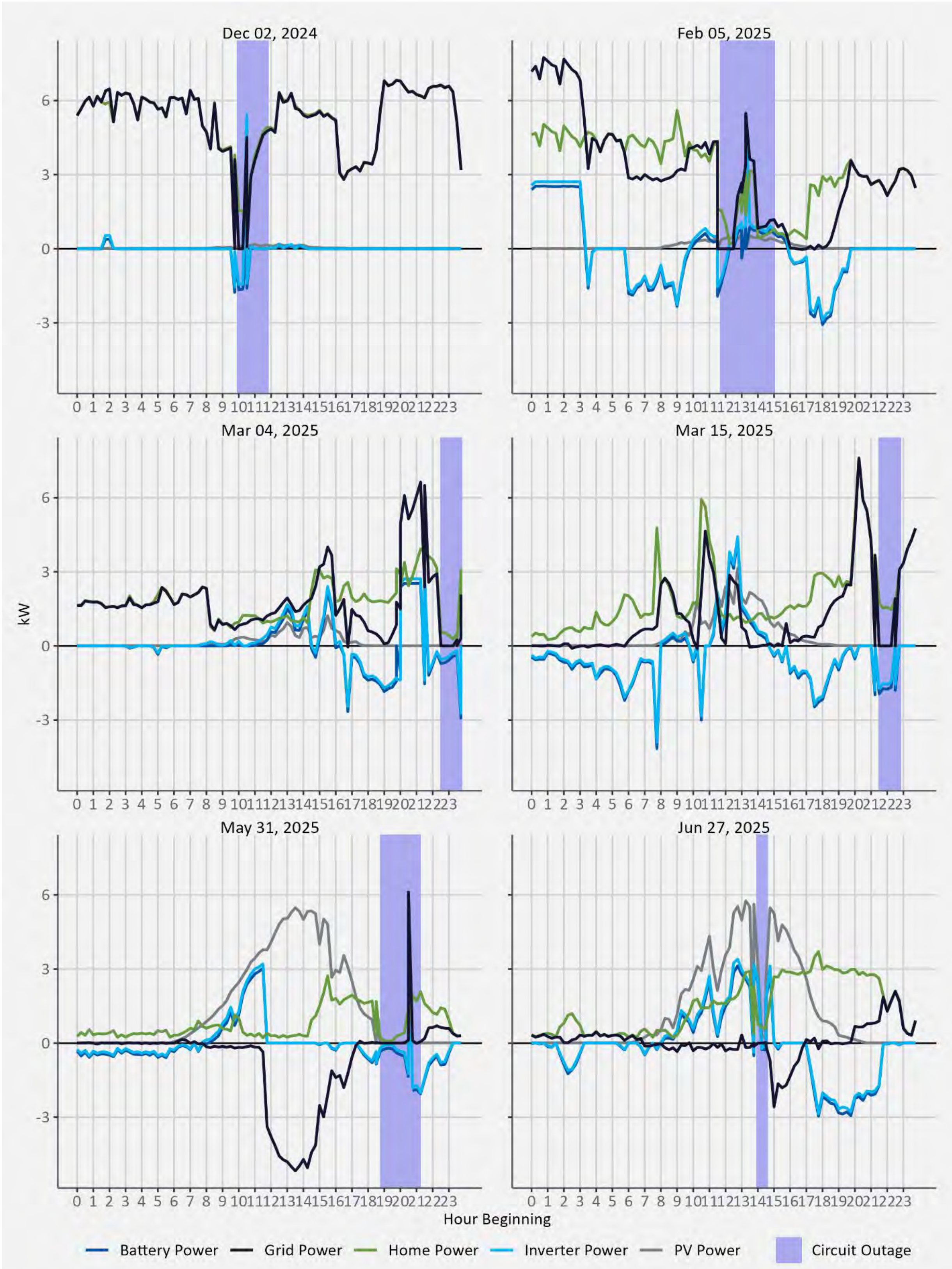


Figure 38. Power Outages System ID Evergy H8 036

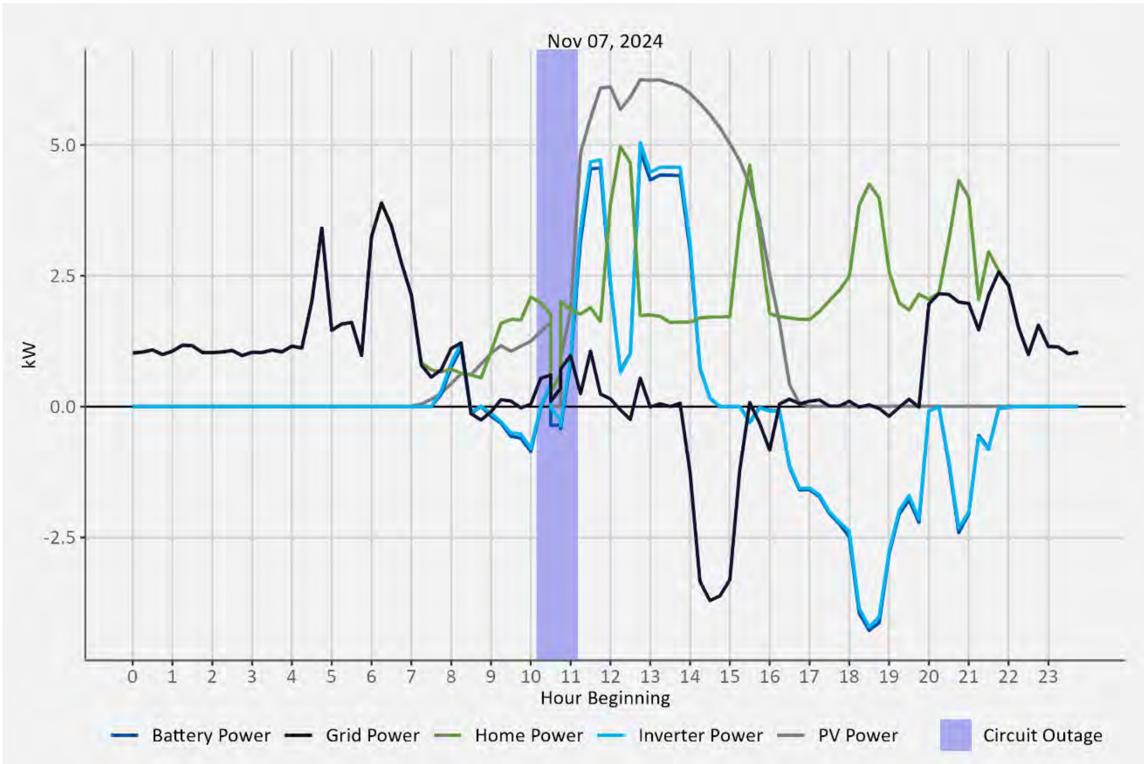


Figure 39. Power Outages System ID Evergy H8 038

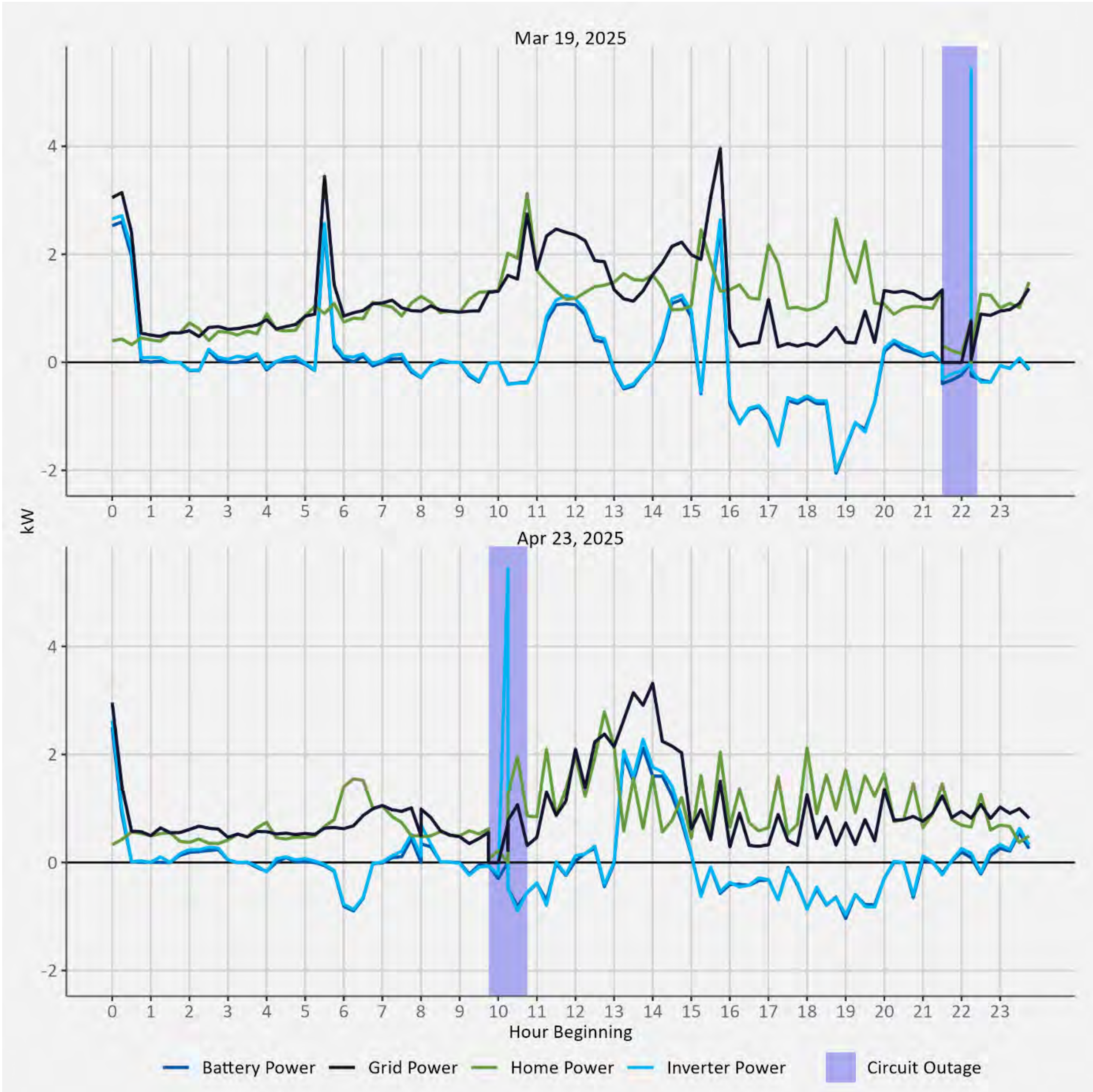


Figure 40. Power Outages System ID Evergy H8 039

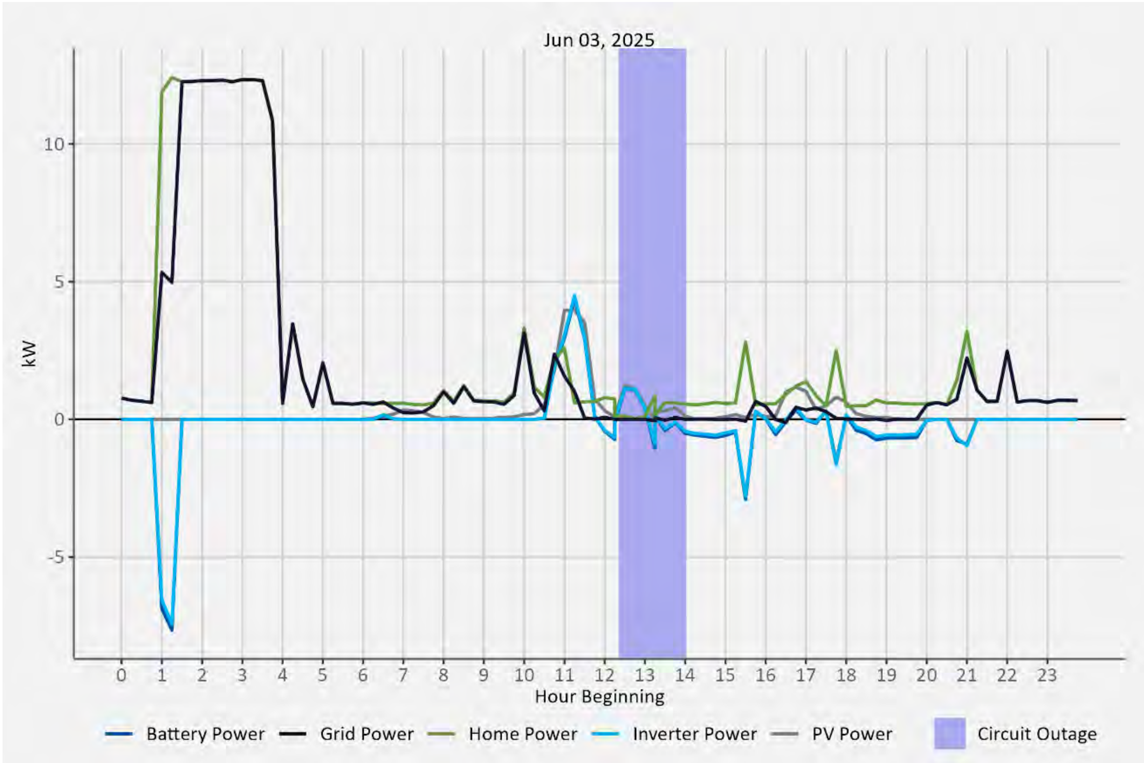


Figure 41. Power Outages System ID Evergy H8 041

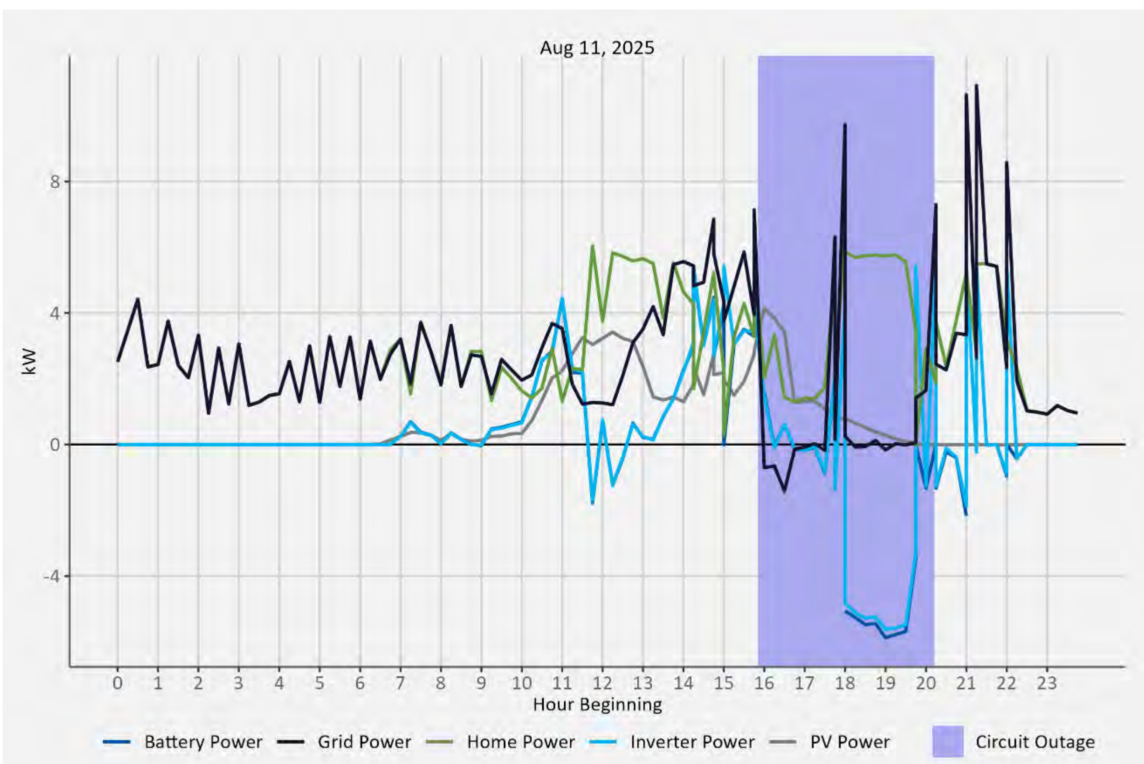


Figure 42. Power Outages System ID Evergy H8 043

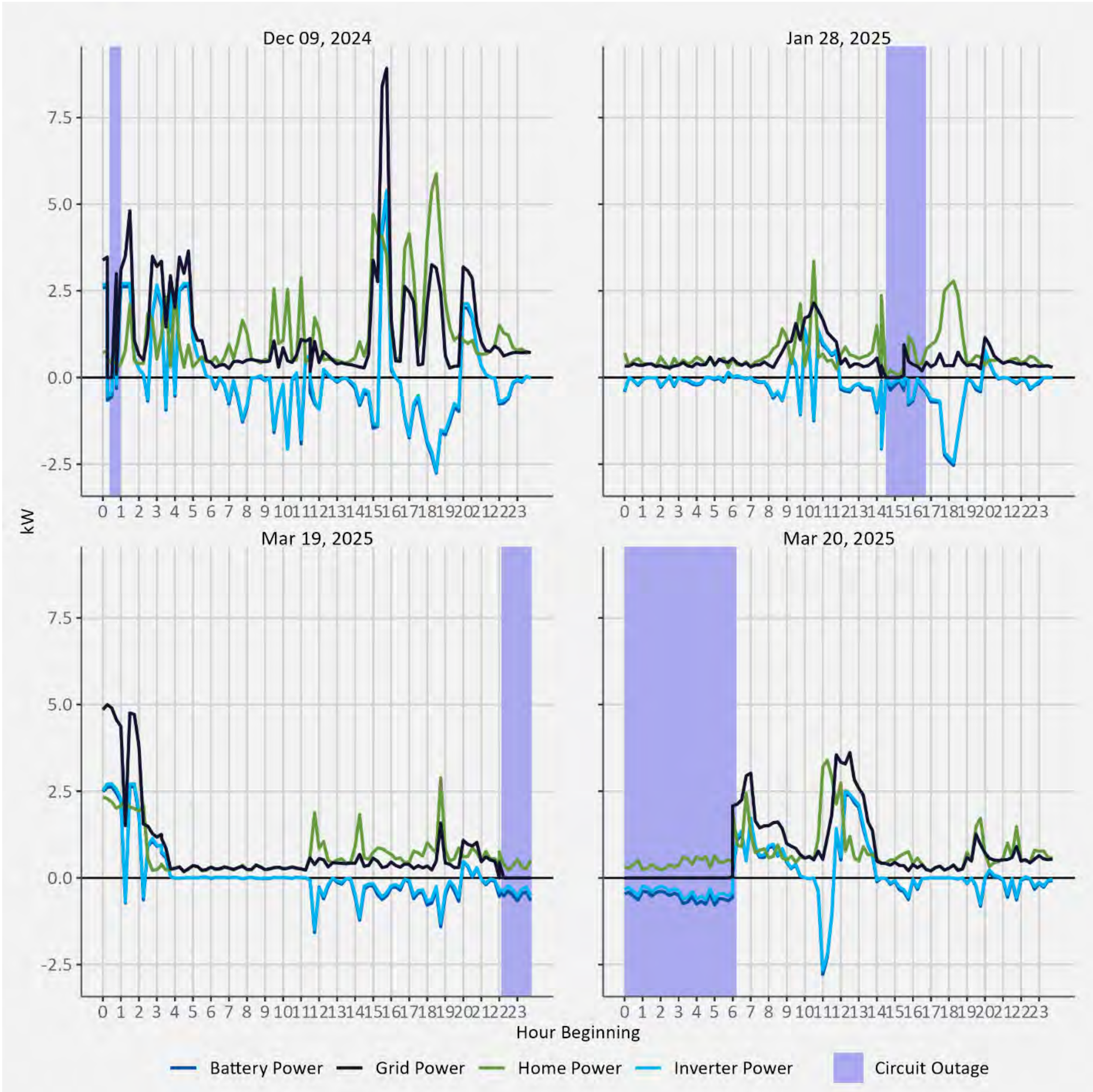
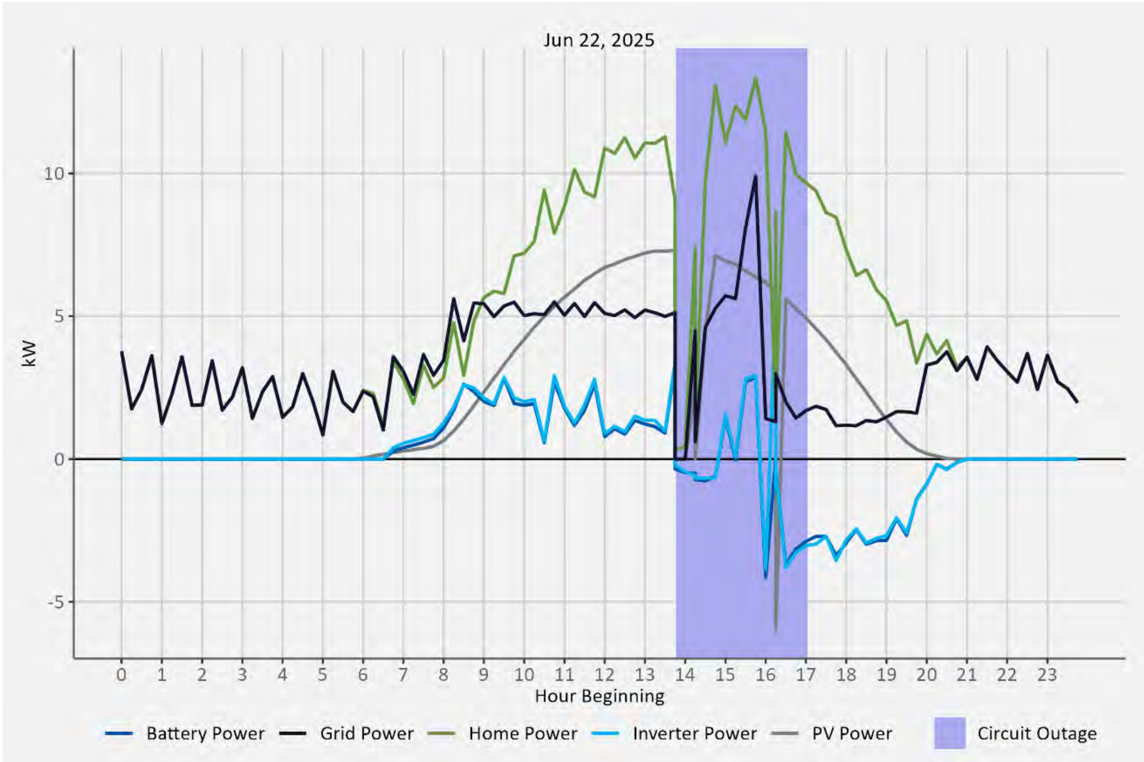


Figure 43. Power Outages System ID Evergy H8 046



Appendix C. Demand Response Events

Appendix C outlines the average battery stored energy, battery power flow, and grid power flow for participating homes in PY3 demand response events. Event times are shaded in gray.

Figure 44. Event 1 (June 25, 2025)

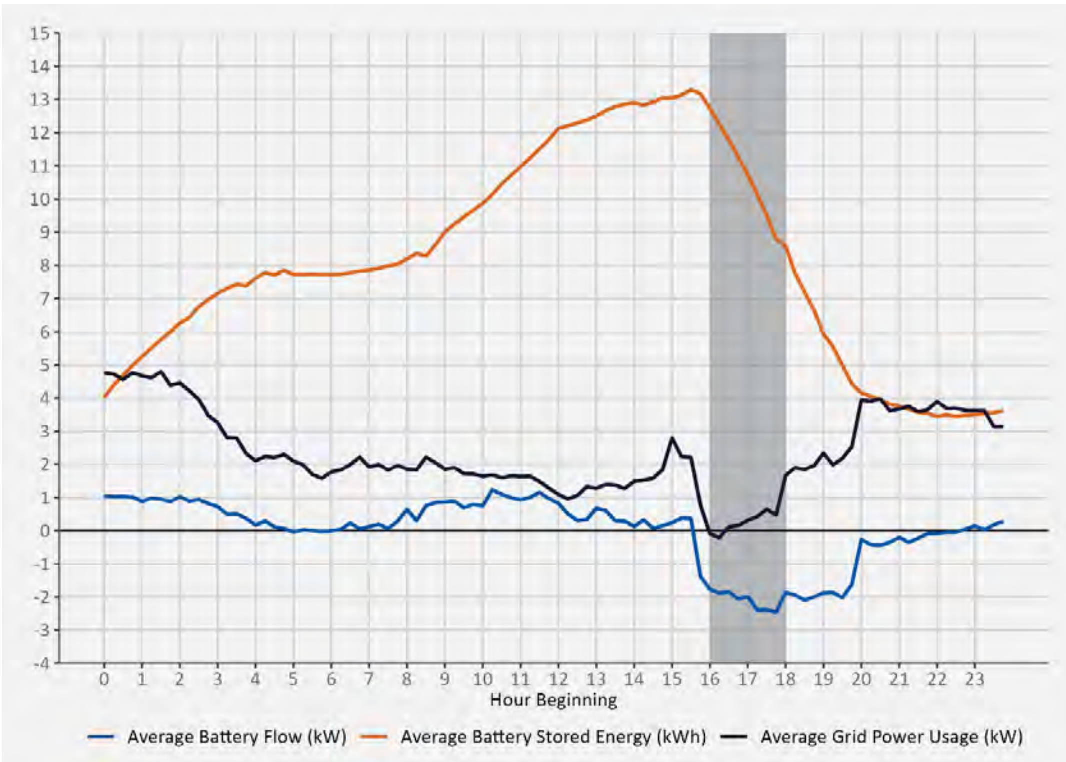


Figure 45. Event 2 (July 16, 2025)

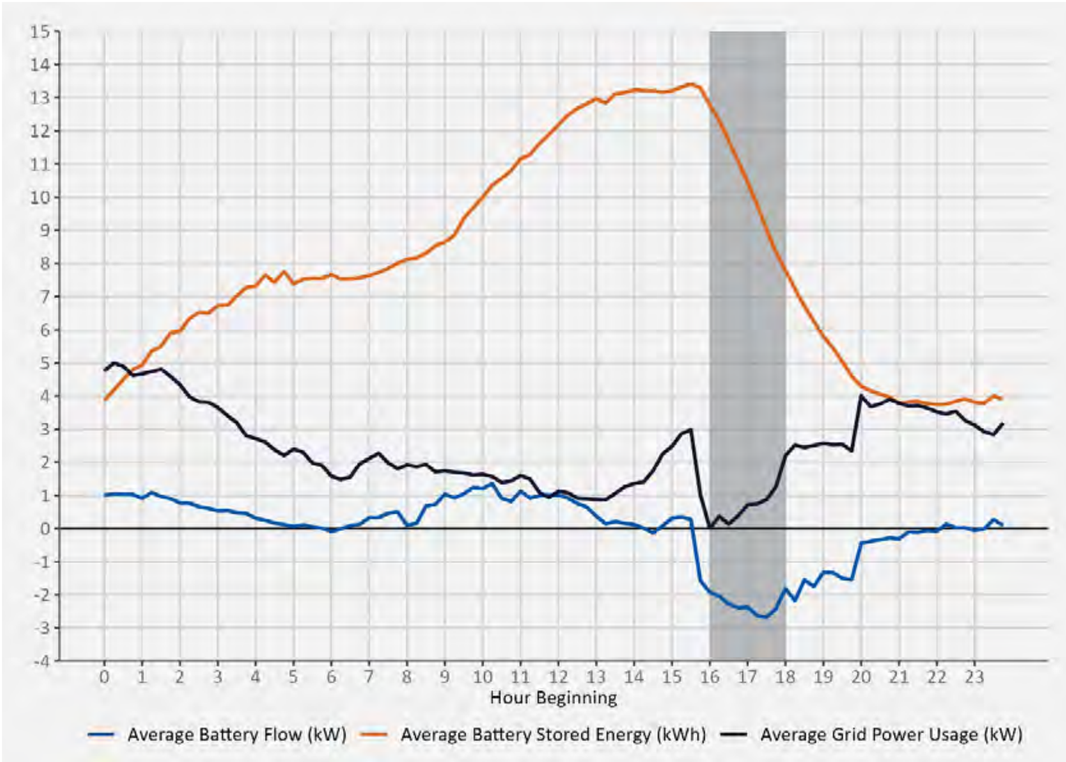


Figure 46. Event 3 (July 22, 2025)

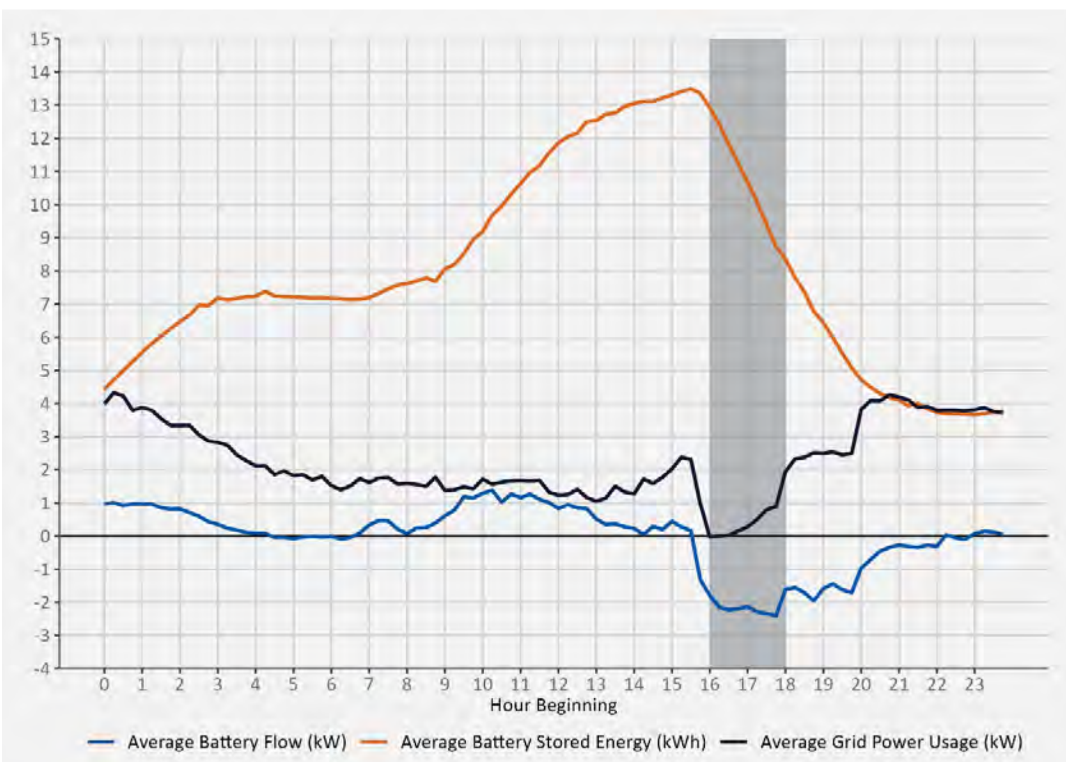


Figure 47. Event 4 (July 28, 2025)

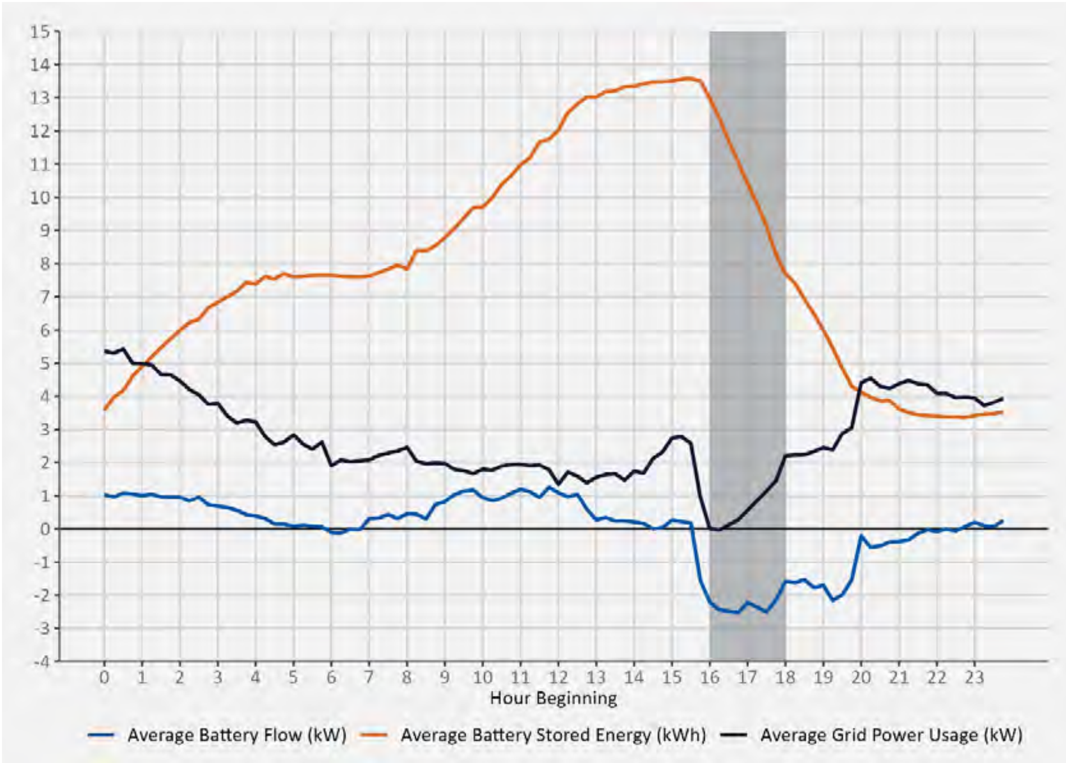


Figure 48. Event 5 (July 29, 2025)

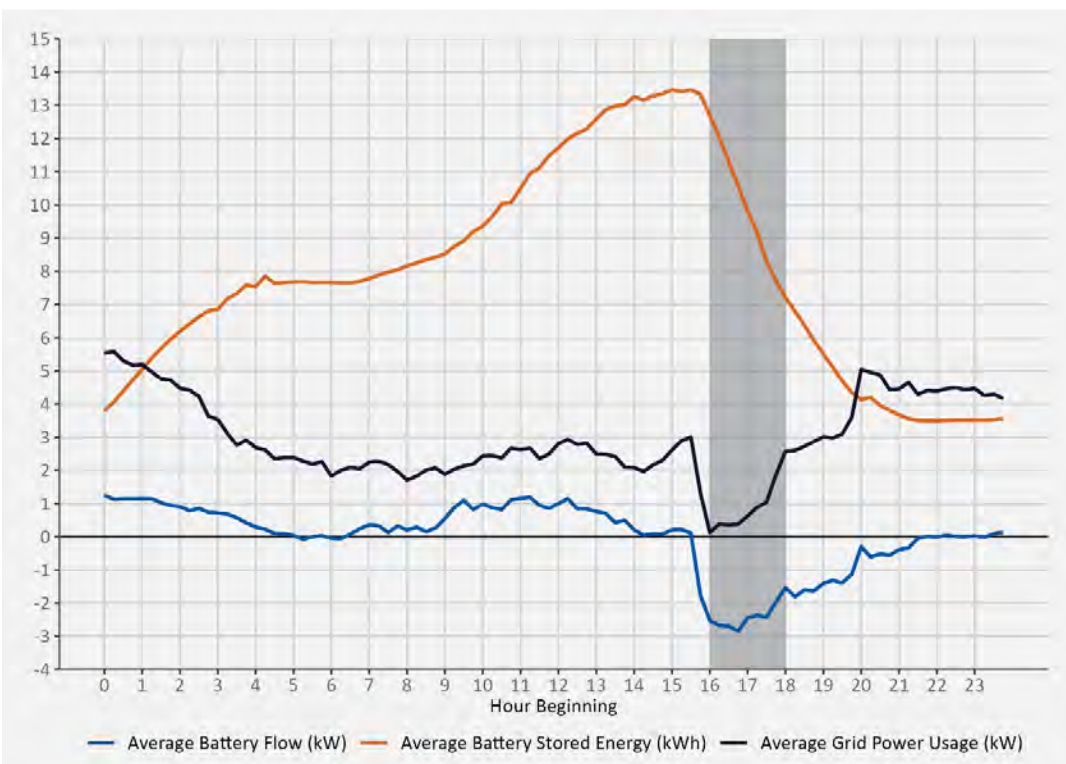


Figure 49. Event 6 (August 18, 2025)

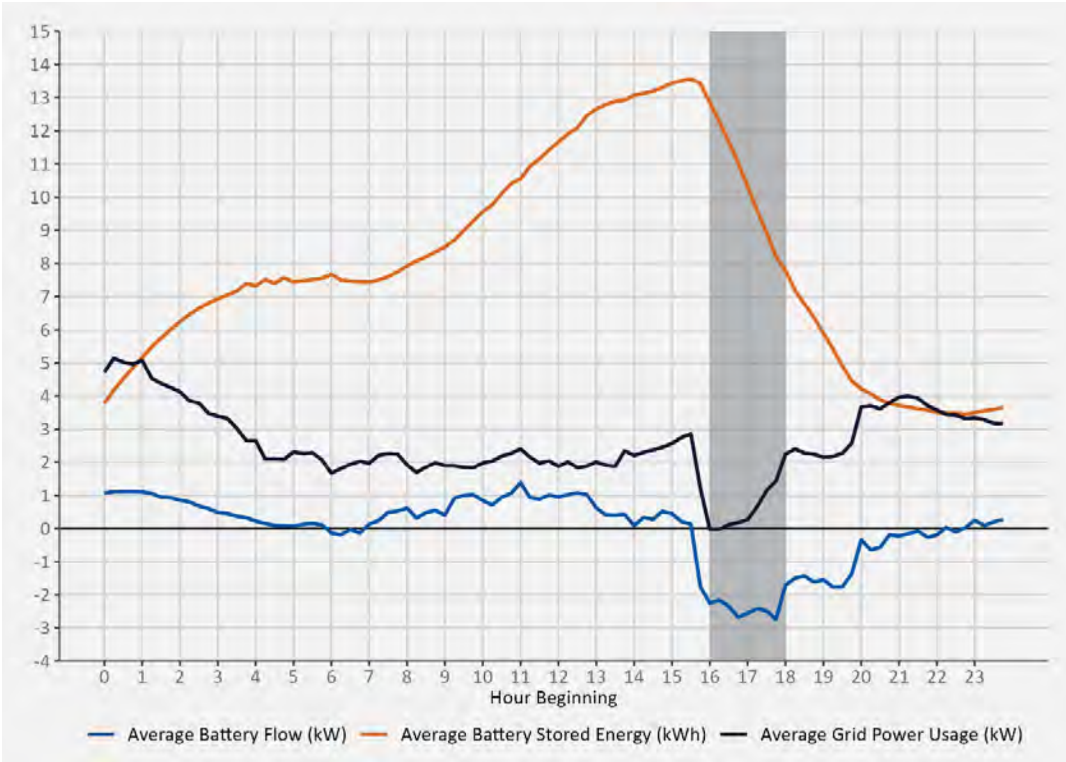


Figure 50. Event 7 (August 19, 2025)

Appendix D. Battery Storage Pilot Early Evaluation Survey

1) Here are the two main benefits to participating in the Battery Storage Pilot. Please select the one that you think is the most important benefit to you.
   a) Cost savings by storing inexpensive energy and using it during peak (expensive) times
   b) Having back-up power available for critical systems when there is an outage

2) Overall, how satisfied are you with the Battery Storage Pilot program so far? (1 = not at all satisfied; 10 = very satisfied)

3) What do you especially like about being part of the Battery Storage Pilot? (open-end)

4) Are there any improvement opportunities you would like to see in the Battery Storage Pilot? (open-end)

5) As part of this program, you have a personalized battery dashboard online that helps you monitor your usage and battery discharge data. Did you receive these training materials that were designed to teach you how to use the dashboard? (Yes, I received this; No, I did not receive this)
   a) Online tutorial to read
   b) Video link to view

6) (IF Q5 tutorial = Yes) Did you read through the tutorial?
   a) Yes
   b) No

7) (IF Q6 = Yes) Please tell us how well the tutorial prepared you to use the battery dashboard. (1 = very poorly; 10 = very well)

8) (IF Q6 = No) Why did you not review the tutorial? Please select all that apply.
   a) I have not had time/too busy
   b) My spouse/partner reviewed it
   c) No need – I figured out the dashboard on my own
   d) I could not open the tutorial
   e) I have no interest in viewing the dashboard
   f) Other (please specify)

9) (IF Q5 video = Yes) Did you view the training video?
   a) Yes
   b) No

10) (IF Q9 = Yes) Please tell us how well the training video prepared you to use the battery dashboard. (1 = very poorly; 10 = very well)

11) (IF Q9 = No) Why did you not review the training video? Please select all that apply.
    a) I have not had time/too busy
    b) My spouse/partner reviewed it
    c) No need – I figured out the dashboard on my own
    d) I could not open the video
    e) I have no interest in viewing the dashboard
    f) Other (please specify)

12) Do you recall receiving communications from Evergy, *specifically about your battery dashboard*?
    a) Yes
    b) No
    c) I'm not sure

13) (IF Q12 = Yes) How useful were those communications, in teaching you about the dashboard and reminding you to use it? (1 = not at all useful; 10 = very useful)

14) Over your time on the program, how many times do you think you've logged into your battery dashboard?
    a) Not at all
    b) Once or twice
    c) Three to five times
    d) Six to 10 times
    e) At least 11 times

15) (IF Q14 is "Not at all") Why have you never used your battery dashboard? Please select all that apply.
    a) I do not know how to login in
    b) I forgot my login username and password
    c) I do not need to know the dashboard data
    d) I do not have time to review the dashboard data
    e) Other (please specify)

16) (IF Q14 is Once or more) How useful has the battery dashboard been in helping you monitor your energy usage and your battery discharge data? (1 = not at all useful; 10 = very useful)

17) (IF Q14 is Once or more) How easy or difficult is it to use the battery dashboard? (1 = very difficult; 10 = very easy)

18) (IF Q14 is Once or more) Why do you say that? (open-end)

19) You were required to be on the Time of Use rate plan as part of this program, and in late 2023 all Evergy customers in Missouri were required to be on Time of Use. How would your knowledge of your Time of Use (TOU) rate plan? (1 = I know nothing at all; 10 = I know a great deal)

20) (IF Q19 < 8) Specifically, what do you wish you knew about your TOU rate plan? (open-end)

21) Have you experienced an outage at your home since the installation of your battery?
   a) Yes
   b) No

22) (IF Q21 = yes) Did the Battery Storage equipment work as expected, providing power to your critical household systems? Please tell us what happened.
   a) Yes, it worked as expected and this is what happened (open-end)
   b) No, it did not work as expected and this is what happened (open-end)

23) How has your participation in the Battery Storage Pilot program changed your perceptions of Evergy?
   a) Much more unfavorable
   b) Somewhat more unfavorable
   c) Doesn't change it at all
   d) Somewhat more favorable
   e) Much more favorable

24) Since you joined the Battery Storage Pilot program, have you talked to your family and friends about it?
   a) Yes
   b) I'm not sure
   c) No

25) (IF Q24 = yes) In a few words, what you have you told others about the program? (open-end)

26) Is there anything else you want to tell us about your experience with the Battery Storage Pilot? (open-end)

Appendix E. Battery Storage Pilot Anniversary Survey

As part of our Battery Storage Pilot in Missouri, you have been part of the pilot for about a year now. This survey is to assess your thoughts on your experience with the pilot and the battery system so far. The adult who usually pays the Evergy bill should complete this survey.

1) Overall, how satisfied are you with the Battery Storage Pilot program so far? (1 = not at all satisfied; 10 = very satisfied)

2) What do you especially like about being part of the Battery Storage Pilot? (open-end)

3) What are some negative aspects of being part of the Battery Storage Pilot? (open-end)

4) How has being part of Evergy's Battery Storage Pilot program changed your opinions of Evergy?
   a) Much more favorable
   b) Somewhat more favorable
   c) Doesn't change at all
   d) Somewhat more unfavorable
   e) Much more unfavorable

5) After having been in the pilot for about a year, how would you rate your understanding of the benefits of a battery storage system? (1 = I don't understand the benefits at all; 10 = I understand the benefits completely)

6) How well have the expected benefits of your battery storage system worked out for you? (1 = very poorly; 10 = very well)

7) Over your time on the pilot program, how many times do you think you've logged into your battery dashboard?
   a) Not at all
   b) Once or twice
   c) Three to five times
   d) Six to 10 times
   e) At least 11 times

8) (IF Q7 is "Not at all") Why have you never logged into your battery dashboard? Please select all that apply.
   a) I do not know how to log in
   b) I forgot my login username and password
   c) I do not need to know the dashboard data
   d) I do not have time to review the dashboard data
   e) Other (please specify)

9) (IF Q6 is Once or more) How useful has the battery dashboard been in helping you monitor your energy usage and your battery discharge data? (1 = not at all useful; 10 = very useful)

10) (IF Q6 is Once or more) What additional information would you like to see added to the battery dashboard?
   a) Nothing – it's fine as it is
   b) This: (open-end)

11) In the last year, have you had an outage at your home?
    a) Yes
    b) No

12) (IF Q11 = yes) Did the Battery Storage equipment work as expected, providing power to your critical household systems? Please tell us what happened.
    a) Yes, and this is what happened (open-end)
    b) No, and this is what happened (open-end)

13) Since starting the Battery Storage Pilot, have you added solar panels to your home?
    a) Yes
    b) No

14) Since starting the Battery Storage Pilot, have you purchased or leased a plug-in electric vehicle?
    a) Yes
    b) No

15) How satisfied are you with your Time of Use rate plan? (1 = not at all satisfied; 10 = extremely satisfied)

16) Why do you say that? (open-end)

17) In your opinion, has your participation in Evergy's Battery Storage Pilot allowed you to save money on your monthly electric bills?
    a) Yes
    b) No
    c) I'm not sure

18) Do you recall receiving one or more "Battery Pilot Bulletin" emails, that answer questions from participants about the program?
    a) Yes
    b) No
    c) I'm not sure

19) (IF Q18 = Yes) How useful were those questions and answers in helping you understand how your battery system works? (1 = not at all useful; 10 = very useful)

20) Having used your system for about a year, how likely are you to recommend a Battery Storage system to a friend or relative? (1 = not at all likely; 10 = very likely)

21) Finally, is there anything else you would like to tell Evergy? (open-end)

Appendix F. Battery Specifications Brochure

LG ESS Home 8

Single Phase AC-Coupled

c UL us LISTED

10 yrs Warranty

The LG Electronics Home 8 is a state of the art home energy system designed for homeowners ready to take control of their home energy usage. The Home 8 is offered in AC-coupled configuration. The 7.5kW AC-coupled solution is ideal for customers looking to install an ESS in a home with an existing solar system. Allowing homeowners to seamlessly store excess solar energy to power their home both day and night. The 7.5kW AC-coupled product can be easily added to an existing solar system, offering a reliable and cost-effective way to manage Time-of-Use (TOU) rates provide backup power. Product features include quick and easy installation, a compact and modern design, and an integrated smart energy management system ThinQ® Service. The Home 8 EMS enables customers to control their electric bill through self-consumption of solar, TOU rate smart schedule, weather FCST base, and including an off-grid mode to protect the customer's home in the event of an power outage.

Features at a glance

Integrated Modern Design

Battery Integrated Modern Design for store energy & simple streamlined connection to Home

Valuable additional functions

Weather-based power back-up response options LG ESS Home provides automatic battery operation options during weather-events that normally cause power outages.

Easy and User Friendly

7-inch Touch Screen HMI
Installers can set up and test the product directly through the supplied HMI, without the need for a separate device.

Latest Reliability

Tested to UL9540A, the latest battery safety standard and UL1741SA, UL1741SB(TBD), NEMA Type 3R

Large Storage Capacity

Parallel operation of up to 4 LG ESS LG Home Energy Storage System can connect 4-AC units

Comfortable Maintenance

Customers can troubleshoot and keep their LG ESS Home up-to-date with ThinQ® Service.

LG

Specification LG ESS Home 8

Home 8 - General Specifications

Nominal Voltage (L-N/L-L)	120/240V Split Phase
Grid Frequency (Nominal)	60 Hz
Rated AC Power (Discharging)	7.5 kVA [1]
Rated AC Power (Charging)	5.4 kVA [1]
Total Capacity	15.0 kWh
Usable Capacity	14.4 kWh [2]
Round Trip Efficiency	> 90 % [3] [4]
CEC Efficiency(PCS only)	90 %
Overvoltage Category	Category IV
Interface	LED Display

1) Adjustable, limited by the battery pack output capability such as charging/discharging power derating by the atmosphere temperature.
2) Usable energy might be reduced for enhancing the battery lifetime and system stability.
3) Verified according to LG Electronics conditions.
4) AC to battery to AC with 4.22 kW charging and 2.88kW discharging power at 25 °C (77 °F) under the beginning of life.

Home 8 - Grid connection mode

Nominal Voltage (L-N/L-L)	120/240V Split Phase
Grid Frequency (Nominal)	60 Hz
Rated AC Power(Discharging)	7.5 kVA [1]
Rated AC Power(Charging)	5.4 kVA [1]
Rated AC Current(Discharging)	31.25 A
Rated AC Current(Charging)	22.5 A
Power Factor	- 0.8 ~ + 0.8

Home 8 - Backup mode

Nominal AC Voltage	120/240V Split Phase
Nominal AC Frequency	60 Hz
Max. AC Power (Discharging)	9.0 kVA (10s)
Rated AC Power (Discharging)	7.5 kVA [1]
Rated AC Power (Charging)	5.4 kVA [1]
Max. AC Current (Discharging)	37.5 A (10s)
Rated AC Current (Discharging)	31.25 A
Rated AC Current (Charging)	22.5 A

Home 8 - Battery

Battery Package Types	Cylindrical Li-ion
Total Capacity	15.0 kWh
Usable Capacity	14.4 kWh [2]
Nominal DC Voltage	406.56 V

Home 8 - Battery Module

Battery Package Types	Cylindrical Li-ion
Module Nominal DC Voltage	101.64 V
Module Capacity	36.9 Ah
Module Size(W*H*D)	600 x 212 x 190 [mm] (23.6 x 8.4 x 7.5 [in])
Module Weight (Max)	26 kg / 57 lb

SE Box - General Specifications

Nominal Voltage (L-N/L-L)	120/240V Split Phase
Grid Frequency (Nominal)	60 Hz
Max AC Current Rating	200 A
Max Continuous AC Current Rating	160 A
Input Short Circuit Current Rating	10 kAIC [5]
Over Current Protection Device	100 - 200 A, Service Entrance Rated [5] [6]
AC Meter Accuracy	+/- 2 %
Operating Mode	PV Self-Consumption, Time of Use (ToU), Backup Only
Backup Operation	Automatic Disconnect for Seamless Backup
Backup Transfer Time	< 100 ms
Modularity	Up to 4 Home 8 units
Overvoltage Category	Category IV

5) When protected by Class J fuses, LG, SE-box, is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.
6) LG SE Box is not suitable for use as service equipment in Canada.

SE Box - Interface

User Interface	7-inch Touch LCD, LG ThinQ App(User), EnerVu Web(Installer)
Internet Connection	Ethernet 10/100, WLAN (802.11 b/g/n)
External Deivce	MODBUS

Enviromental Specification

	Home 8	SE Box
Dimensions(W*H*D)	698 X 1260 X 205 [mm] (27.5 X 49.6 X 8.1 [in])	500 X 600 X 178 [mm] (19.7 X 23.6 X 7.0 [in])
Weight	163 kg / 359 lb	25 kg / 55 lb
Cooling	Fan(Forced Air Cooling)	Natural Convection
Operating Temperature	-20 ~ 50 °C (-4 ~ 122 °F) @ Discharging -10 ~ 45 °C (14 ~ 113 °F) @ Charging	-20 ~ 50 °C (-4 ~ 122 °F)
Recommended Operating Temperature	0 ~ 35 °C (32 ~ 95 °F) @ Discharging 0 ~ 33 °C (32 ~ 91.4 °F) @ Charging	-20 ~ 50 °C (-4 ~ 122 °F)
Storage Temperature	-20 ~ 50 °C (-4 ~ 122 °F)	
Ambient Humidity (RH)	5 ~ 95% (non-condensing)	
Altitude	< 3000 m (9843 ft)	
Mounting Type	Floor Stand with Wall Mount	Wall Mount
Noise	< 47 dB	
Warranty	10 years (Battery : 70% @ 10 years) [7]	

7) 10-years warranty: Internet connection & LG ThinQ® service registration are required.
5-years Limited Warranty : Not connected to the internet or not registered in the LG ThinQ® service

Compliance

LGE ESS Home 8	Home 8	SE Box
Grid Code	IEEE1547, 1547.1, UL1741, UL1741SA, CA Rule21	CA Rule21, IEEE2030.5-2018/Sunspec CSIP
Safety	UL1741, C22.2 No.107.1-16, UL1642, UL1973, UL9540A	UL1741, C22.2 No.107.1-16
Functional Safety	IEC60730-1 Annex H	-
System Safety	UL9540	
Enclosure	NEMA Type 3R	
EMC	FCC Part15 Subpart B	
Seismic	IEEE 693-2005, High	

SE Box - Accessories

LG Electronics DO NOT provide Eaton products. Installer must provide properly rated breaker per circuit breaker list following. Eaton is a trade name, trademark and/or service mark of Eaton Corporation plc, or its subsidiaries and affiliates.

Main breaker	Eaton CSR or BW series main breaker: CSR2100, 100A Main Breaker, 2-pole, 120/240V, 25kAIC CSR2125N, 125A Main Breaker, 2-pole, 120/240V, 25kAIC CSR2150N, 150A Main Breaker, 2-pole, 120/240V, 25kAIC CSR2175N, 175A Main Breaker, 2-pole, 120/240V, 25kAIC CSR2200N, 200A Main Breaker, 2-pole, 120/240V, 25kAIC BW2100, 100A Main Breaker, 2-Pole, 120/240V, 10kAIC BW2125, 125A Main Breaker, 2-Pole, 120/240V, 10kAIC BW2150, 150A Main Breaker, 2-Pole, 120/240V, 10kAIC BW2175, 175A Main Breaker, 2-Pole, 120/240V, 10kAIC BW2200, 200A Main Breaker, 2-Pole, 120/240V, 10kAIC
Branch circuit breaker	Eaton BR series circuit breaker: BR220B, 20A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR230B, 30A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR240B, 40A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR250B, 50A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR260, 60A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR270, 70A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR280, 80A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR290, 90A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR2100, 100A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR2110, 110A Circuit Breaker, 2-pole, 120/240V, 10kAIC BR2125, 125A Circuit Breaker, 2-pole, 120/240V, 10kAIC
Hold Down kit [1]	Eaton BRHDK125, Hold Down Kit for fixing BR series circuit breaker(if required)
Sub-feed lug block	Eaton BRPSF225, 225A/2pole Main or Sub-feed lug block
Current Transformer	Carlo Gavazzi CTD-1X.200.1AXXX [2]

1) Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.
2) A current transformer for PV inverter output measurement is included in SE Box package. If the extra current sensors are required on the site, installer MUST order the current transformer from LG Electronics. If other current transformer may be used in the system, LG Electronics DO NOT ensure the energy measurement accuracy and the system stability.

SE Box - Wire Gauges

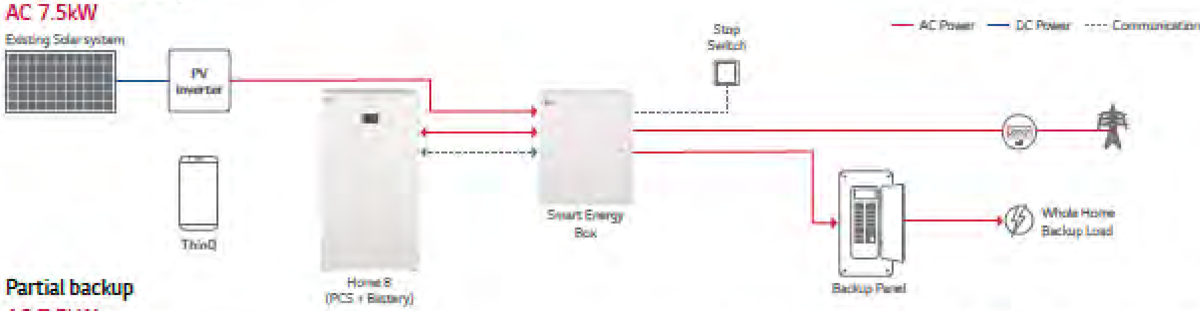
Grid lug(L1,L2)	Cu/Al : 6 AWG ~ 300 KCMIL
CSR/BW Breaker(L1,L2)	Cu/Al : 6 AWG ~ 300 KCMIL
Backup/Non-backup load lugs(L1,L2)	Cu/Al : 6 AWG ~ 250 KCMIL
Neutral(Large)	Cu/Al : 6 AWG ~ 250 KCMIL
Neutral(Medium) and Ground	Cu/Al : 14 AWG ~ 2/0 AWG

System configuration

The LG Home 8 is provided as an integrated all in one storage system (PCS+Battery) and smart energy box included CT Sensors. Furthermore LG Home 8 can connect 4-unit all in one system all together. The 7.5kW AC-coupled product can be easily added to an existing solar system, offering a reliable and cost-effective way to manage Time-of-Use (TOU) rates provide backup power. Additionally allowing homeowners to seamlessly store excess solar energy to power their home both day and night.

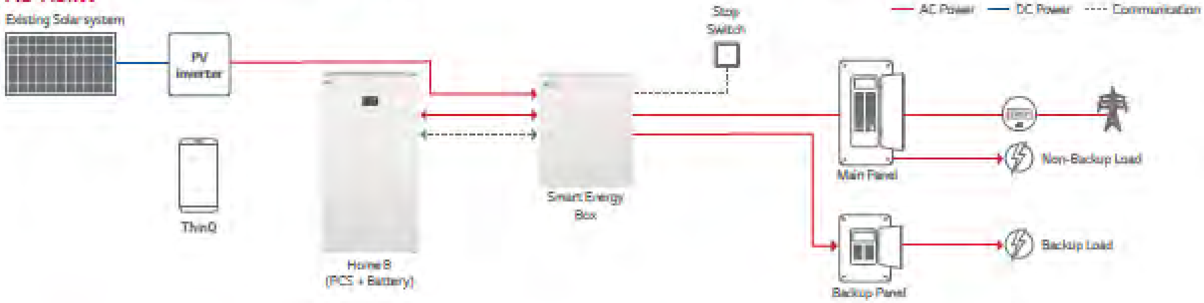
Whole home backup

AC 7.5kW



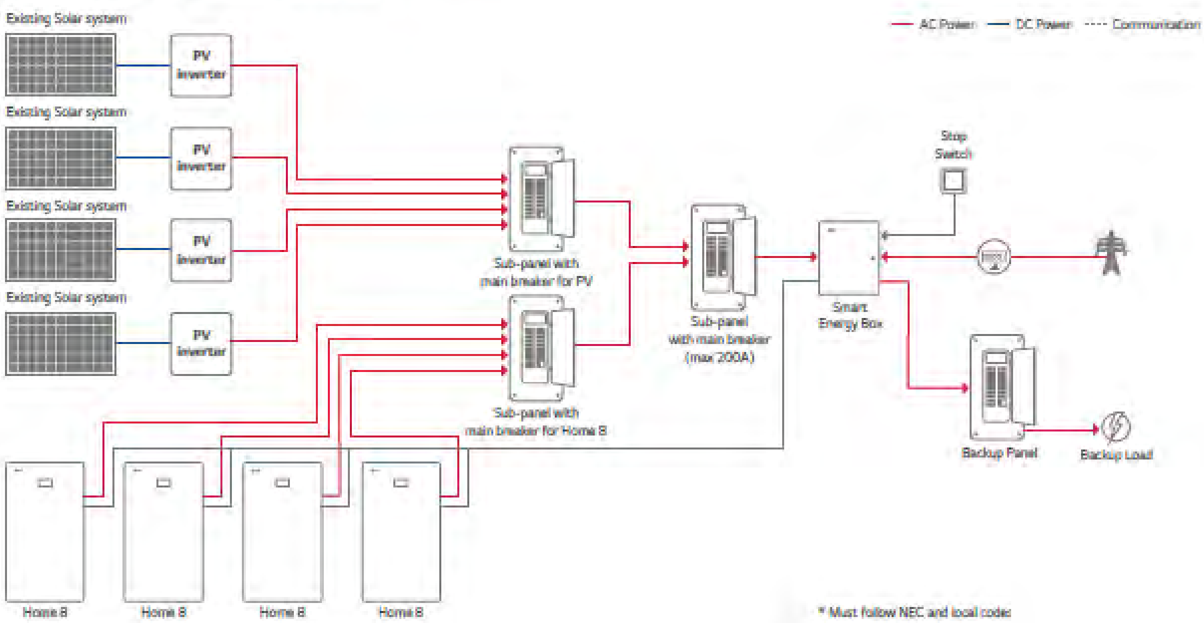
Partial backup

AC 7.5kW



Multiple 4 Home 8 units connection with large-scaled PV inverter

LG Home Energy Storage System can connect 4-AC units

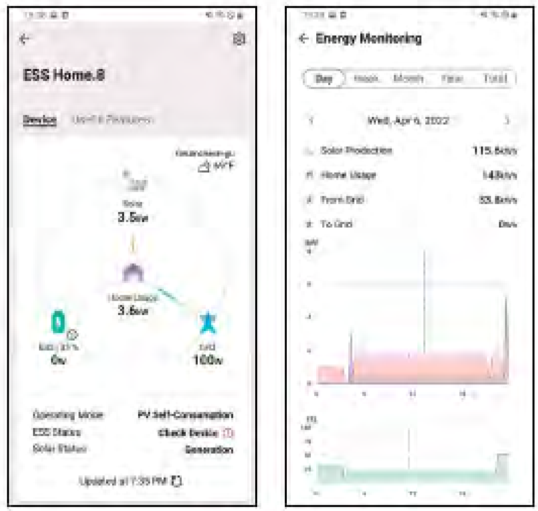


* Must follow NEC and local codes

LG EnerVu, LG ThinQ®

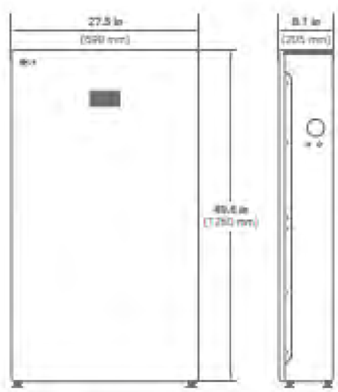
LG provides the monitoring tools for the installers and the users respectively. EnerVu is web monitoring system for the installer and LG ThinQ® is the mobile application for the users. (For these services, the registration is required)
To use the EnerVu web monitoring system, the user's ESS must be activated by LG ThinQ® mobile application first.
After registering in EnerVu, installer can check variety of information such as system status, information, report, etc.

LG EnerVu

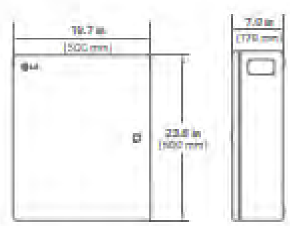


LG ThinQ®

Mechanical size



Home 8 (PCS+Battery)



Smart Energy Box

Appendix G. Customer Electric Rate Information

System ID	Service Area	Electric Rate Plan
Evergy H8 001	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 002	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 003	Missouri West	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 004	Missouri West	Nights and Weekends Max Plan (RTOU-3)
Evergy H8 005	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 006	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 007	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 008	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 009	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 010	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 011	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 012	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 013	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 014	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 015	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 016	Missouri Metro	Nights and Weekends Plan (RTOU)
Evergy H8 017	Missouri Metro	Nights and Weekends Max Plan (RTOU-3)
Evergy H8 018	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 019	Missouri Metro	Nights and Weekends Max Plan (RTOU-3)
Evergy H8 020	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 021	Missouri Metro	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 022	Missouri West	Nights and Weekends Max Plan (RTOU-3)
Evergy H8 023	Missouri West	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 024	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 025	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 026	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 027	Missouri Metro	Nights and Weekends Max Plan (RTOU-3)
Evergy H8 028	Missouri West	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 029	Missouri Metro	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 030	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 031	Missouri West	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 032	Missouri Metro	Nights and Weekends Max Plan (RTOU-3)
Evergy H8 033	Missouri Metro	Summer Peak Time-Based Plan (RTOU-2)
Evergy H8 034	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 035	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 036	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 037	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 038	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 039	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 040	Missouri Metro	Default Time-Based Plan (RPAS)

System ID	Service Area	Electric Rate Plan
Evergy H8 041	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 042	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 043	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 044	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 045	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 046	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 047	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 048	Missouri West	Default Time-Based Plan (RPAS)
Evergy H8 049	Missouri Metro	Default Time-Based Plan (RPAS)
Evergy H8 050	Missouri West	Default Time-Based Plan (RPAS)

Appendix H. Maintenance Issues and Total Costs

Appendix H provides the battery maintenance information Evergy provided to Cadmus in December 2025. Evergy reported that the total cost of maintenance for the 50 pilot batteries across the three pilot years was $7,500. Table 15 summarizes the maintenance issues that required field visits during the pilot.

Table 15. RBES Pilot Battery Maintenance Field Visits

System ID	Issue	Date
Evergy H8 046	Mislabeled Fuse	9/12/2025
Evergy H8 004	Site Electrical Issues	9/3/2025
Evergy H8 007	Sunverge Maintenance: Battery Recovery	5/20/2025
Evergy H8 044	Sunverge Maintenance: Internet Communication	3/5/2025
Evergy H8 027	Sunverge Maintenance: Restore LG System Internet	9/26/2024
Evergy H8 008	Lost Communication	8/5/2024
Evergy H8 019	Lost Communication: Power Outage	8/5/2024
Evergy H8 018	Lost Communication: Homeowner sold their home and electricity was disconnected	7/29/2024
Evergy H8 015	Can Bus Fault	1/23/2024
Evergy H8 016	SEB Replacement	1/3/2024
Evergy H8 020	LG System Fault	11/2/2023
Evergy H8 005	Battery Replacement	10/26/2023
Evergy H8 007	Customer PV Fault	10/18/2023
Evergy H8 008	Undersized breaker	10/12/2023
Evergy H8 006	SEB Fault	9/28/2023
Evergy H8 004	Loss of Wi-Fi	9/6/2023
Evergy H8 013	SEB Replacement	9/5/2023

Appendix I. DERMS Integration

Appendix I provides the DERMS integration documentation Evergy provided to Cadmus in January 2026.

1.9. Executive Summary Report: Battery Pilot DERMS Integration

Tianling Wu and Christian Winingar (December 31, 2025)

Overview

The Battery Pilot DERMS integration provided Evergy with a foundational step toward incorporating real-time data into its OATI DERMS platform. With 46 out of 50 enrolled customer assets successfully integrated (four customers changed ownership and are not included in the testing), the pilot demonstrated Evergy's current DERMS capabilities and identified areas for improvement.

The project team worked diligently until the final deadline. As this was a pilot project, the results reflect both our best efforts and valuable lessons learned throughout the process. This initiative has demonstrated the significant challenges associated with integrating distributed energy resources (DERs) with OpenADR across different vendor systems. It also underscores the need for a deeper understanding of the OpenADR specification to ensure accurate and seamless interoperability.

To ensure a smooth experience for our customers during the holiday season, we conducted testing on lab devices instead of customer units. This approach allowed us to avoid any inconvenience while still validating system performance.

Key Takeaways of the Integration

- **Clear Vendor Specifications:** Technical integration requirements, including network security, must be well-defined upfront.
- **Program Architecture:** A structured framework ensures smooth implementation and scalability.
- **System Requirements:** Comprehensive and precise requirements are critical for successful integration.

Benefits of OpenADR Integration with DERMS

- **Standardized Communication:** Simplifies interoperability between utilities and DER assets.
- **Vendor Neutrality:** Reduces lock-in and supports diverse DER portfolios (solar, batteries, etc.).
- **Automation:** Enables automated demand response, improving grid reliability.
- **Scalability:** VTN-VEN architecture may support thousands of devices efficiently.
- **Regulatory Compliance:** Aligns with recognized demand response standards.
- **Customer Engagement:** Facilitates transparent participation in demand response programs

Challenges of OpenADR Integration

- **Protocol Alignment:** Requires bridging OpenADR with other DER protocols (IEEE 2030.5, API, Modbus).
- **Security Complexity:** Certificate management across multiple vendors adds risk.
- **Event Granularity:** High-level OpenADR signals need mapping to detailed device commands.
- **Scalability Stress:** Large VEN volumes during peak events may cause performance bottlenecks.

Future Steps

- **Enhanced DERMS Functionality:** Integration with Budderfly introduced features like Battery Viewer Display and Electric Storage Asset Creation screens—key building blocks for future programs.
- **Program Expansion:** Evergy can leverage this framework to launch initiatives, such as a Bring Your Own Battery residential program.
- **Weather Data Integration:** Linking DERMS with local weather data can enable proactive asset charging before storms and dispatch during critical grid needs.

Conclusion

The Battery Pilot DERMS integration delivered valuable insights into Evergy's current capabilities and laid the groundwork for future enhancements. By addressing identified challenges and leveraging OpenADR benefits, Evergy is positioned to develop a robust, scalable, and customer-centric DERMS ecosystem that supports grid reliability and innovative energy programs.

Appendix J. EV Charger Integration

Appendix J provides the EV charger integration documentation Evergy provided to Cadmus in January 2026.

1.10. EV-Charger Integration Testing Summary

Tianling Wu (December 31, 2025)

Overview

Testing through the ChargePoint cloud dashboard was successful and met expectations. However, API-based testing on Budderfly's platform could not be completed due to the following challenges.

Key Issues

- **Customer Availability:** The Eaton EV charger was installed at the customer's home in April 2025. The customer was unable to participate for several months and later reported garage-space limitations that prevented EV charging for testing.
- **API Discontinuation by Eaton:** Eaton discontinued support for the APIs associated with its first-generation EV chargers, resulting in an API shutdown in July 2025. Consequently, Budderfly could neither retrieve data nor control the deployed chargers.
- **Vendor Communication and Alternatives:** Evergy contacted Eaton, who confirmed via email the API shutdown and discontinuation of their first-generation EV breakers and chargers. Eaton offered two options:
  - Process a return for the purchased chargers or provide a ChargePoint (CPH50) equivalent replacement.
  - Offer similar functionality through either a smart breaker feeding an EV charger or via their new partnership with ChargePoint, leveraging ChargePoint hardware and the AbleEdge Developer Portal API.
- **New Installation:** A new ChargePoint EV charger was installed at a different customer location in November 2025.
- **ChargePoint API Access Delay:** While the ChargePoint dashboard was successfully configured for testing, API support was delayed due to ChargePoint technical support being on maternity leave.

Current Status

- Dashboard testing through ChargePoint is completed and successful.
- API integration testing is pending due to vendor support delays and hardware transitions.

Appendix K. Pilot Learning Objectives

Appendix K provides the RBES pilot's learning objectives outlined in Evergy's September 2022 Stipulation and Agreement with the Missouri Public Service Commission. Table 16 links the learning objectives of the Stipulation and Agreement to the sections of this report where they are explored.

Table 16. Pilot Learning Objectives

Learning Objective	Report Section(s)
Costs/savings to participants and non-participants	• *System Impacts* • *TOU Battery Operation Billing Impacts*
Costs/savings to Evergy	• *System Impacts* • *TOU Battery Operation Billing Impacts*
Effects on peak demand	• *Non-Event Peak Load Reduction* • *Battery Operations During Demand Response Events*
Reliability improvements provided to grid/customer	• *System Impacts* • *Battery Operations During Grid Outages* • *Experience with Battery Storage Systems* • *Appendix I. DERMS Integration* • *Appendix J. EV Charger Integration*
Effect on participant usage/behavior	• *TOU Battery Operation Billing Impacts* • *Smart Thermostat Demand Response* • *Satisfaction with TOU Rate Plan*
Tracking of charging/discharging times	• *Typical Battery Operations* • *Battery Operations During Demand Response Events*
Tracking of maintenance issues and costs	• *Appendix H. Maintenance Issues and Total* Costs
Participant satisfaction surveys	• *Pilot Participant Survey Findings*