myenergi

VICTORIA State Government | Energy, Environment and Climate Action

zappi ZEVET Project

Report June 2025

Glossary of Terms

Term	Definition
ZEVET program	Zero Emissions Vehicle Emerging Technologies program, supporting innovative electric vehicle (EV) charging technologies to further reduce barriers for Victorians transitioning to zero emission vehciles.
BEV *Battery Electric Vehicle*	A fully electric vehicle powered only by a battery. It has no internal combustion engine and produces zero tailpipe emissions. Also referred to as Zero-Emission Vehicle
PHEV *Plug-in Hybrid Electric Vehicle*	A vehicle that combines a petrol or diesel engine with a rechargeable battery. It can run on electric power for short trips and switch to fuel for longer distances.
DSR *Demand-Side Response*	A strategy that adjusts electricity usage in response to grid signals (e.g. peak demand, price). In EV charging, this means shifting or reducing charge loads to support grid stability.
DNSP *Distribution Network Service Provider*	The organisation that manages the electricity poles, wires, and local network infrastructure. They ensure safe and reliable power distribution to homes and businesses.
Self-Consumption	The portion of solar energy generated on-site that is used within the property, instead of being exported to the grid.
zappi	A smart EV charger made by myenergi, that can prioritise use of solar power, supports DSR, and provides flexible charging modes for both grid and renewable integration.
kW *Kilowatt*	A measure of electrical power. 1 kW is 1,000 watts. In EV charging, it represents how fast energy is delivered to the vehicle.
kWh *Kilowatt-hour*	A measure of electrical volume. 1 kWh is the energy used by a 1 kW appliance running for 1 hour. EV battery sizes and energy consumption are typically expressed in kWh.
Smart Charging	A system that intelligently controls the timing and rate of EV charging based on grid conditions, solar availability, safety overrides or user preferences.
Mode 3 Charging	A standard for AC charging where the charger is permanently wired to the supply and delivers up to 32 amps. Most residential and public AC chargers are Mode 3.
Load Balancing	A function that limits the EV charger's power draw based on the total site demand, preventing overloading of the main electrical supply.
V2G *Vehicle-to-Grid*	A system that allows an EV to discharge stored energy back into the grid, effectively making the car a mobile battery for grid support or home use.
PV *Photovoltaics*	Technology that converts sunlight into electricity. In EV contexts, PV refers to solar power used to charge vehicles or battery storage.
SOC *State of Charge*	The current energy level in an EV battery, usually shown as a percentage. SOC is critical for managing charging and estimating range.

01. Introduction

01. Introduction

As the world transitions toward electrification and renewable energy, Victoria faces increasing pressure on its aging electricity infrastructure.

Originally designed for one-way energy flow, the grid must now accommodate growing volumes of two-way traffic — particularly from the widespread adoption of rooftop solar and the increasing uptake of Electric Vehicles (EVs) and Plug-In Hybrid Electric Vehicles (PHEVs).

These developments present three challenges:

1. managing excess energy exports;
2. preparing for erratic electricity supply;
3. increased demand.

01. Introduction

To address these emerging issues, the Victorian State Government established the EVC-RAD project — a statewide initiative to investigate smarter, more sustainable approaches to EV charging.

As part of EVC-RAD, the ZEVET trial was implemented to evaluate how intelligent, demand-aware charging infrastructure can support the Victorian grid during its clean energy transition.

This report documents the findings of myenergi contribution to the project, where 100 smart EV chargers were installed in Victorian homes.

The project demonstrates how intelligently coordinated, solar-aware EV charging can not only ease pressure on the grid, but also empower households to maximise use of their own renewable energy — contributing to both cost savings and climate goals.

State of play in Victoria

5
Distribution Network Service Providers operating in Victoria

41,000+
Zero-emission vehicles registered in Victoria

9.4%
Market share of Zero-emission vehicles sold in Victoria
(September 2024)

50%
Targeted market share of Zero-emission vehicles sold in Victoria by 2030

700,000+
Victorian homes with rooftop solar
(2024)

9.3%
Percentage of Victoria's energy generation from rooftop solar
(2023/24)

37.8%
Percentage of Victoria's energy from renewables
(2023/24)

95%
Renewable Energy Target for Victoria in 2035

02. *Project Objectives*

02. Project Objectives

Reduce Grid Exports Through Optimised Solar Self-Consumption

By prioritising the use of surplus solar energy for EV charging within the home, we aim to significantly reduce the volume of energy exported back to the grid — a major factor in current network stress.

Support Grid Stability Through Responsive Charging

Each zappi in the trial will respond dynamically to real-time solar generation and household energy demand. Surplus solar is automatically directed to the EV, and charging rates are adjusted to avoid grid import and unnecessary export.

Demonstrate Potential of Demand Side Response

All devices in the trial were integrated into a centralised platform, enabling real-time simulation of grid events. This allowed us to demonstrate how aggregated EV charging infrastructure can respond to peaks in demand, offering a flexible, distributed tool for network support.

Deliver Real-World Data to Inform Decision Making

Through continuous monitoring and analysis, we are generating robust performance data to inform Victorian energy policy. The findings will also help dispel common myths about EV charging and its impact on the grid, shining a light on on the role of smart charging technology in a sustainable energy future.

03. *Site Selection*

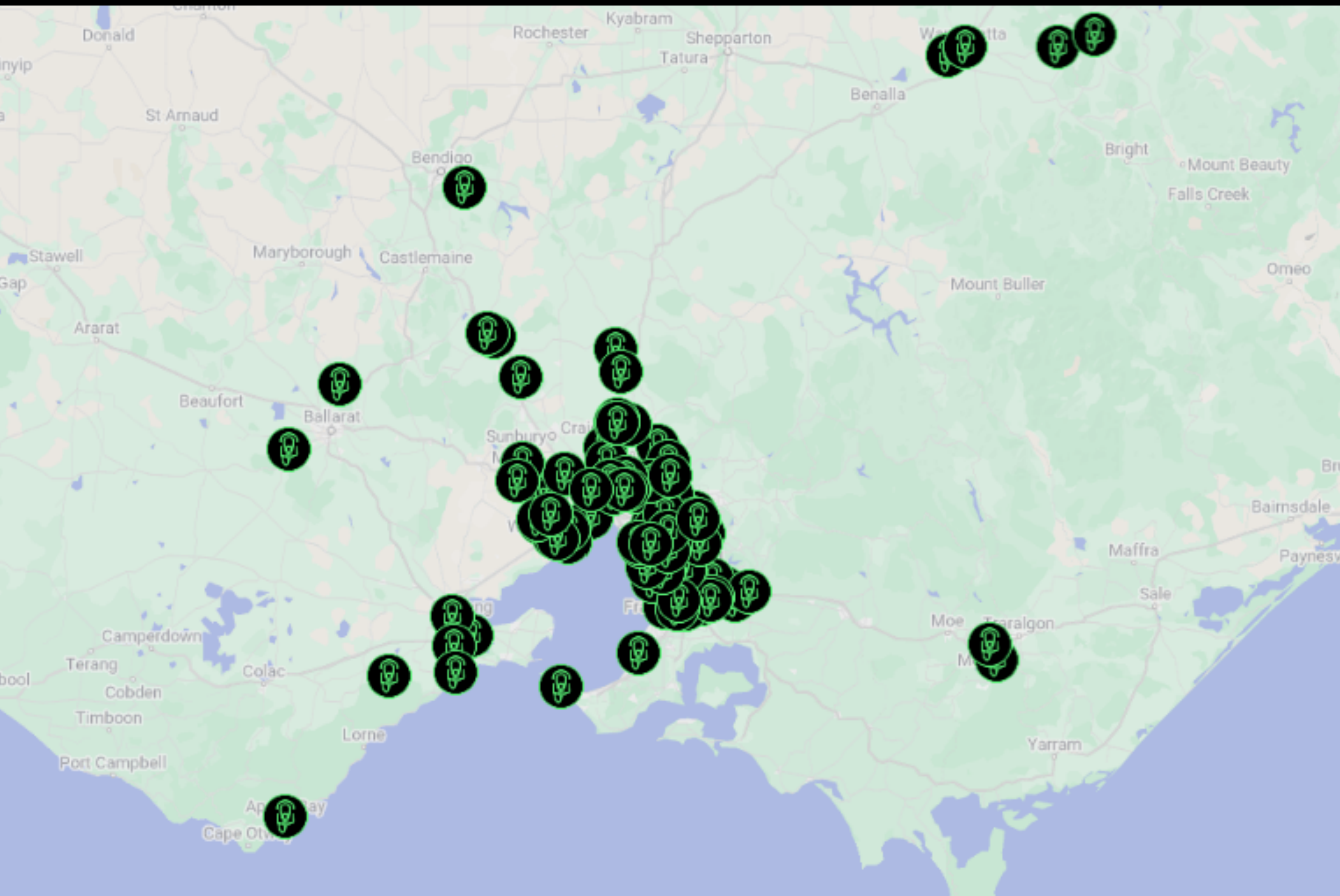
03. Site Selection

To assess site suitability for the ZEVET grant, myenergi applied a clear set of eligibility criteria.

Applicants were required to:

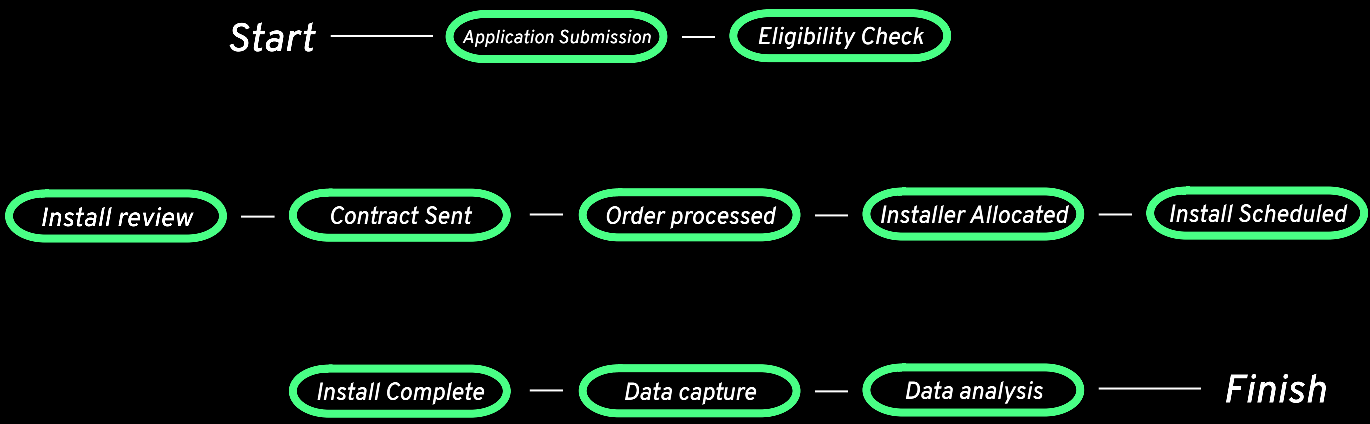
- Be a resident or business owner in Victoria.
- Own or lease an EV
- Have an existing rooftop solar system installed at your home or business.
- Agree to participate in the trial and allow data collection for the duration of the project.

Recognising Victoria's diverse climate and the presence of five electricity distribution networks (DNSPs), we made a conscious effort to ensure a representative mix of properties across both Greater Melbourne and regional areas. This allowed us to capture a broad range of grid conditions and household energy behaviour.
In addition to meeting the core criteria, site selection also considered the technical suitability of the property, the candidate's level of engagement, and the cost and complexity involved in safely and effectively installing a zappi



04. *Installation & Commissioning*

04. Installation and Commissioning



04. Installation and Commissioning

To ensure the best possible outcome for customers and the overall effectiveness of the trial, all installations were carried out by a trusted network of Product Champions.

Product Champions are experienced electricians who are trained and accredited by myenergi. They uphold the highest standards of professionalism and workmanship.

We are sincerely grateful for the dedication and expertise of our Product Champions. Without their contribution, this project would not have been possible

myenergi would sincerely like to thank:

Flex EV

Sleeth Electrical and Solar

Carlin Co

Procharged EV

Mann Made Electrical

MoBros Electrical

Oasis Electrical

05. Data Collection

05. Data Collection

myenergi devices are equipped with advanced intelligence that enables detailed monitoring of energy usage and user behaviour.

Designed and manufactured in the UK, zappi records minute-by-minute telemetry for each device, capturing comprehensive data on household energy consumption, EV charging activity, and other key performance metrics.

All this data is available to the end user through their personal myenergi web account, enabling transparency and empowering more informed energy decisions.

As part of the trial, participants agreed to share this data with myenergi for a period of six months.

This granular level of insight has been instrumental in informing the findings of this report, allowing for a robust analysis of user patterns and system performance throughout the trial.

06. Key Findings

06. Key Findings Summary

The EVC-RAD project successfully demonstrated the technical feasibility and value of solar-aware EV charging combined with demand-side response (DSR) capabilities in Victoria.

Overall the zappi chargers installed achieved an average uptime of 96.5%.

Data completeness was high, although a small number of devices lacked full connectivity, underscoring the importance of robust pre-installation checks

An estimated 54,950kWh of EV charging was powered directly by rooftop solar, avoiding approximately 40.3 tonnes of CO_2 emissions during the 6 month trial.

These outcomes highlight the potential of distributed, solar-aware EV charging to alleviate grid pressure, reduce emissions, and support Victoria's energy transition.

40.3
Tonnes of CO_2 emissions saved

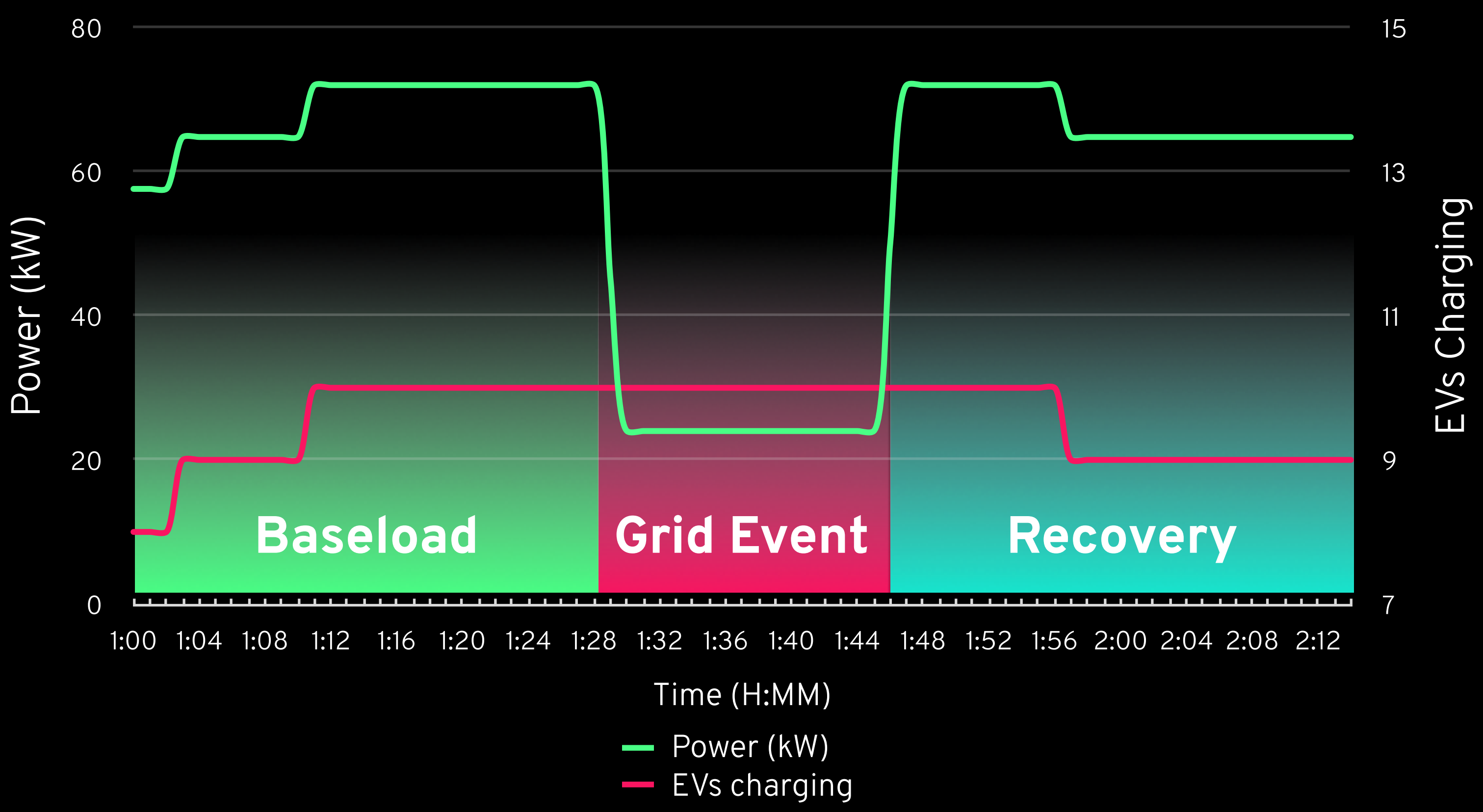
96.5%
Average device uptime

DSR Explained

Think of your home's main safety switch: when too many appliances run at once, the circuit becomes overloaded, and the switch trips to prevent damage. Now, imagine that same principle applied to the entire electricity grid.

Just like your switchboard protects your home, demand-side response (DSR) helps protect the wider energy network. It's a way for electricity distributors (DNSPs) to temporarily reduce or shift the power usage of certain high-demand devices during times of stress on the grid.

Smart devices like zappi play a vital role in balancing energy supply and demand. With smart charging, usage can be adjusted in real time. While one charger may seem insignificant, the coordinated reduction of thousands—without switching them off—can ease grid strain, lower blackout risks, and reduce the need for costly infrastructure upgrades.



DSR Explained

For consumers, the benefits are just as powerful. DSR opens the door to dynamic or agile tariffs, which allow homes to use electricity when it's cheapest and most abundant—like during periods of high solar or wind generation.

Smart charging can reduce peak grid load by up to one third, lowering energy costs and making the system more sustainable.

As more households adopt grid-aware smart devices, demand-side response will be a key part of Victoria's transition to a cleaner, more flexible, and more resilient energy future.

06. Key Findings
Demand-Side Response

Three DSR events demonstrated a peak load reduction potential of 77.21kW across 18 devices, with an average response rate of 11.58%.

Extrapolating this response to an estimated 50,000+ EVs suggests a potential grid relief of 24.3MW during coordinated DSR events

To put that figure into perspective, Mortlake Power Station (gas-fired) has a capacity of 566MW. A 24.3MW reduction through DSR equates to approximately 4.3% of Mortlake's capacity.

While this may seem modest, it's important to note that:

- DSR provides decentralised load reduction, which can alleviate stress on specific parts of the grid without the need for additional generation.

- As the number of EVs increases, the potential for DSR grows proportionally. For instance, with 200,000 EVs, the potential grid relief could reach approximately 97.2MW.

- Implementing DSR is quicker easier and more cost-effective than investing in additional sources of generation and upgrading infrastructure.

DSR Event #1

Event Date: Friday 23rd May 2025

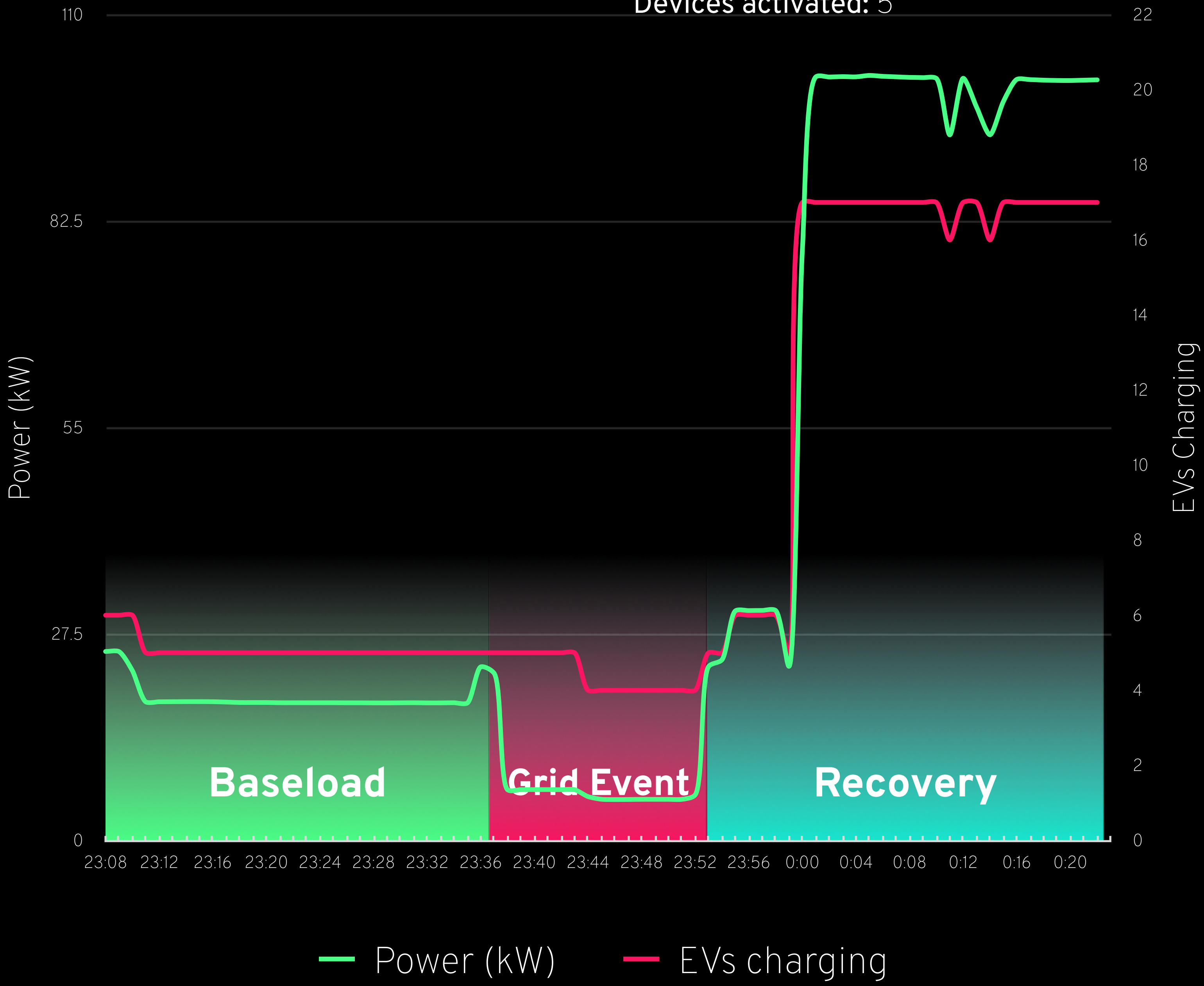
Event Start Time: 11:38pm

Event Duration: 15 minutes

Reduction from Baseload Power: 13.81kW

Energy Reduced: 3.45kWh

Devices activated: 5



Comments:

This DSR event demonstrates the widespread uptake of scheduled charging aligned with off-peak EV energy plans, as shown by a sharp increase in device activations at midnight. While effective for cost savings, this behaviour can place sudden demand on the grid if left unmanaged. Implementing features such as randomised start delays or dynamic charging windows can help mitigate this impact and support network stability.

DSR Event #2

Event Date: Sunday 25th May 2025

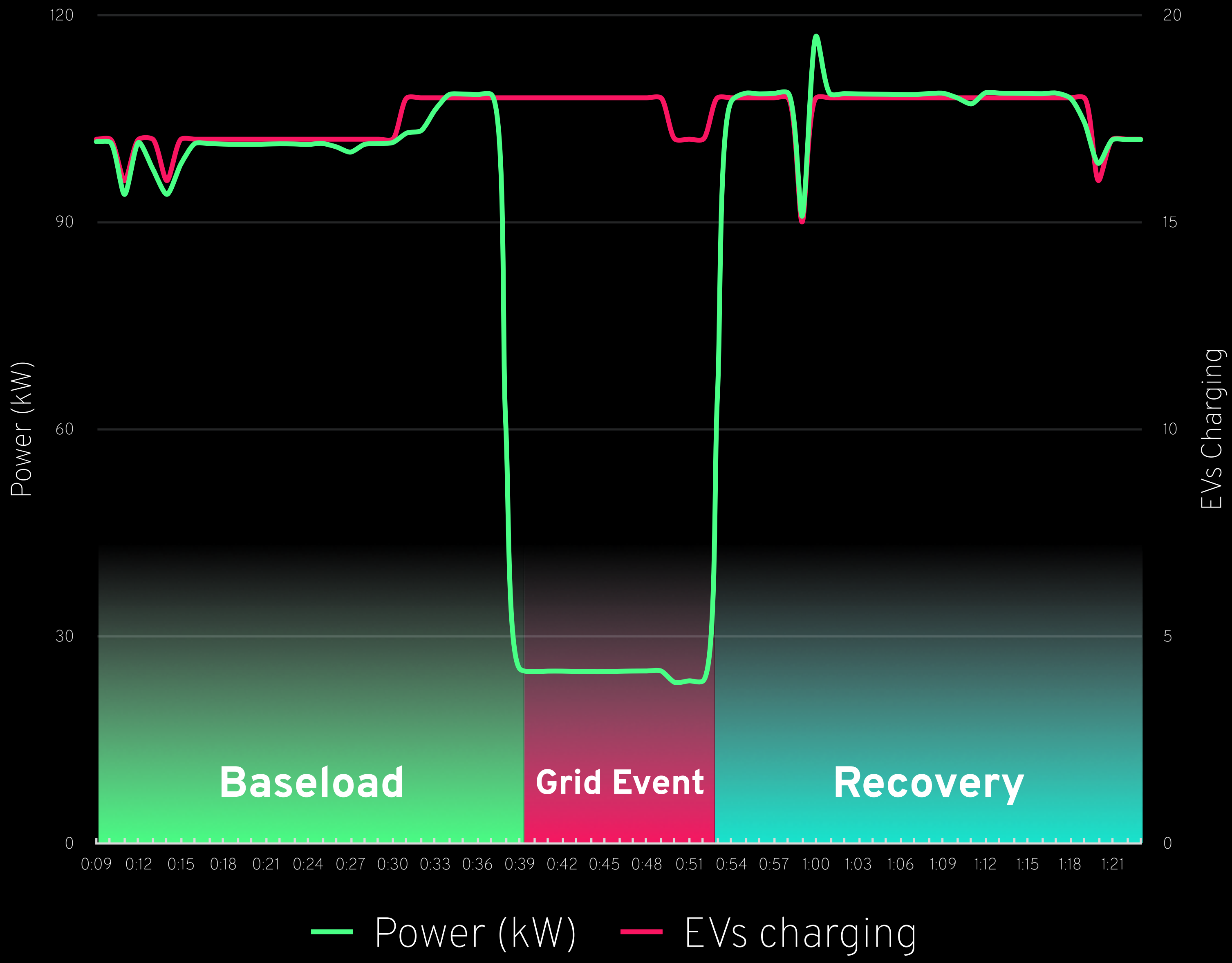
Event Start Time: 12:39am

Event Duration: 15 minutes

Reduction from Baseload Power: 77.21kW

Energy Reduced: 19.3kWh

Devices activated: 18



Comments:

Based on the clear trend of increased charging activity beginning at midnight—driven by off-peak EV energy plans—the second DSR signal was strategically triggered shortly after midnight. This timing was chosen to align with peak scheduled charging behaviour, allowing us to demonstrate the greater potential impact of coordinated demand response during high-usage periods.

DSR Event #3

Event Date: Wednesday 28th May 2025

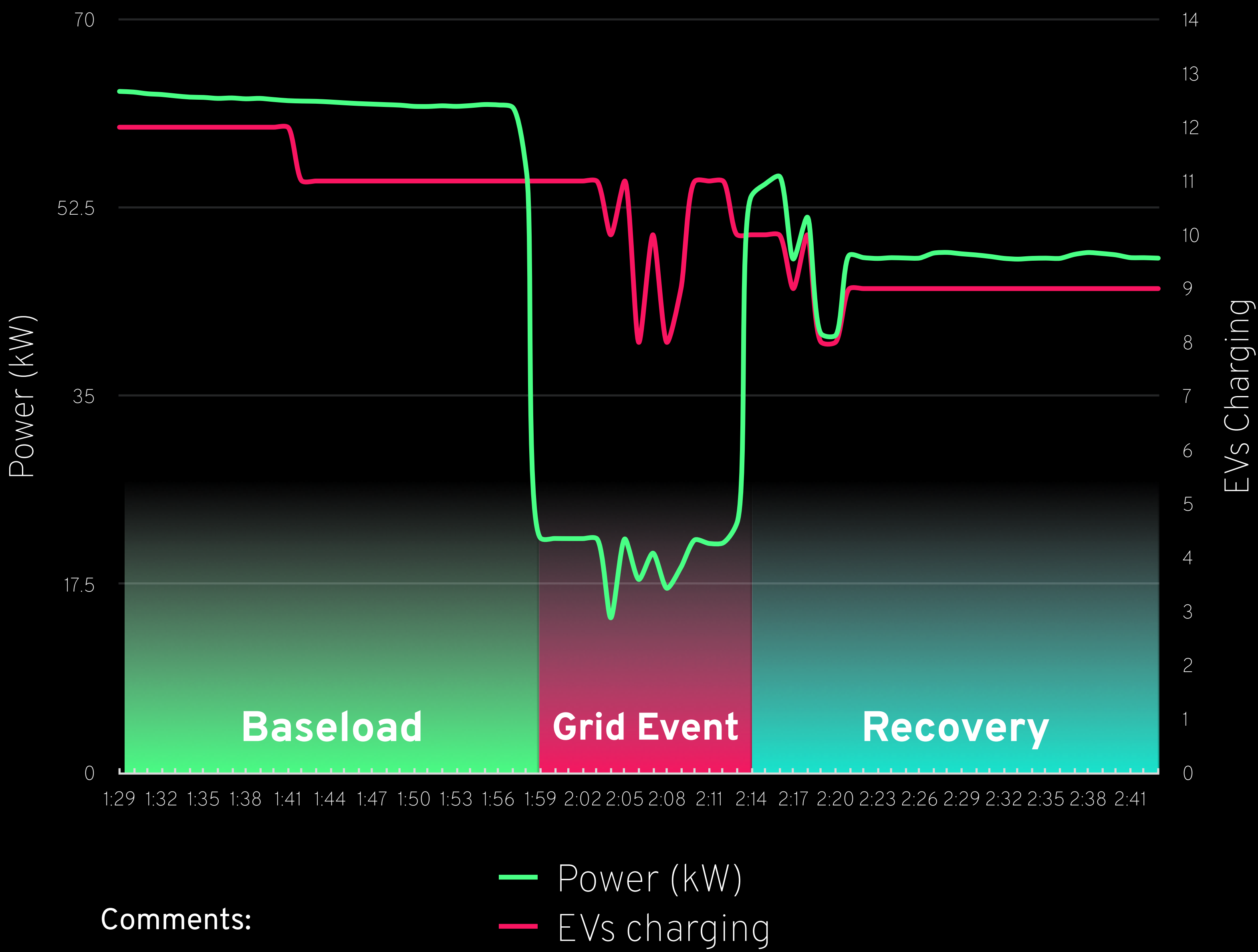
Event Start Time: 1:59am

Event Duration: 15 minutes

Reduction from Baseload Power: 47.82kW

Energy Reduced: 11.96kWh

Devices activated: 11



Comments:

The third DSR event was triggered at 1:59 AM to observe the effect on devices nearing their desired State of Charge (SoC).

During the 45-minute window, the number of actively charging vehicles dropped from 12 to 9, indicating that several EVs had completed or nearly completed charging. This natural decline in demand highlights the potential to spread charging loads more effectively across the full off-peak window, helping to reduce clustering around midnight and improve overall grid stability.

06. Key Findings User Behaviour

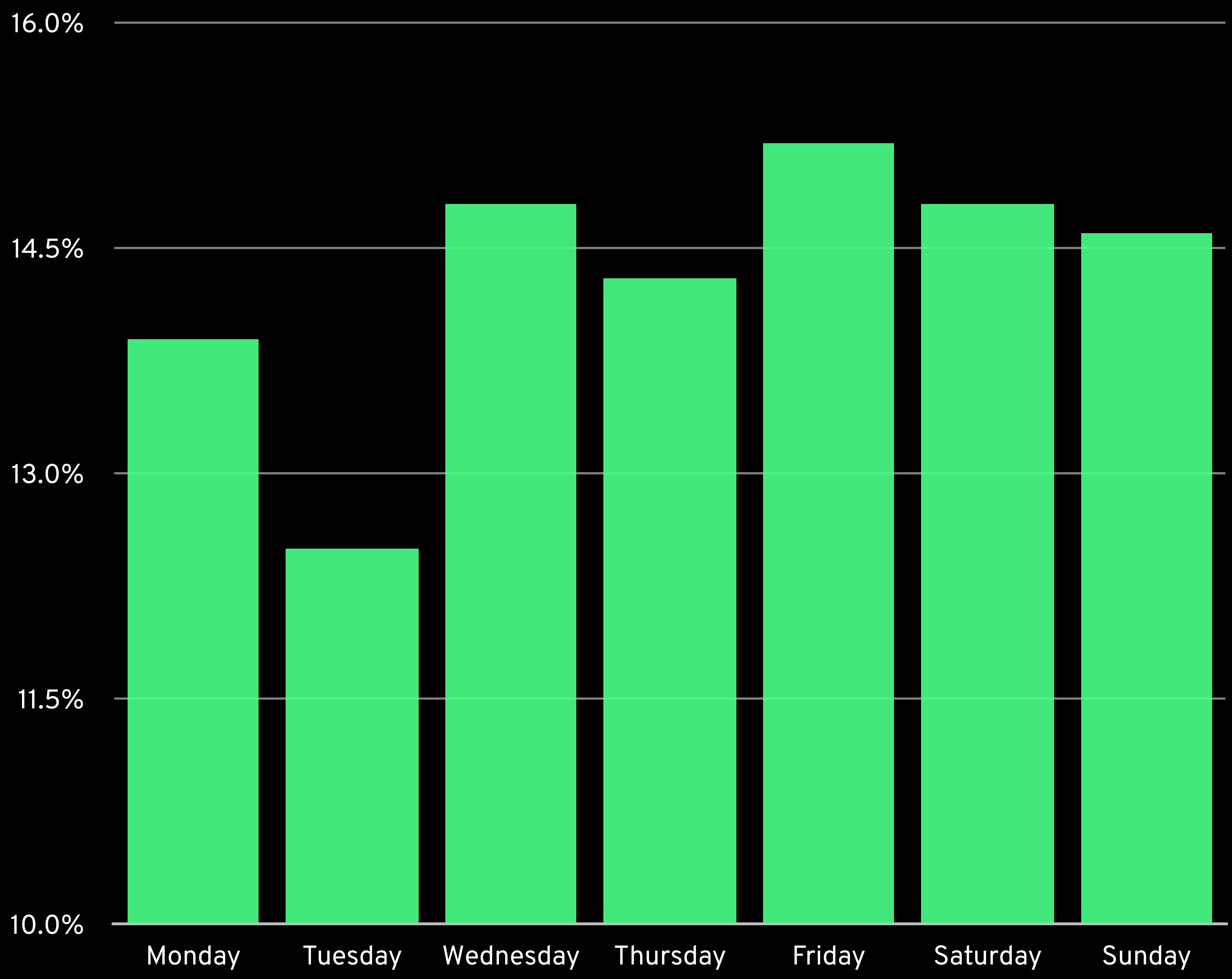
Almost 50% of charging occurred during solar generation hours (10am–4pm), indicating strong alignment between user behaviour and solar availability.

Overnight charging (midnight–6am) accounted for 30.1%, highlighting demand spiked by the popularity of off-peak charging that may impact network stability without intervention.

49.7%
Peak Generation Consumption
10am-4pm

5.7%
Morning Peak Consumption
6am-10am

Daily Distribution



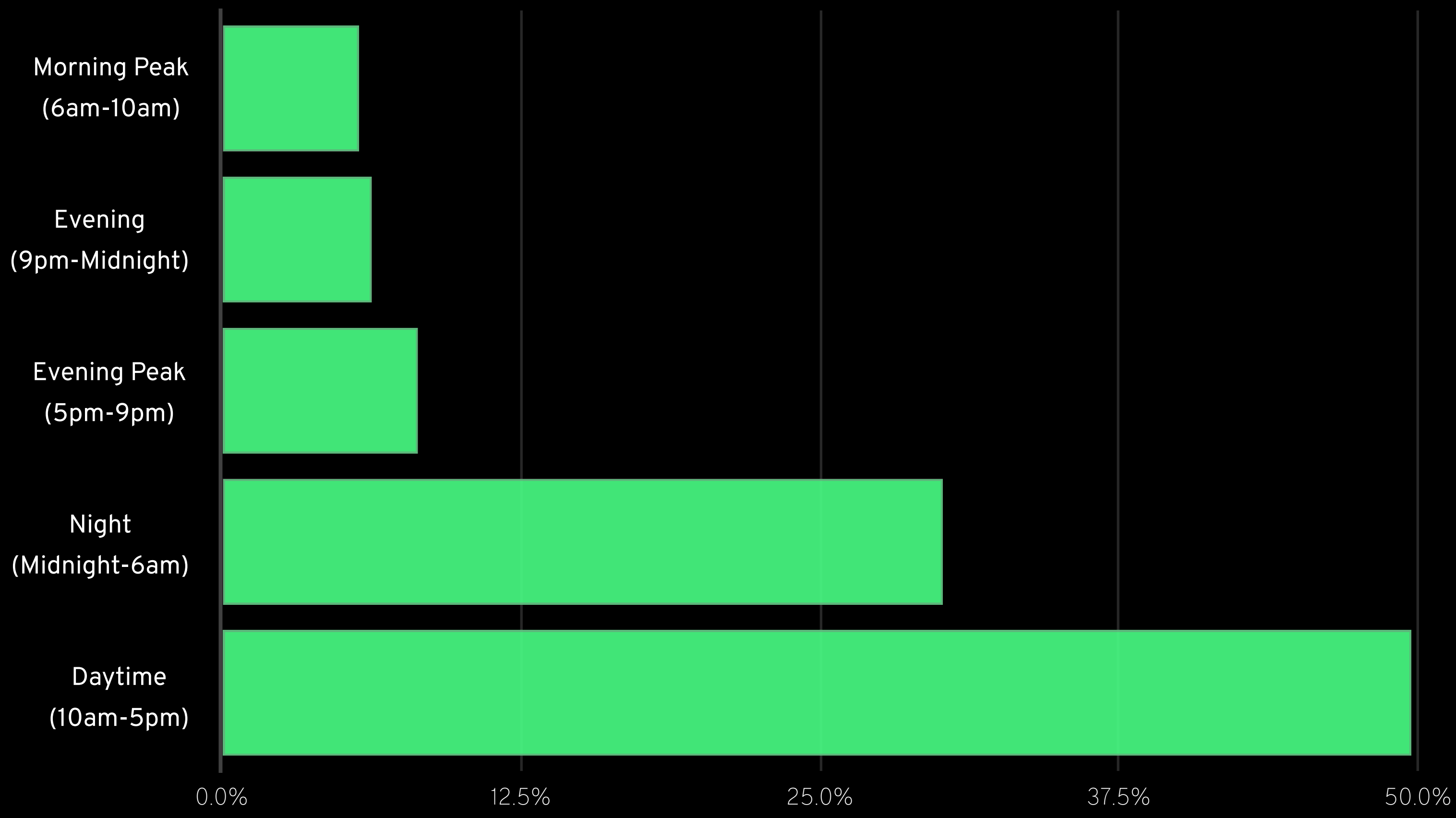
Comments:

The daily energy distribution among devices during the trial period revealed a fairly even spread across the week, with no marked trend toward increased weekend charging.

The highest usage was recorded on Fridays (15.2%) and the lowest on Tuesdays (12.5%), a modest range of just 2.7%. The split between weekday and weekend charging was 70.5% on weekdays compared to 29.5% on weekends

Interestingly, a larger share of the total charging activity—73.8%—occurred between Wednesday and Sunday, compared to 26.4% on Monday and Tuesday combined. This suggests a mild skew toward mid-to-late week usage, though not sharply defined enough to indicate a strong behavioural trend.

Charge Time Period Analysis



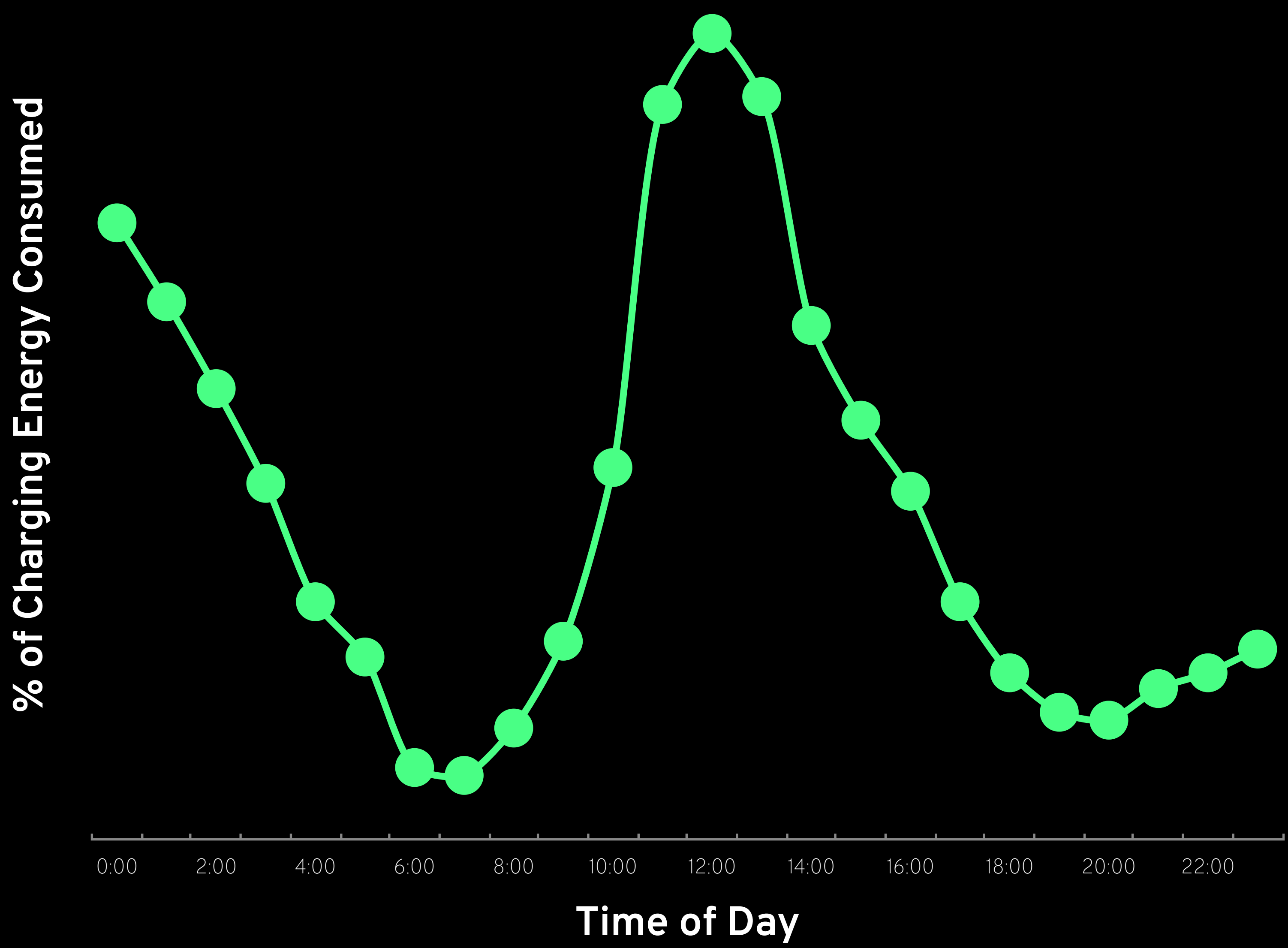
Comments:

This graph paints a clear picture of charging behaviour patterns among participants. Nearly half of all EV charging (49.7%) occurs during the daytime (10AM–5PM) in alignment with periods of peak solar production. This reflects both the accessibility of home solar systems and the intelligent use of smart charging to prioritise self-generated solar to avoid grid consumption.

It's worth noting that this daytime figure may also be influenced by some energy retailers offering free electricity during the middle of the day, which encourages consumption when renewable generation is abundant—a practice that can improve grid stability by absorbing excess supply.

Additionally, 30.1% of charging occurs overnight (midnight–6AM), demonstrating the strong influence of EV-specific energy plans. These tariffs offer lower electricity rates during off-peak hours, and many users take advantage of scheduled charging features to reduce costs while helping to flatten demand peaks.

Charging Energy % per Hour



Comments:

This graph shows when EV charging energy is consumed throughout the day, with two key peaks.

The peak charging consumption occurs around midday, with 10.2% of daily charging. This aligns with solar generation, suggesting users are charging from rooftop PV or taking advantage of free or discounted daytime rates. This behaviour helps absorb excess solar and supports grid stability.

A second peak appears just after midnight, tapering off by 6AM, likely because vehicles reach their target charge level quickly.

The adoption of dynamic, smart tariffs and automated scheduling can help spread charging more evenly—reducing demand spikes and improving grid predictability.

06. Key Findings Solar Prioritisation

Participants achieved an average of 39.43% of their total charge consumption from their own surplus generation

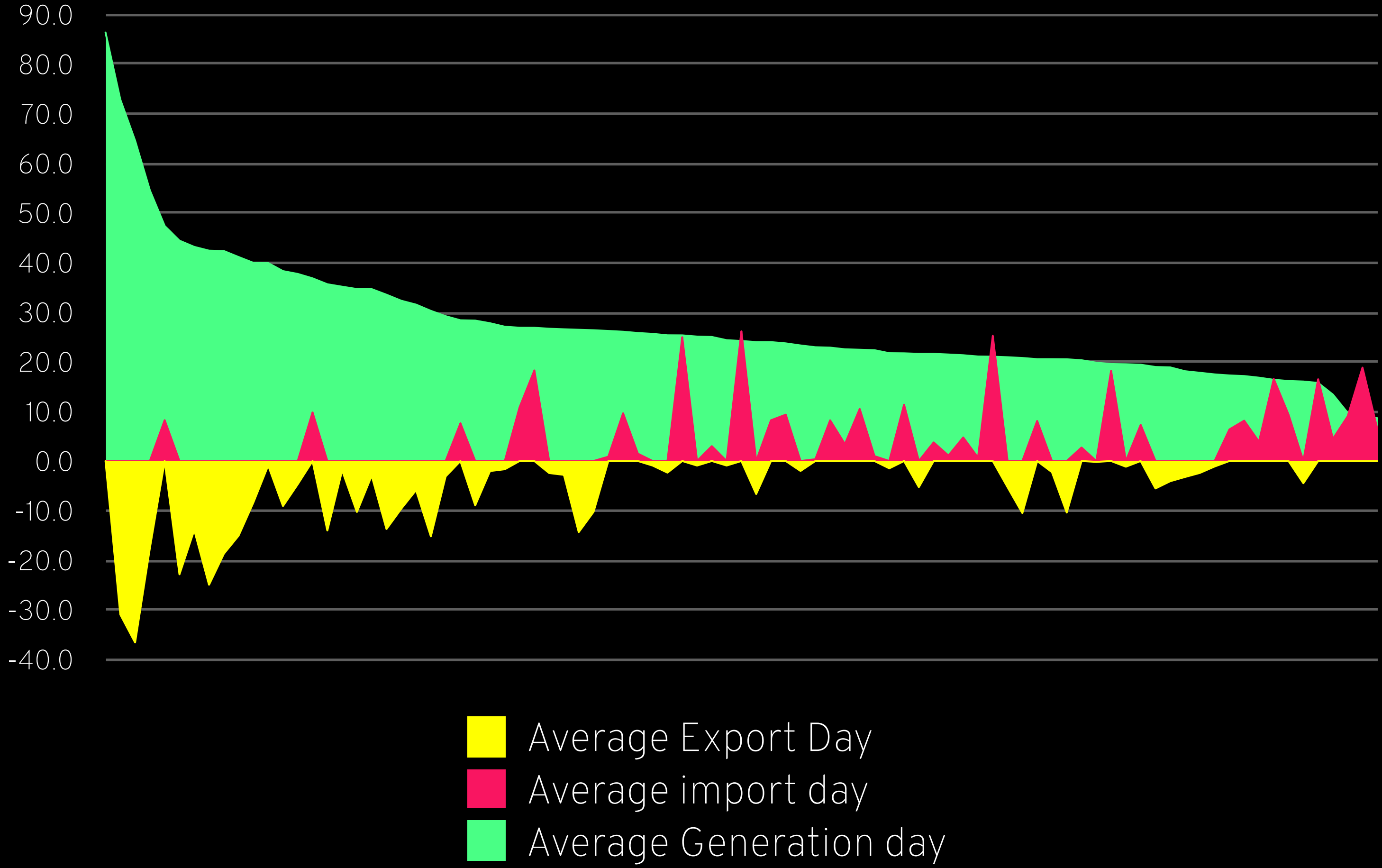
Almost 1 in 4 participants exceeding 75%, and one in 10 exceeded 90%.

This directly reduced grid imports and maximised the use of locally generated renewable energy.

39.4%
Average Solar Self-Consumption

12.1%
Percentage of Total PV Generation Used for Charging

Household Energy Profiles (Most > Least Generation)



25.4
Average Solar Generation per day(kWh)

14.7
Average solar export per day (kWh)

13.8
Average grid import per day (kWh)

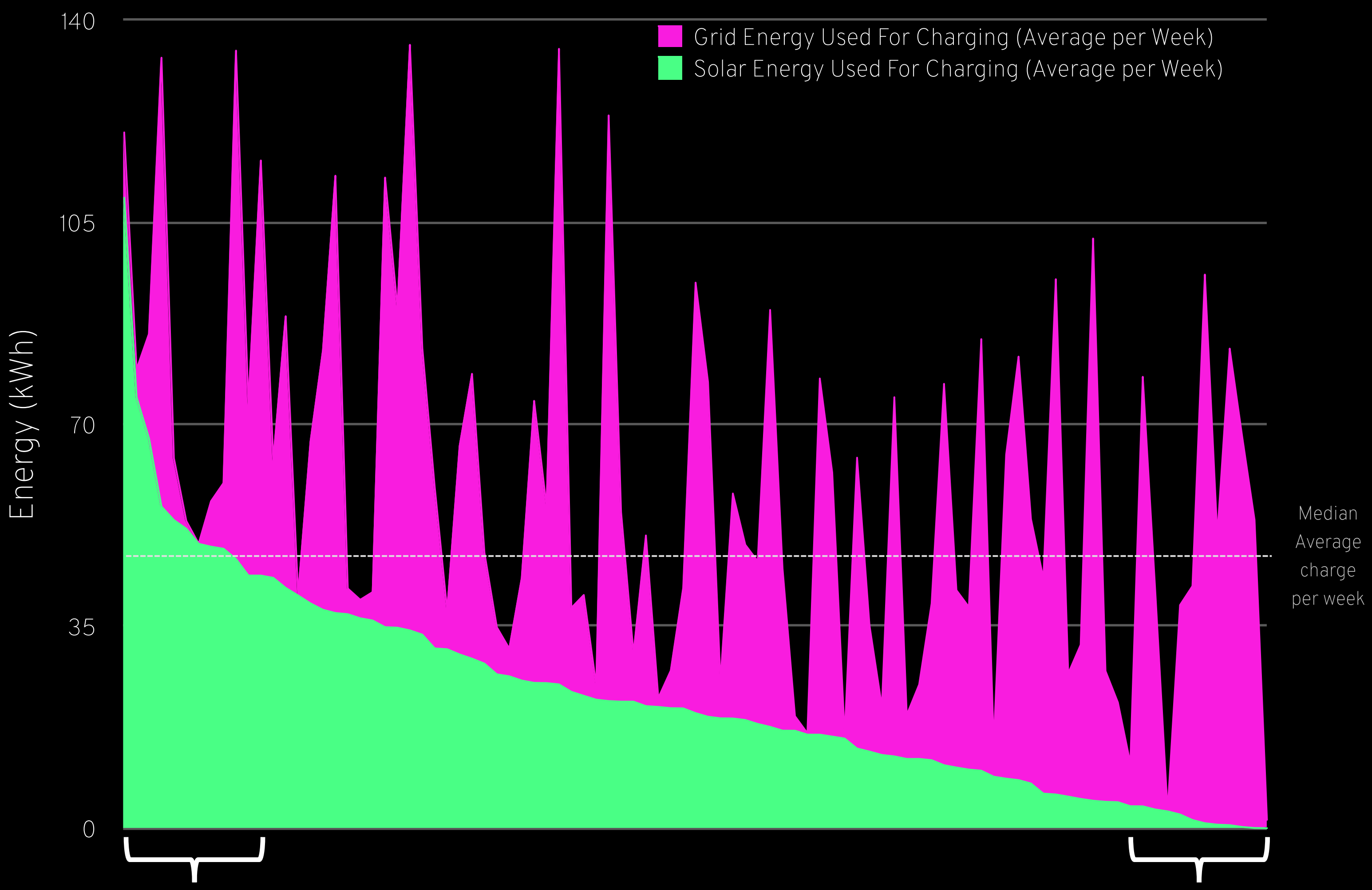
-0.9
Average Net Grid balance per day (kWh)

Comments

The graph provides a high-level overview of the average daily energy generation, imports, and exports across participant households during the trial.

As solar systems become more affordable and efficient, there is an increasing need to actively manage solar exports to prevent grid congestion. At the same time, encouraging higher self-consumption of locally generated energy through solutions like solar-aware EV charging becomes essential for reducing grid stress.

Average Weekly Charging Source – Solar vs. Grid



78.7%

% of Charge From Solar Top 10% of users

39.1%

Median Average % of Charge From Solar

14.9%

% of Charge From Solar Bottom 10% of users

53.3kWh

Median Average charge energy per week

14.3 Hours

Average time spent charging per week

3.9kW

Average charge rate

Comments:

Shown here are the average weekly breakdown of solar and grid energy used for EV charging across participants. While some households maximised solar use, a significant proportion still supplemented from grid energy, highlighting the popularity of off-peak tariffs and reduced generation in winter months.

07. *Participant Feedback*

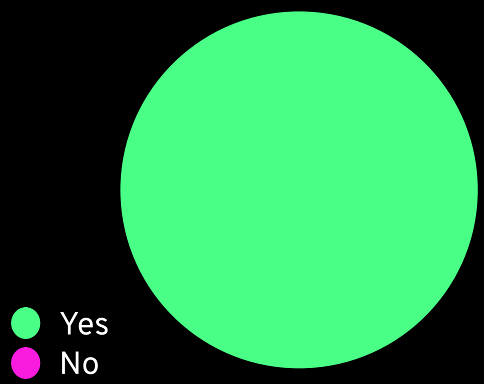
> ***Great initiative and I feel like I won the lottery from being selected to participate.***

Satisfied Participant – Point Cook

07. Participant Feedback Installation Process

Feedback about the selection and installation process was overwhelmingly positive, which is a credit to Product Champions who went above and beyond to deliver. There was an understandably high demand for updates on the application status, which feedback suggests could be improved for future trials.

Was your Product Champion (installer) on-time, polite, and explained to you how to use your zappi?



How would you rate the experience of your zappi installation?

Participant Feedback on Installation:

"It was straight forward"

"It was far quicker than I expected, the slowest part was waiting for my sign-up email for the app activation."

"Installer was excellent to deal with. We have actually had him back to assist with other electrical matters since the zappi installation."

"The only feedback I can think of is the time between submitting request to join to trial, and when the installation communication was made. There was no real way to understand what response time frames would be, whether it was likely to be approved or declined etc."

"The installer listened to me when it came to deciding where I wanted the charger installed. It was installed precisely where I wanted it."

"Rob from Procharged EV is professional and a delight to communicate with. His after sales service is also top notch".

"Ricc from FlexEV was very professional to deal with during installation, would recommend him to anyone else installing a zappi charger"

"Was excellent communication and seamless experience. I have recommended him on to other that are installing chargers."

"Everything was straight forward and easy from a customer perspective."

"There was a period where nothing was heard regarding when we can expect installations to happen until I rang up to get an update."

"There was a hiccup at the start where the zappi charger stock item was not delivered on-time to the installer, but once delivered, it was smooth process"

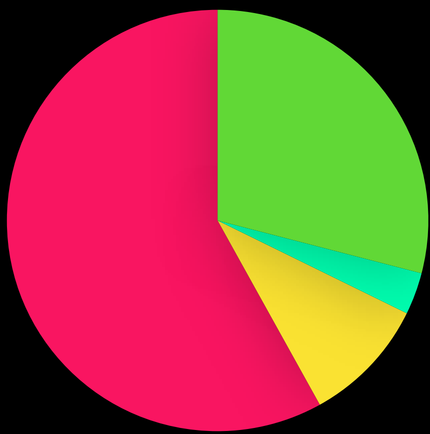
07. Participant Feedback
Charging from Solar

How often do you prioritise solar-aware charging?

- I only charge from surplus solar
- I charge using surplus solar, and only from grid when absolutely necessary
- I prioritise use of surplus solar, and supplement with scheduled charging at cheaper rates
- I don't prioritise solar, I charge when I need to
- I charge from solar when the car is home during the day but typically charge overnight

After installing your zappi, has your charging behaviour changed?

- Yes - Now I charge exclusively from surplus solar
- Yes - I primarily schedule charging based on energy price
- No - I just plug in and charge whenever I need to
- Yes - I charge from surplus solar as well as schedule when energy is cheap



Feedback on Solar Charging:

"I was surprised by how often we weren't home to use the excess solar, and as our usage of the EV increased (deliberately reducing use of the diesel golf), we weren't getting enough power for our weekly drives. We were also on red energy Ev plan where they have free power in the middle of the day on the weekend (when you're most likely driving somewhere?!) so have now switched to AGL with low midnight rates. One night charge to fully top up, solar surplus dwindling in winter..."

"It helped me much using excess solar energy to charge my EV and tremendously decrease my power bill."

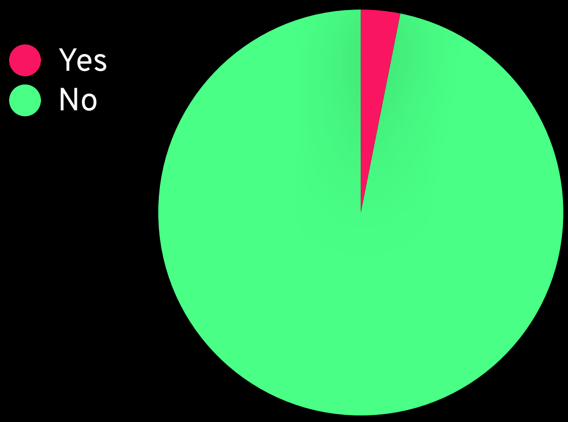
"It makes a big difference beforehand I manually adjust to use Solar"

"The charging experience will be different during the winter months. We are just about to experience that for the first time. We have found initially with so many more dull days, we are topping up from grid more often."

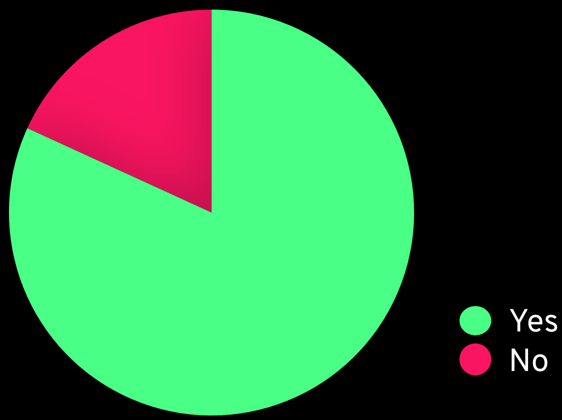
"We have since purchased a second EV. We would not have done so if we did not have zappi installed as we would not have been able to get both cars charged."

07. Participant Feedback Demand-Side Response

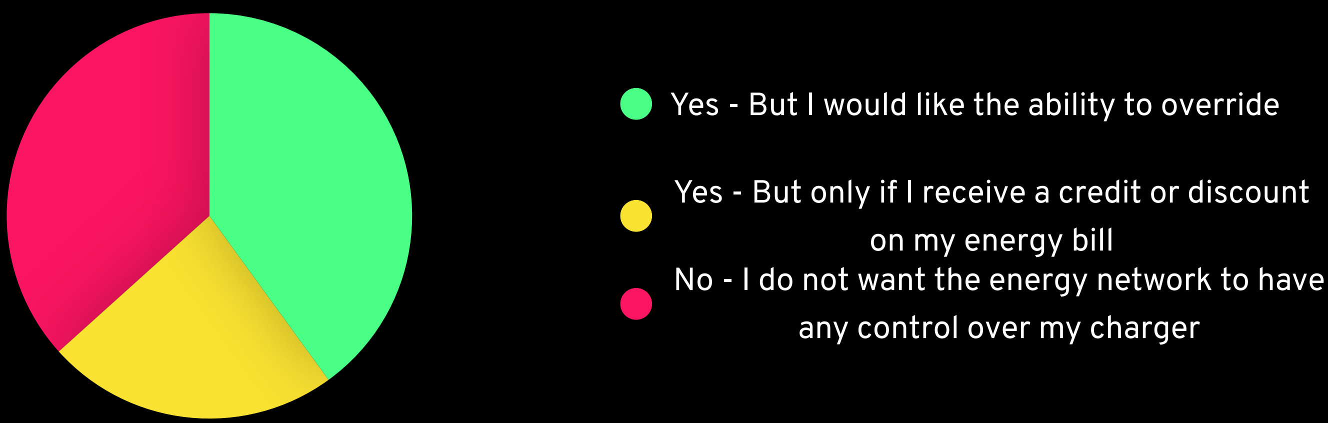
Did you notice any occasions where you charge rate slowed by a signal from your energy network?



Were you aware your zappi could respond to signals from the grid?



Do you support the idea of your energy provider reducing your charge rate to help the grid during busy times?



Participant Feedback on Demand-Side Response

"To me the charging cost is the first priority. So right now some electricity retailer offer EV plan to charge at night, which the cost is the same as FIT. This definitely changed my charging habit from solar only to schedule. If such plan is gone or if the mid night charging cost is going to higher than solar FIT, then I will probably move back to primary solar charging and scheduled mid night charge as supplementary."

"The trial was very non-intrusive, I almost forgot that I was taking part in one."

"While I understand the need for the energy provider to reduce charge date during high demand periods, I would like to have the option to override just in case I need to charge my car quickly due to an emergency."

07. Participant Feedback
Additional Feedback

"It is a joy to use during summer months where we have a long period of daylight, provided that there is little/no cloud cover"

"I have 6.6kW solar system with a 5kW inverter so using solar to only charge seemed to be a waste. So I would charge during the day to make use of the solar I was getting but charge at full speed. But when only wanting to use solar only the zappi was perfect."

"I wish the ECO+ mode had a shorter cooldown for turning off when overcast instead of the default 30 seconds, like 10 seconds to turn off but 30 seconds to turn on again. The device was so easy to use, and I can't believe we didn't get a charger for ages."

"Be nice to have some better online stats."

"Zappi has been excellent and definitely covers most of my needs including being solar aware. However, it would've be great if a V2H capable charger was offered to future proof and maximise the usage solar generated power when V2H is regulated."

"I would love to read more about how my data was used to build the report. What outcomes there were. What are the next steps, and how will this contribute to shaping the industry."

"Just making you aware we are now charging two EVs as of Feb 25. If there is going to be a V2G trial, we would certainly consider being involved as we now hold 140+ kW between both cars."

"While there was a lot of paperwork provided, it would have been great if the installer or someone explained how the data from this trial is going to be used and when I get full ownership of the charger."

08. *Lessons Learnt*

08. Lessons Learned

The trial provided valuable operational insights, as well as identified areas of focus and improvement for future trials.

Energy Price has a Significant Influence on User Behaviour

Charging patterns are clearly clustered around peak generation hours and tariff-driven windows (midnight), reinforcing the need for dynamic scheduling algorithms and smart tariffs to better manage and spread demand.

Education and Incentives Are Required to Encourage DSR Participation

Almost all users were not aware a DSR event had taken place, nor were they impacted negatively. Some users were unclear on DSR functionality and benefits. Awareness programs, user control and financial incentive will enhance participation.

Strengthening Data Reliability and User Involvement

While only a small percentage of households did not return complete data, site-specific challenges (WiFi availability, user engagement) affected data consistency. Future programs should prioritise technical readiness checks, set clear expectations on participant engagement, and a detailed background on existing charging habits, demographics, and user objectives.

Offering the equipment at no cost may have skewed the demographic of participants and reduced accountability, with five homeowners not recording a single charging session. Future projects should assign greater responsibility to participants, to ensure genuine engagement and alignment with program goals.

09. *Future Objectives*

09. Future Objectives

Building on the trial's success, the following steps are suggested to better understand the benefits of solar-aware, demand-responsive EV charging.

Scale Up Future Trials

Expand the program to a larger, more diverse cohort, including different demographics, grid zones, and EV models, to validate findings at scale.

Integrate Dynamic Tariffs

Partner with DNSPs and energy retailers to trial dynamic tariffs that encourage load shifting in real time, beyond static TOU pricing.

Explore V2G and V2H

Pilot trials of bidirectional charging, enabling EVs to provide on-demand grid support and home backup.

Clearly Define DSR Participation

Help constituents develop a clearer understanding of DSR and how it can benefit them as well as the grid. Investigate ways to incentivise participation and easy-to-use opt-in/opt-out control to boost response rates.

Community Engagement

Continue public education campaigns to promote solar-aware charging. Promote off-peak charging which supports grid stability

Energy,
Environment
and Climate Action

1300 743 443

myenergi.com/au
apac.support@myenergi.com

580 Church Street
Cremorne, Victoria, 3121