An Australian Government Initiative

Regional Development Australia

IPSWICH & WEST MORETON

# Regional Energy Transition Collaborative

## Final Report

**June 2025**

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**Prepared for Advance Queensland, an initiative of the Queensland Government.**

ADVANCE QUEENSLAND

Queensland Government

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# Executive Summary

The Regional Energy Transition Collaborative (RETC) project, funded by Advance Queensland and delivered by Regional Development Australia Ipswich & West Moreton, investigated how collective action through modern technology and innovative energy sharing models can transform the local distribution network and create significant economic benefit. Focusing on the Ipswich and West Moreton region, RETC evaluated three cohort-based frameworks—small (residential), medium (residential plus SMEs and small commercial), and large (commercial and institutional)—to determine their technical viability, social readiness, and economic impact.

Technical modelling demonstrated that coordinated energy sharing can materially relieve network constraints and flatten peak demand. In West Ipswich, adding 100 residential and 35 small commercial solar-plus-battery systems reduced evening peaks by up to 500 kW and shifted 1.6 MWh of energy daily, unlocking over $555,000 of annual value from an investment under $3.3 million (a 17–23% simple return). In Springfield, aggregating 167 household batteries could meet an 1.8 MWh daily peak-shaving requirement, while a dedicated 2 MWh grid-connected system would similarly prevent substation overloads. These findings underscore that energy sharing, when enabled by smart inverters, real-time monitoring and virtual power plant platforms, can deliver tangible network benefits and economic efficiencies—if coordinated at scale.

Social research revealed that the medium and large-scale models require far fewer participants to achieve meaningful outcomes. Large commercial and institutional partners, driven by ESG commitments, can unlock significant value with minimal coordination effort. Small-scale residential models, although technically feasible, demand extensive customer acquisition, onboarding and ongoing support to reach the minimum viable cohort (circa 1,000 homes). Across all models, participants must be recruited, educated and empowered to adopt load-shifting behaviours and share surplus energy—all of which hinges on robust local engagement.

Critically, none of these technical or economic gains will materialise without a dedicated, place-based coordinator. A central “Project Officer” role or social enterprise entity is essential to:

- Inform and recruit diverse participants
- Manage financial flows, dividends and community benefits
- Oversee installation of meters, control devices and digital platforms
- Facilitate real-time data collection, decision support and reporting

Without local coordination, the complexity of energy sharing—contractual arrangements, technology integration and participant communication—becomes insurmountable, stalling collective impact.

To harness the full potential of energy sharing, RETC recommends piloting either the medium or large-scale model in Ipswich. Key actions include:

1. Commissioning detailed market research to tailor engagement strategies.
2. Securing funding to underwrite a coordinator position and initial working capital.
3. Deploying metering, control hardware and software to enable seamless energy trading.
4. Establishing transparent governance and benefit-sharing mechanisms.

By investing in these enablers, Advance Queensland can catalyse a locally coordinated energy sharing initiative that eases network strain, returns economic value to participants and serves as a scalable blueprint for regional communities across Australia

# Introduction

The Regional Energy Transition Collaborative (RETC) project, supported by Advance Queensland (AQ), an initiative of the Queensland Government, and delivered by Regional Development Australia Ipswich & West Moreton (RDAIWM), worked to explore energy sharing in the Ipswich region.

This project aimed to research a local energy share initiative that allows community members to share and sell surplus energy generated by individuals to other individuals or organisations of choice utilising virtual trading mechanisms. This model allows participants to earn a profit, alleviate pressure on the energy network, and deliver broader benefits to the community.

Envisioned under the vision "keep energy local," the project sought to foster a community where participants can generate and share energy seamlessly by coordinating efforts within the same distribution network. Additionally, RDAIWM is particularly interested in how such a project might enhance regional development.

The research aimed to identify the social drivers and technical requirements necessary for each model's successful implementation. It focused on three models—small, medium, and large—each designed for further exploration.

*Figure 1: Energy Share Models*

| **Model** | **Participant cohort** |
|---|---|
| Small | Residential |
| Medium | Residential, small mixed-use business and small commercial & industrial |
| Large | Large-scale commercial/organisational |

RDAIWM collaborated with CS Energy to gain insights into the large-scale model and received guidance from the Department of State Development, SEQ West Regional Office. Additionally, RDAIWM partnered with energy consultant Ashley Bland from Constructive Energy to provide the technical expertise needed for comprehensive energy data analysis and reporting across the three proposed models. RDAIWM led community engagement, seeking to understand the community drivers for each model and uncover insights.

The project team developed the social enterprise model in an attempt to answer the question, "Why isn't energy sharing happening already in local communities and contexts?". Additionally, we established terms of reference (TOR) for the roles within the model (*Figure 3*).

The focus of our research centred on:

- Identifying drivers.
- Uncovering the ideal customer persona/archetype.
- Assessing the value.

A key consideration for the model was its application in a physical subset of the Distribution Network. This is different to existing virtual energy trading mechanisms that apply equally anywhere within a State or even more widely throughout the National Energy Market (NEM).

Figure 2: Social Enterprise Model.

**Projects**

- PV installation – BESS installation - Load monitoring and control device installation

**Drivers (include but not limited to)**

- Annoyance with Retailers/gov/renewables
- Relive financial pain
- Push factors – retailers, solar installers, owners
- Grants/Gov programs
- Local DN constraints
- Self-interest
- Peer pressure / Word of Mouth
- Easy way to do good in community

**Coordinator role**

- Inform and engage
- Recruit
- Decision support
- Coordinate
- Communicate
- Facilitate outcomes eg funding for social good

**Particiapnts:**

- Households -no solar
- Households - solar
- Small – Medium Enterprises (SME)
- Commercial and Industrial (C&I)
- Large businesses

**Context**

- National Energy Market function - Electrification - EVs - Distribution Network function

Figure 3: Terms of Reference

| Role | Attributes | Activity |
|---|---|---|
| Coordinator<br><br>(CO) | • NFP or Social Enterprise<br>• Place-based<br>• Trusted reputation<br>• Technologically able<br>• Commercial business capability<br>• ‘Sales’ experience/capacity<br>• Engagement skills | • B2B management<br>• B2C management<br>• Sales/Onboarding<br>• Financial control and disbursement<br>• Social benefit delivery<br>• Customer service<br>• Technological support<br>• Contractual management<br>• Ongoing CC engagement |
| Investment Customer<br><br>(IC) | • Residential homeowner<br>• Small-medium business owner Commercial operator | • Owns dwelling or commercial property<br>• Solar and/or battery assets<br>• Willingness to purchase assets<br>• Contractually obliged<br>• Energy behavioural plan<br>• Leverages technology (App)<br>• C2B (CO) communication<br>• Receives dividends at an agreed price<br>• Agrees to share stored surplus energy<br>• Eases reliance on grid<br>• Agrees on % to benefit community<br>• Engages with CC/CO platforms/opportunities |
| Zero Cost Customer<br><br>(ZC) | • Residential homeowner or renter<br>• Small-medium business owner | • Rents or owns commercial property or dwelling<br>• No assets required<br>• Energy behavioural plan<br>• Leverages technology (App)<br>• C2B (CO) communication |

| | | |
|---|---|---|
| | | • Engages with CC/CO platforms/opportunities<br>• May reduce energy bills<br>• May reduce reliance on grid |
| Energy Retailer<br>(ER) | • Technologically able and aware<br>• Policy able<br>• Legislatively compliant<br>• Commercially viable<br>• Contractually capable<br>• B2B relationship<br>• Future-focused | • B2B<br>• Contractual purchase agreement<br>• Provides dividends<br>• Administers energy sharing between CCs<br>• Real-time data capability |
| Customer<br>Cohort<br>(CC) | • Mixed IC and ZC customers | • Place-based customers onboarded<br>• Identified as IC or ZC<br>• Follows behavioural plan/s<br>• Receives benefits dependent on customer type<br>• Provides feedback |

Arguably, energy sharing models now exist in the context of a highly individualistic and time poor society. Understanding the drivers and mechanisms for individuals to be identified, recruited, on-boarded, supported and reported to, are found to be critical in order to reach a scale that can deliver meaningful benefit to both networks and the community.

# Technical Findings:

All energy share models were envisaged within the Ipswich West Morton region.

## Small scale (residential).

A survey was conducted using local contacts to obtain residential energy bills and identify the type of home, the quantum of energy consumed and usual energy profile of households in the region.

This resulted in the following three broad house types being identified:

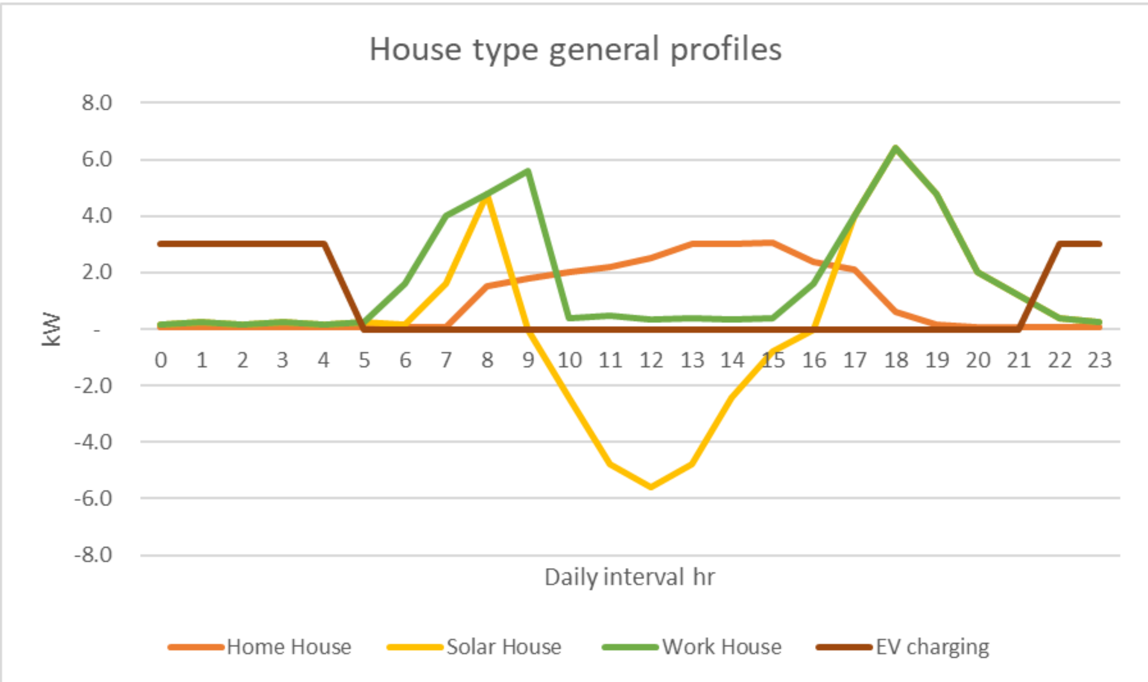
| | | |
|---|---|---|
| 1. | Home house | *A home where residents spend most of the day at home, either through being unemployed, retired, studying or working from a home business.* |
| 2. | Work house | *A home in which residents leave for standard work hours (9 am-5 pm) and which is effectively empty for most days.* |
| 3 | Solar house | *A home in either category above but that has a 6.6kW solar + 5kW inverter installed* |

In addition to the three house types, we identified EV charging as an emerging impact. While we appreciate the significant impact that vehicle-to-grid charging will have on the Distribution Network at some point in the future, at this stage, we have only considered EV charging and only used trickle charging through a standard PowerPoint on the basis that this is achievable now.

Based on both Ipswich sample data and sector research, the following generalised profiles were identified for the three house types and EV charging.

*Note that the profiles do not reflect peak demand spikes.*

Figure 4: Small-scale energy profiles.



The house types and profiles were used to identify a target 'audience' or pool of participants and to test viability thresholds for creating enough value for the group/project to be self-sustaining.

After visiting Springfield and speaking with community leaders, a base case consisting of 1000 participants split across house types was identified in the following ratio.

| Dwelling type | 1,000 |
|---|---|
| Home House | 50 |
| Work House | 500 |
| Solar House | 450 |
| EV Charging | 50 |

EV charging does not contribute to participant numbers because it is considered to occur within some of the cohort homes.

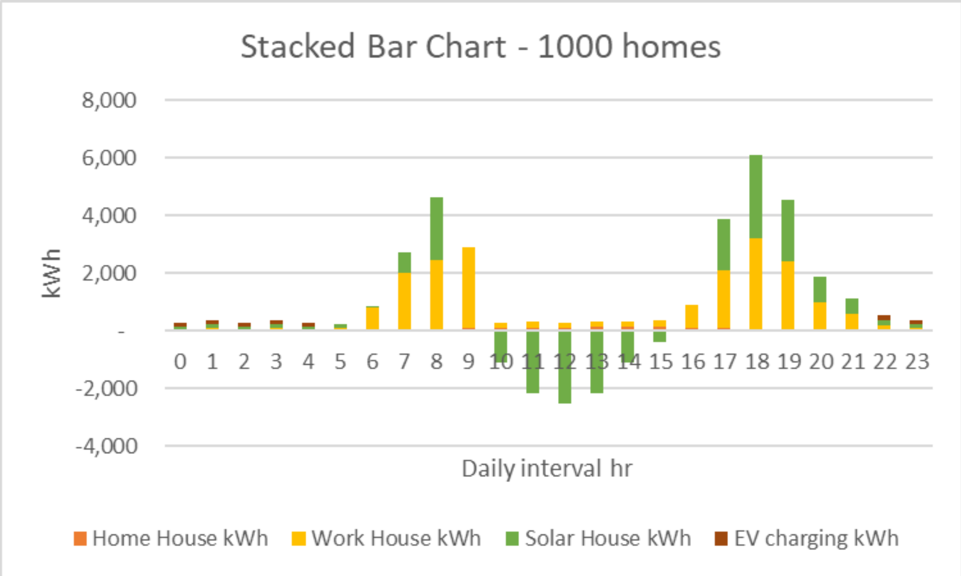
The following table indicates cumulative hourly consumption.

Figure 5: Energy consumption table.

| Multiple | 50 | 500 | 450 | 50 | |
|---|---|---|---|---|---|
| **Interval** | **Home House kWh** | **Work House kWh** | **Solar House kWh** | **EV charging kWh** | **Sum Profile kWh** |
| 0 | 3 | 80 | 72 | 150 | 305 |
| 1 | 5 | 120 | 108 | 150 | 383 |
| 2 | 3 | 80 | 72 | 150 | 305 |
| 3 | 5 | 120 | 108 | 150 | 383 |
| 4 | 3 | 80 | 72 | 150 | 305 |
| 5 | 5 | 120 | 108 | - | 233 |
| 6 | 3 | 800 | 72 | - | 875 |
| 7 | 5 | 2,000 | 720 | - | 2,725 |
| 8 | 75 | 2,400 | 2,160 | - | 4,635 |
| 9 | 90 | 2,800 | - | - | 2,890 |
| 10 | 100 | 200 | - 1,080 | - | - 780 |
| 11 | 110 | 240 | - 2,160 | - | - 1,810 |
| 12 | 125 | 160 | - 2,520 | - | - 2,235 |
| 13 | 150 | 200 | - 2,160 | - | - 1,810 |
| 14 | 150 | 160 | - 1,080 | - | - 770 |
| 15 | 153 | 200 | - 360 | - | - 7 |
| 16 | 120 | 800 | - | - | 920 |
| 17 | 105 | 2,000 | 1,800 | - | 3,905 |
| 18 | 30 | 3,200 | 2,880 | - | 6,110 |
| 19 | 8 | 2,400 | 2,160 | - | 4,568 |
| 20 | 3 | 1,000 | 900 | - | 1,903 |
| 21 | 5 | 600 | 540 | - | 1,145 |
| 22 | 3 | 200 | 180 | 150 | 533 |
| 23 | 5 | 120 | 108 | 150 | 383 |
| Totals | 1,261 | 20,080 | 2,700 | 1,050 | 25,091 |

The same data, presented as a stacked bar chart, indicates the potential average peak demand and solar excess associated with the 1000-home base case.

Figure 6: Energy consumption bar graph




In this scenario, the solar excess (after self-consumption within the group), peaks at around 2.2MWh and in volume, represents approximately 7.4Mwh. As indicated in the table below, this is currently valued at around $135,000 via the default Feed-in Tariff. However, if this energy was directed at 5c/kWh to another entity that was currently paying 15c/kWh, a reasonable savings value is 7c/kWh, after retailer transactional costs are taken out.

| | | Daily kWh | Annual kWh |
|---|---|---|---|
| | Solar excess | - 7,412 | - 2,705,380 |
| $ 0.05 | FiT value | $ 370.60 | $ 135,269 |
| $ 0.07 | Gift saving value | $ 518.84 | $ 189,377 |

In other words, a group of 1000 homes could foreseeably deliver ~$190,000 of value to third-party entities if they coordinated. Extending this logic to larger numbers of participants results in the following.

| Dwelling type | 1,000 | 2,000 | 2,000 | 10,000 |
|---|---|---|---|---|
| Home House | 50 | 200 | 200 | 2000 |
| Work House | 500 | 1,100 | 800 | 3000 |
| Solar House | 450 | 700 | 1,200 | 5000 |
| EV Charging | 50 | 200 | 200 | 2000 |
| Gifted value | $ 189,000 | $226,000 | $ 510,000 | $1,670,000 |

It is important to note that the relative proportions of house type makes a significant difference to value realised. As indicated above, the value created within a 2,000-home grouping could be doubled simply by recruiting 500 more homes with solar than homes without.

If batteries are introduced, then this enables energy to offset expensive peak time consumption for the individual, to reduce the amount of unwanted daytime solar in the network and to provide energy into the market at a time when it is more valuable.

If we assume 90% round-trip efficiency for the battery and a value of 15c/kWh (whether by avoided peak consumption or revenue from sale to market/others), then this can be considered for each home grouping.

Finally, the ability to remove load in emergency scenarios is valuable and can attract payments to enable a retailer to switch off certain items for short periods. Assuming that there is one event per year and that 80% of the cohort agreed to turn off a 1kW load such as an air conditioner, this results in a Demand Response payment to participants as indicated in the table below.

| Dwelling type | 1,000 | 2,000 | 2,000 | 10,000 |
|---|---|---|---|---|
| Home House | 50 | 200 | 200 | 2000 |
| Work House | 500 | 1,100 | 800 | 3000 |
| Solar House | 450 | 700 | 1,200 | 5000 |
| EV Charging | 50 | 200 | 200 | 2000 |
| Gifted value | $ 189,000 | $226,000 | $ 510,000 | $1,670,000 |
| Battery Value (revenue) | $ 365,000 | $436,000 | $ 983,000 | $3,230,000 |
| Demand Response (1 event) | $ 21,900 | $ 48,000 | $ 35,000 | $ 131,000 |

*Note that the value created via batteries necessarily cannibalises the gifted value of solar, so the sums are not cumulative.*

## Discussion

This analysis reveals critical insights into factors that may be considered when recruiting a cohort to participate in a VPP.

1. Collaboration can release significant value.
2. The mix of house types makes a material impact.
3. Realised value will be shared among individuals and others, necessitating agreement.

A cohort of 1,000 homes can release financial value, but it is unlikely to have a material impact on the distribution network. However, if 10,000 homes were participating in an area connected to the same Zone Substation or Feeder, then this could have a significant impact on the network, both positive and negative.

Modelling of the 10,000-home cohort indicated an export peak of around 30 MW; however, interval-matched group consumption reduces this to around 22 MW.

In Springfield, with a population of 55,000 supplied by 2 Zone Substations, it is feasible to imagine 10,000 homes connected to one Substation or Feeder. In this case, 22MW could be very helpful in times of network constraint, as explored later in this report.

A minimum of 1000 homes is considered to make a local VPP program viable as the resulting value could fund a Project Officer position to recruit participants, resolve issues, direct funding to agreed priorities and report on outcomes.

## Social Findings: Small scale

Analysis of Ipswich residential energy data indicated that the social enterprise requires around a minimum 1000 Investment Customers (IC) for the small-scale model to be viable.

The model means investment customers could maximise their renewable assets, such as rooftop solar and batteries, and receive dividends for their surplus stored energy. Zero-cost (ZC) participants would add value to the social enterprise through indicating their commitment to sustainability and the potential to transition to IC status. However, they will experience immediate benefits, yielding modest savings on energy bills through accessing cheaper local energy and load shifting.

The 1000 participants required to make the residential model a success require several key attributes. These include financial stability, commitment to climate action or local purpose, technical competence, ability to adapt energy use (load shift), regulatory awareness, and a collaborative and community mindset.

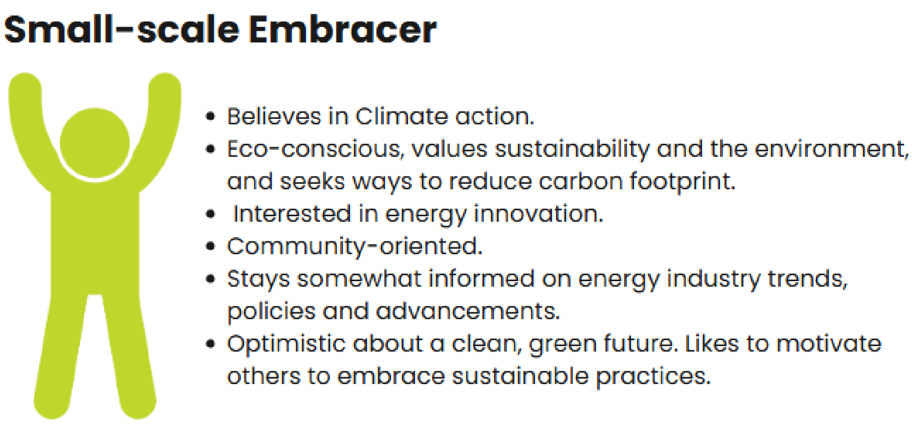
While Ipswich has embraced rooftop solar, with 55%* of homes generating energy, the adoption of battery storage is considerably lower. This presents a significant barrier for the social enterprise and introduces an additional challenge: the need to support the acquisition of solar and battery assets before onboarding customers. Federal and State battery subsidies are expected to result in increased uptake with people who can afford to own a battery. Additionally, a number of retailers and battery providers are offering ‘zero upfront cost’ as a mechanism to encourage residents to install batteries however in this instance the resident will be contracted for a minimum of 5 years and will effectively hand over operation of the battery to the supplier.

Overall, RETC findings indicate that a comprehensive approach to the small-scale model would demand significant resources, commitment, and collaboration to ensure successful management. This may erode any monetary gains made by the small-scale model participants to some extent.

The RETC concluded that the challenges associated with customer and system management, along with the effort required to attract and retain customers in a competitive space, rendered the small-scale model unviable without short term funding support to underwrite the coordinator role. If large numbers of participants could be gained however, the model could be a substantial economic driver for social enterprise and a significant factor in efficient local network utilisation.

An ideal customer persona (ICP) or archetype has been developed as a result of community interactions though this program. Traits of the ideal small-scale participants are indicated below.

Figure 7: Ideal Customer Persona, small-scale



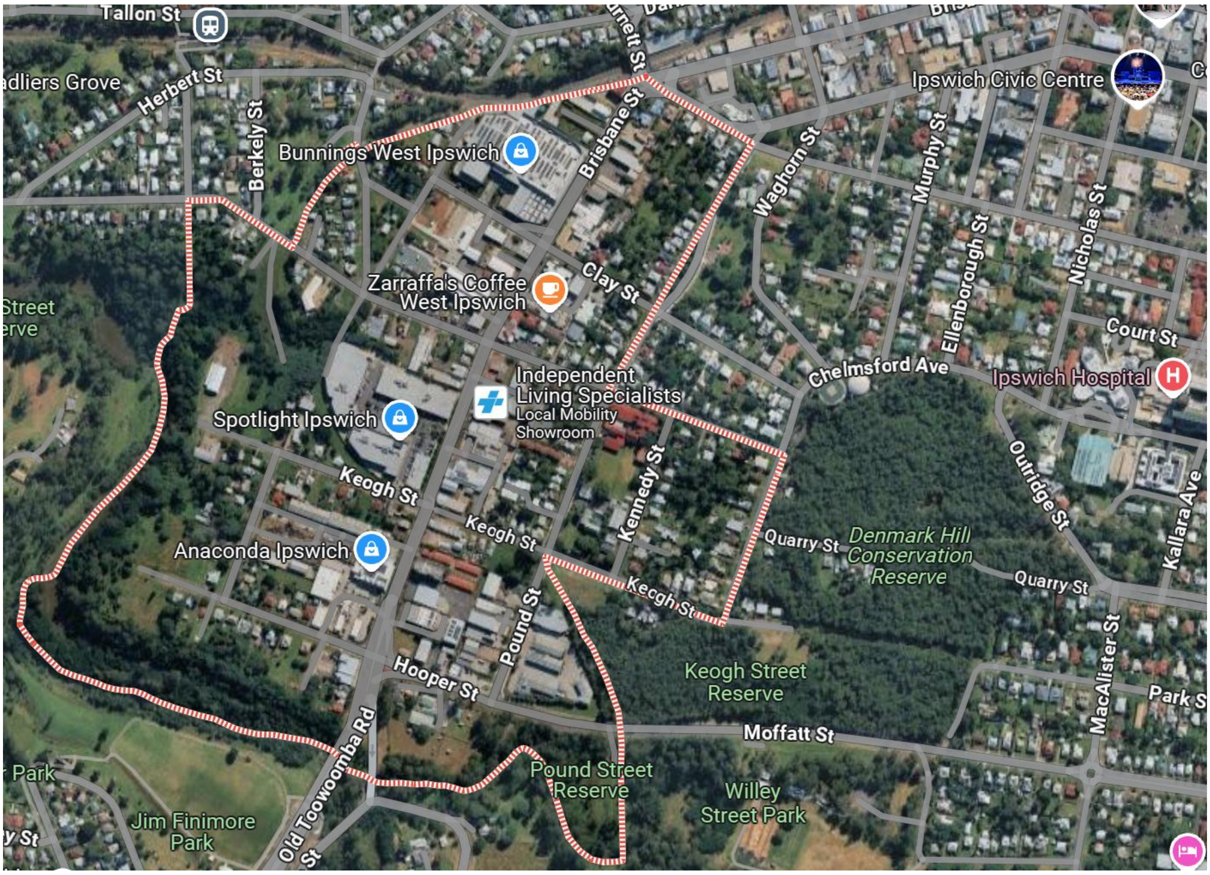

**55% rooftop solar sourced via Queensland Audit Office (QAU).*

## Medium scale (residential, small mixed-use business and small commercial)

For the second test case, we looked for scenarios where a single part of the Distribution Network served a single region or community and where various loads and generation opportunities were present. West Ipswich forms a good case study as it contains large businesses, a shopping centre, light industry, charities, and some lower socio-economic residential housing. It is also closely serviced by the Roderick St (33/11kV) Zone Substation and a Feeder powerline RST20A, which is close to operating at maximum capacity.

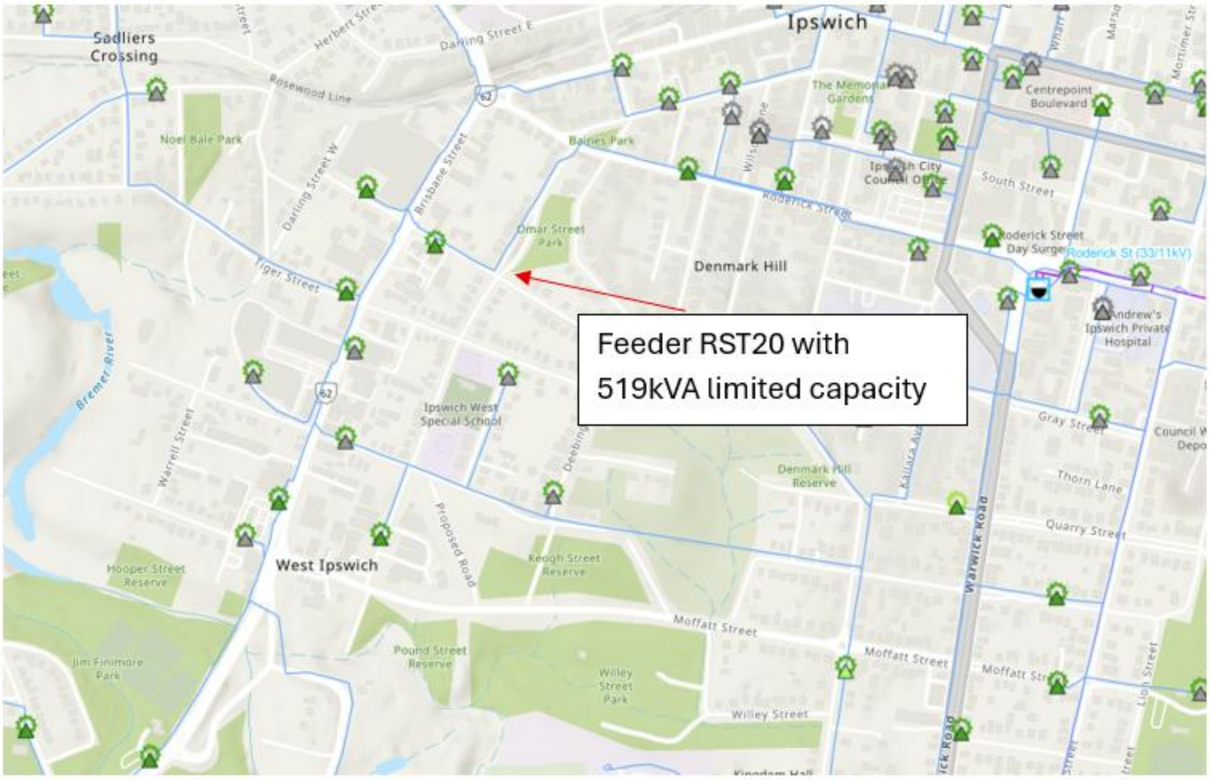
An energy sharing program in West Ipswich could deliver social benefits and provide capacity relief to the network.

Figure 8: Aerial view, West Ipswich




Looking more closely at the Distribution Network, the RST20A Feeder that meets the powerline on the main street near Bunnings is an 11kV line with a capacity of 5759kVA and a max historical load of 5259kVA. This means that any further load on this part of the network is limited. Indeed, Energex mapping indicates "Feeder Load Capacity Available" is 519kVA, meaning it will be difficult to obtain approval for more than a few hundred kW of additional demand. This limits new business or electrification of existing functions, such as transport (EV charge stations) or process heat.

Figure 9: Network map of the West Ipswich study area indicating constrained feeder.




Physical inspections, interviews, and spatial data analysis indicate the approximate composition of buildings in the West Ipswich area.

- 50 x Commercial & Industrial (sheds & office buildings)
- 1 x Bunnings Warehouse
- 1 x Retail Centre
- 180 x residential homes

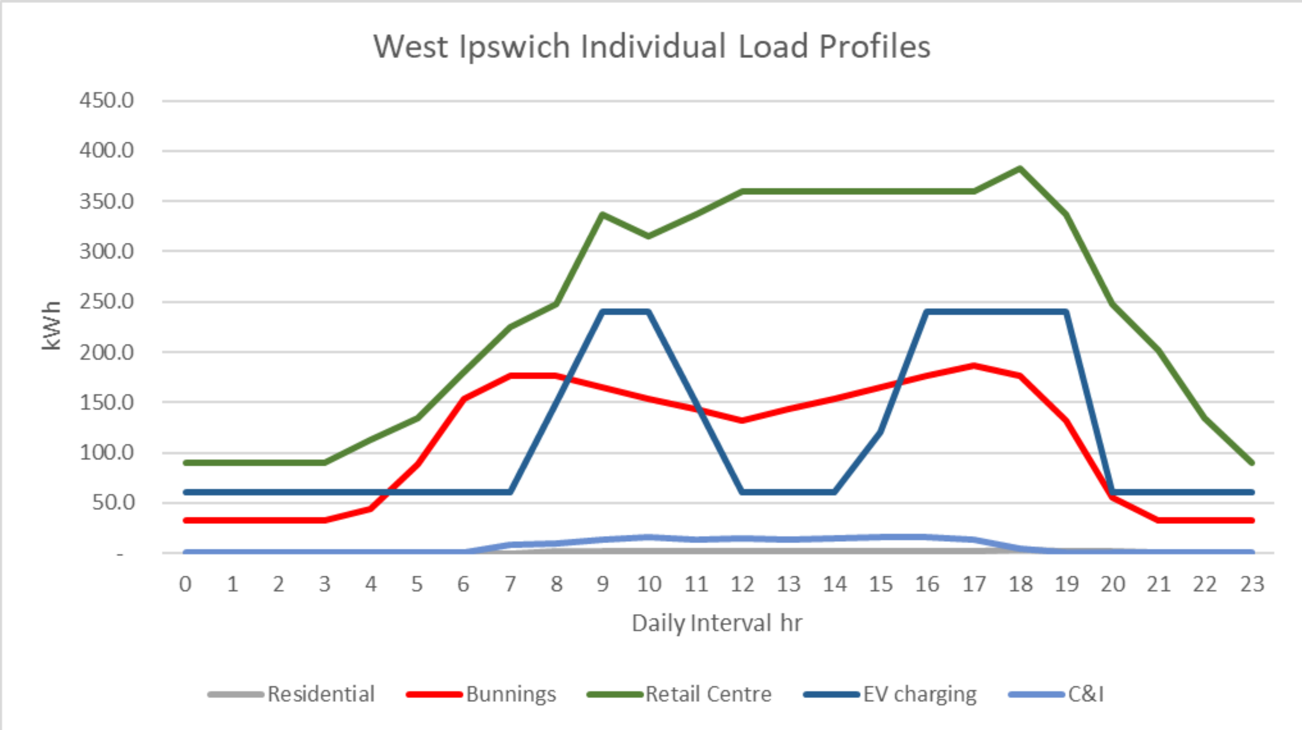
While there is minor EV charging infrastructure, there are no major charging stations yet. There is potential for EV charging in association with the shopping centre and Bunnings car parks which both are in proximity to large transformers that are underutilised.

Solar PV installation in West Ipswich is comparatively low. Only 15 of the 50 C&I premises were equipped with rooftop solar and ~30 of the 180 residential buildings, or ~17%. Consequently, solar PV has not been included in the modelled profile for residential housing in aggregate. Because of the high degree of uncertainty in C&I load and PV system performance, solar has only been conservatively incorporated into the modelled C&I demand profile.

We were not able to obtain data for Bunnings or the retail shopping complex; however, based on reported data and other sources, we were able to estimate demand. Bunnings does have rooftop solar, which has been factored into the modelled demand profile.

The chart below indicates the modelled profiles for the main identified loads. Note that EV charging has been added in a very minor capacity, with a profile based on eight high-speed chargers (equivalent to 1 Tesla Supercharger Station) used predominantly in the morning as people turn up to work and in the afternoon as people complete school runs, shopping, etc.

Figure 10: West Ipswich Load Profiles



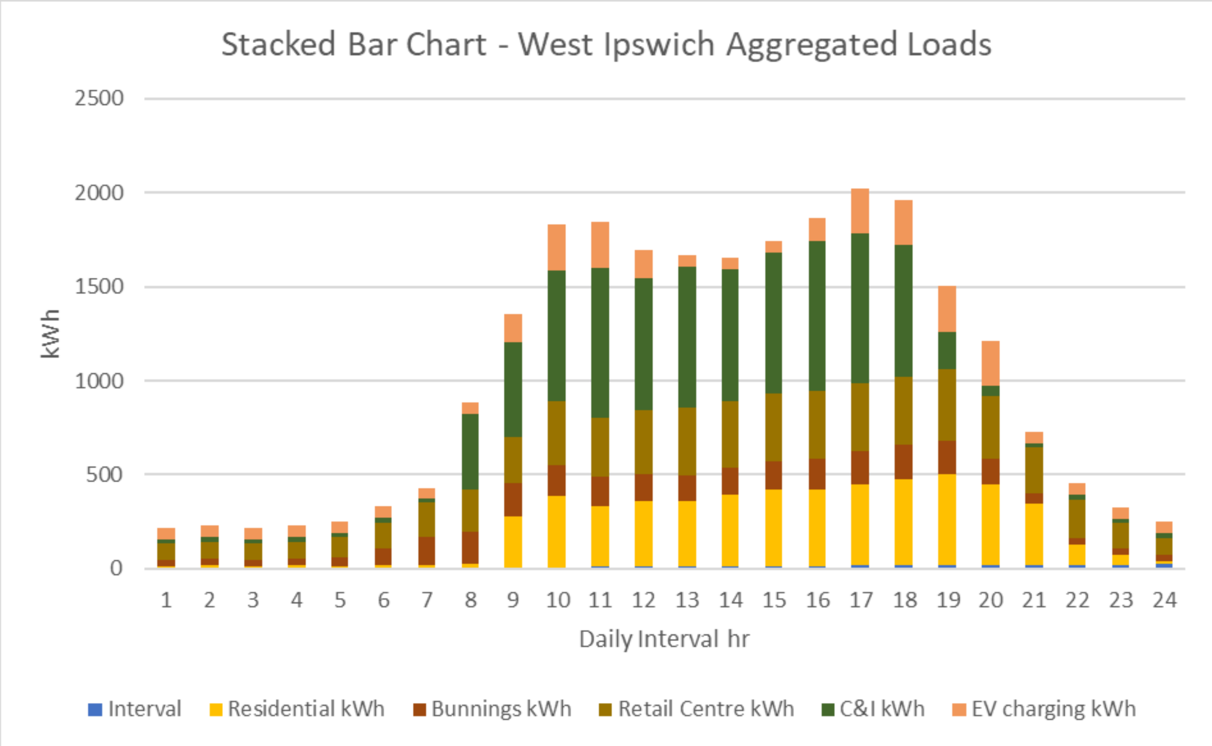

Combining the profiles in aggregate is indicated in the following table.

| Multiple | 180 | 1 | 1 | 50 | 1 | |
|---|---|---|---|---|---|---|
| **Interval** | **Residential kWh** | **Bunnings kWh** | **Retail Centre kWh** | **C&I kWh** | **EV charging kWh** | **Sum Profile kWh** |
| 0 | 11 | 33 | 90 | 20 | 60 | 216 |
| 1 | 16 | 33 | 90 | 30 | 60 | 232 |
| 2 | 11 | 33 | 90 | 20 | 60 | 216 |
| 3 | 16 | 33 | 90 | 30 | 60 | 232 |
| 4 | 11 | 44 | 113 | 20 | 60 | 249 |
| 5 | 16 | 88 | 135 | 30 | 60 | 332 |
| 6 | 11 | 154 | 180 | 20 | 60 | 445 |
| 7 | 16 | 176 | 225 | 400 | 60 | 927 |
| 8 | 270 | 176 | 248 | 500 | 150 | 1,404 |
| 9 | 378 | 165 | 338 | 700 | 240 | 1,891 |
| 10 | 324 | 154 | 315 | 800 | 240 | 1,838 |
| 11 | 351 | 143 | 338 | 700 | 150 | 1,688 |
| 12 | 351 | 132 | 360 | 750 | 60 | 1,657 |
| 13 | 378 | 143 | 360 | 700 | 60 | 1,646 |
| 14 | 405 | 154 | 360 | 750 | 60 | 1,733 |
| 15 | 405 | 165 | 360 | 800 | 120 | 1,855 |
| 16 | 432 | 176 | 360 | 800 | 240 | 2,028 |
| 17 | 459 | 187 | 360 | 700 | 240 | 1,996 |
| 18 | 486 | 176 | 383 | 200 | 240 | 1,565 |
| 19 | 432 | 132 | 338 | 50 | 240 | 1,252 |
| 20 | 324 | 55 | 248 | 20 | 60 | 732 |
| 21 | 108 | 33 | 203 | 30 | 60 | 449 |
| 22 | 54 | 33 | 135 | 20 | 60 | 307 |
| 23 | 16 | 33 | 90 | 30 | 60 | 232 |
| Totals | 5,281 | 2,651 | | 8,120 | 2,760 | 25,119 |

Note that the peak demand is modelled at just over 2,000 kWh, significantly under the peak usage on Feeder RST20A of 5,259 kWh indicated by Energex. This is because modelling only considers hourly and annualised averages. Peak demand typically occurs for a few hours per year when factors coincide, such as a heatwave during the busiest commercial period.

Presenting the information above in chart format reveals the relative importance of each component. Notably, despite the large geographical footprint and dominance of the larger stores, the aggregated impact of C&I loads dominates. This is followed by the residential load and the shopping complex. Another point of note is the importance of EV charging, which could be an unwelcome addition to the peak demand at the end of the day.

Figure 11: West Ipswich bar graph




Because of the low number of installed solar systems, while the small number of individual owners may resent low Feed-in Tariffs for export, West Ipswich does not have a 'problem' with excess solar energy. This represents both a limitation for immediately creating greater value through sharing excess solar energy internally *and* an opportunity for coordinated installation of more solar and battery systems.

In fact, West Ipswich analysis shows that growth in demand from new business or electrification is likely to depend on network infrastructure upgrades, *or* load reduction and shaping through coordinated Consumer Energy Resources.

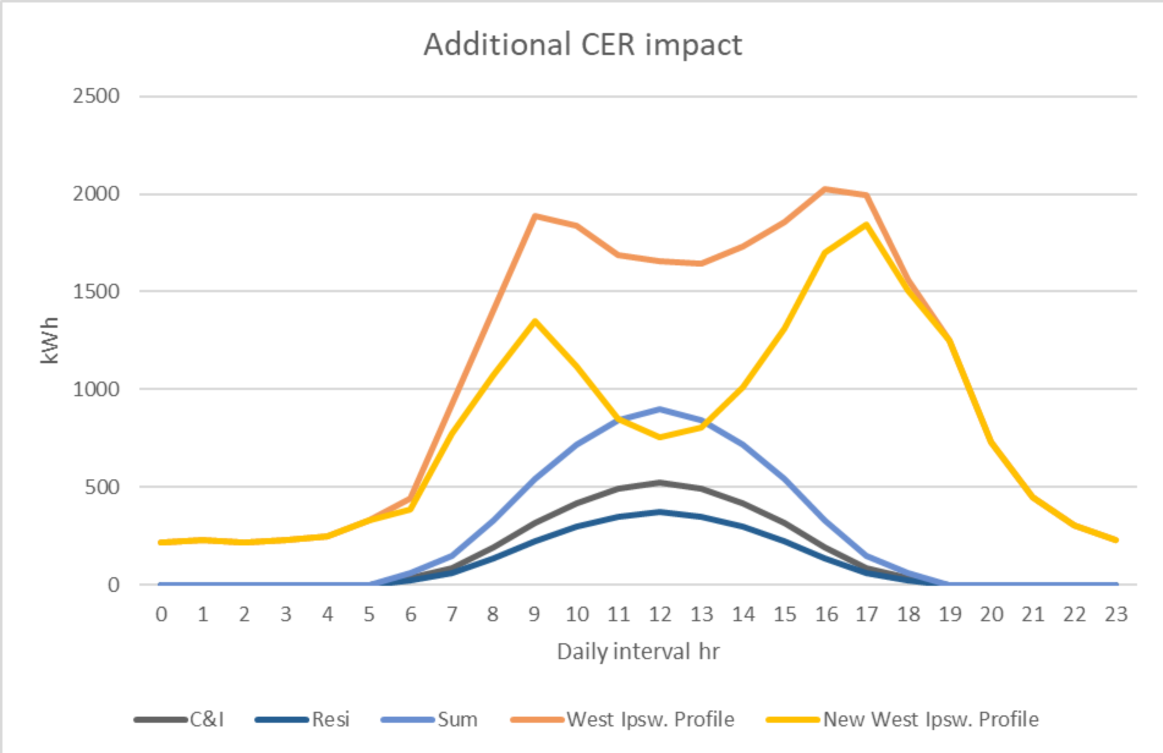
Critically, this analysis points to the likelihood that a virtual energy sharing project operating more widely than West Ipswich, but including it, could negatively impact local power infrastructure. If, for example, West Ipswich residents, small businesses or charities are recipients of other VPP participants' more affordable solar excess, this would encourage an increase in daytime demand, thereby increasing the risk of network overload, blackouts, etc.

West Ipswich provides a clear example of how an energy sharing program which increased installation of CER and provided on-going coordination can both unlock growth in demand and prevent the need for expensive network upgrades. Some analysis has been provided below to indicate the level of CER adoption that would be effective.

We considered the impact of all the remaining 35 C&I premises without existing solar being equipped with a 30kWp solar system and 20kW inverter/export limit (on average). We also considered a further 100 homes being equipped with a 7kWp solar system and 5kW inverter.

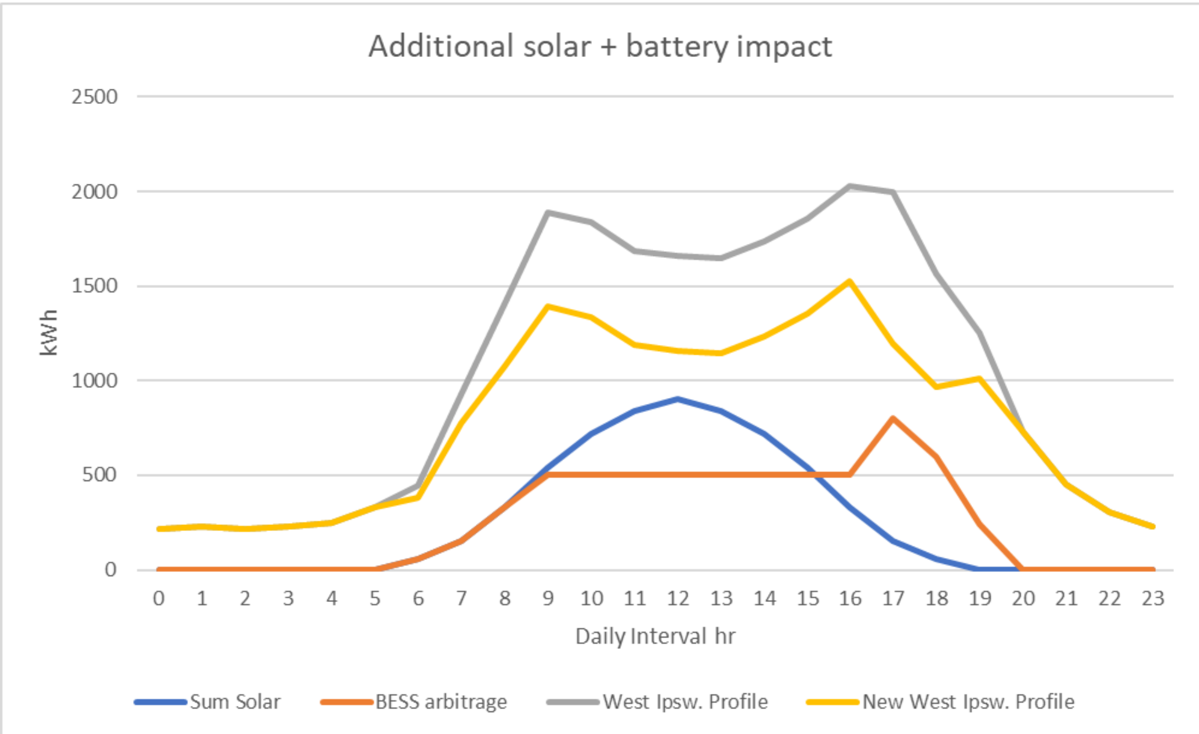
The following impact emerges on the West Ipswich aggregate load profile.

Figure 12(a):




As can be seen, additional Consumer Energy Resources (CER) significantly reduces daytime demand; however, it only marginally reduces peak evening demand. The addition of battery storage could address this, either in association with the solar installations (for the greatest individual benefit) or co-located with existing transformers, such as at Bunnings and the Shopping centre where capacity exists (for the greatest control and network benefit).

Figure 12(b):



The addition of batteries enables the solar contribution to be limited to 500kW and the excess to be stored for release after 5pm, in turn reducing the evening peak by around 500kW. The volume of energy shifted in this example is 1,600kWh. This impact could be achieved with the following indicative approaches.

- 135 Tesla Powerwall or equivalents. One of every solar installation modelled.
- 16 ~100kW kiosk BESS units. Associated with the larger businesses.
- 3 x 550kW BESS units. Possibly collocated with EV chargers adjacent to existing large transformers.

The financial value of commercial scale batteries is described in detail further in this report in Large Scale (commercial/organisational). In simple terms however we can consider the following for West Ipswich.

Daily sharing of 1,600kW excess could be valued at 7c/kWh as per Small scale model.

1600 x $0.07 x 365 = $40,880 per year

Daily export using BESS to highest value could achieve 15c/kWh average

1600 x $0.15 x 365 = $87,600 per year

The above equations are simplistic and conservative, and value created internally to the entity that installed each battery would be higher than this because of factors including peak demand tariff reduction. Additionally, this analysis does not incorporate the value of easing constraints in a part of the network or substation, such as deferring investment in upgrading the network to meet additional load which could be recognised through a DNSP novel or dynamic tariff structure.

The following table attempts to broadly quantify the economic impact of adding the 100 residential solar systems (5kWp solar + BESS) and 35 SME/C&I rooftop systems (20kWp solar + BESS) in West Ipswich.

| | Resi kWh | $ tariff | $ value | C&I/SME | $ tariff | $ value |
|---|---|---|---|---|---|---|
| Sum daily production | 2,575 | | | 3,605 | | |
| % self consumption | 40% | $ 0.30 | $ 309 | 60% | $ 0.32 | $ 692 |
| % solar export | 20% | $ 0.05 | $ 26 | 20% | $ 0.05 | $ 36 |
| % battery self consumption | 35% | $ 0.30 | $ 270 | 10% | $ 0.32 | $ 115 |
| % battery export | 5% | $ 0.15 | $ 19 | 10% | $ 0.15 | $ 54 |
| Total | | | $ 624 | | | $ 898 |
| Annual Total | | | $ 227,920 | | | $ 327,640 |

The assumptions around self-consumption reflect the difference in household and business demand profiles and the ability of both to minimise export through battery storage for later avoided self-consumption or export. While general in nature, the results indicate that provision of the solar + BESS would liberate significant economic value to residents and enterprises in the suburb of West Ipswich - $555,560 each year in the example.

Using simple 'rules of thumb' for installation of solar and BESS, the cost of such a program would be in the order of that described in the table below.

| Combined Resi + C&I | $/watt min | $/watt max | kW | Capex min | Capex max |
|---|---|---|---|---|---|
| Solar installation | $ 0.80 | $ 1.25 | 1,200 | $ 960,000 | $ 1,500,000 |
| Battery installation | $ 800 | $ 1,000 | 1760 | $1,408,000 | $ 1,760,000 |
| | | | Total | $2,368,000 | $ 3,260,000 |

Note: 1,200kW Solar installation is based on 100x5kW residential systems and 35x20kW C&I systems
1760 Battery installation is based on 90% round-trip efficiency for 1,600kWh available capacity.

If it is true that ~$560,000 annual value is released from an investment of $2.4 – 3.3 million then this represents a simple return of around 17%-23%. While these figures are generalised, they do demonstrate the base level economic development potential of increased CER in a single suburb.

If governments invested in such a program as an economic stimulus or 'cost of living' initiative, and community + C&I enterprise also subsidised the installations, then within a few short years there is foreseeably in excess of $500,000 annually available for local investment.

It is important to consider that the resulting 'New West Ipswich' demand profile that would be apparent at the Zone Substation occurs independently of the BESS delivery solution chosen. Because it doesn't matter from an electrical perspective, it becomes important to consider other factors driving how and where the BESS is rolled out.

Batteries in association with each solar installation deliver maximum individual benefit but may not always be practically or financially possible and may be more difficult to coordinate. BESS, in association with the existing large transformers at Bunnings and the shopping centre, for example, would have cost and operational efficiencies but may not deliver community or individual benefit. If tied to EV charging in a public place like the Bunnings or shopping centre car-park, public BESS could be very helpful to the network at certain times. In between could be a model of enterprise-level BESS which could assist in affordable energy for each SME but for which the wider community benefit may also be limited.

In each case, it is entirely possible that private funds assist in delivering public benefits, and this would need to be acknowledged through tariff structures, for example. The establishment and coordination of increased CER in the West Ipswich community would require clear and fair mechanisms for sharing the benefits beyond the immediate host benefits.

## Discussion

West Ipswich is representative of many subsections of Distribution Networks in Regional Australia. That is, areas containing mixed development that has consumed most of the spare peak capacity in legacy powerline infrastructure. Under current DNSP policy and procedures, this limits both the capacity for increased CER and/or increased load.

Because DNSPs consider worst-case scenarios and do not have an agreed approach to coordination of CER in a regional context, applications for businesses or individual organisations to install rooftop solar panels are frequently limited to small systems that are undersized and economically inefficient. Eg. A business may require 30kW to offset most of their daytime load but the network may only allow the installation of 5kW to avoid the possibility of overloading the network. In addition, the wider societal drive to 'electrify everything' is limited because the network is not capable of substituting electricity for energy from gas as process heat or energy from liquid fuels for transport.

Rather than prevent development, or expend large amounts of funding to upgrade existing network, increasing the amount of embedded generation in association with controllable batteries/inverters has the capacity to reduce pressure on the local network, increase network utilisation and add resilience to extreme events.

The West Ipswich Medium scale study shows that

1. Collaboration can release significant $value.
2. Increased and coordinated CER could assist in reducing network constraints and enabling development.
3. Deciding where and how to roll out the batteries is a non-trivial task that would require considered engagement and design in benefit sharing.

While the fundamental driver for businesses to be involved is self-interest/financial, there is a good sense of community in the district which could potentially be harnessed and reinforced by collaboratively providing support to a cause of common concern.

## Social Findings: Medium scale (residential, small mixed-use business and small commercial)

By coordinating residential and mixed-use businesses, the medium-scale model benefits from diverse energy needs, optimising energy sharing due to wide and varied usage patterns.

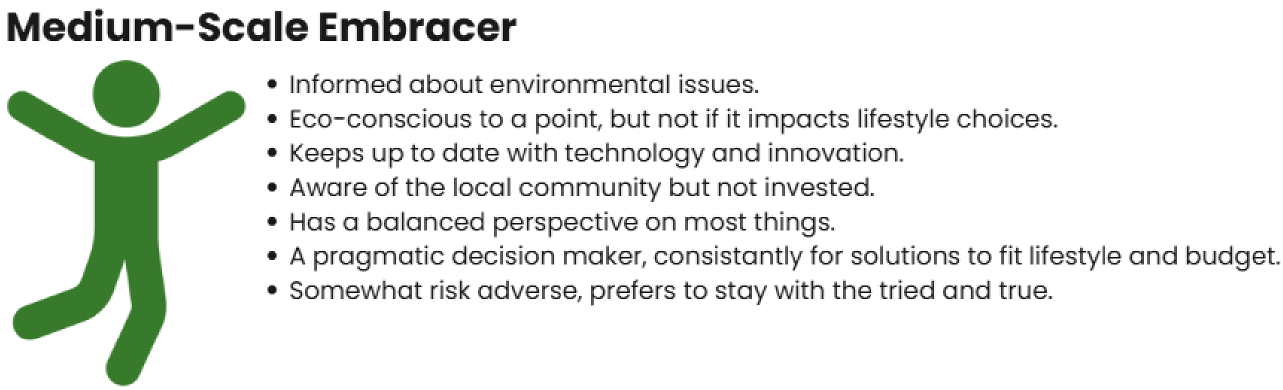
In addition to the attributes required for the small-scale model (financial stability, non-hostility to renewables/climate action, technical competence, ability to adapt energy use (load shift), medium-scale participants must also exhibit flexibility and adaptability, as adjustments to operational hours and processes may be necessary to optimise the energy-share opportunity.

Insights from RETC's engagement with local businesses revealed that while owners are interested in participating in energy-sharing, some challenges related to business hours and employee experience could be barriers. However, the potential to provide social benefits would serve as a motivating factor, enhancing their reputation and attracting more loyal customers.

Research findings from the medium-scale model indicate that implementing the medium model presents comparable challenges, particularly the need to attract, onboard, and manage a wide mix of customers.

The social enterprise's management demands must be carefully weighed against the benefits of energy sharing for this customer cohort. That said, the RETC concluded that the medium-scale model is technically viable, could provide substantial savings for this cohort and has the potential to deliver substantial benefits to the community and Network Operator.

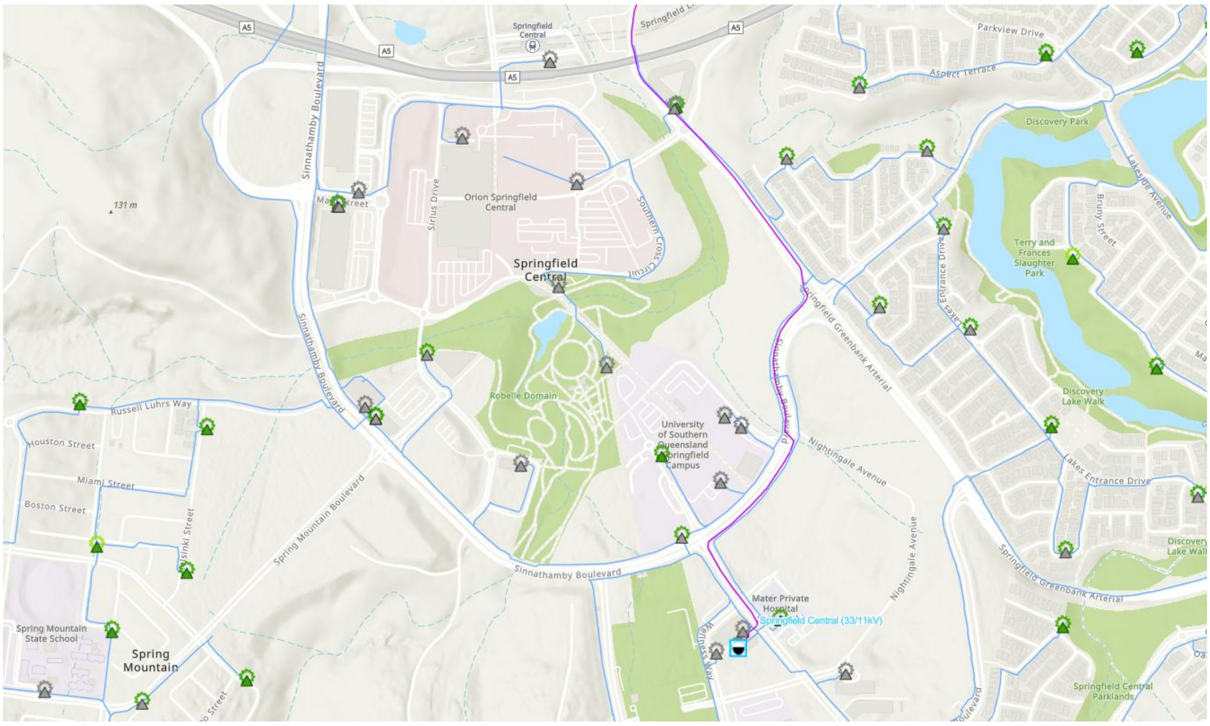
Figure 13: Ideal Customer Persona, medium-scale



# Large Scale (commercial/organisational)

The third energy sharing model examined interval data for large energy consumers supplied by CS Energy and Springfield Management. Data was also provided by Energex for the Springfield Central Zone Substation. Interval data for the Substation was mapped against the actual demand profiles of government-owned sites supplied by CS Energy and private sites supplied by Springfield Management. The ZSS appears to the right of centre in the bottom of the image below and is supplied by a 33kV powerline (represented in purple), which distributes power to Springfield via the 11kV Feeder PDBSFC12.

Figure 14

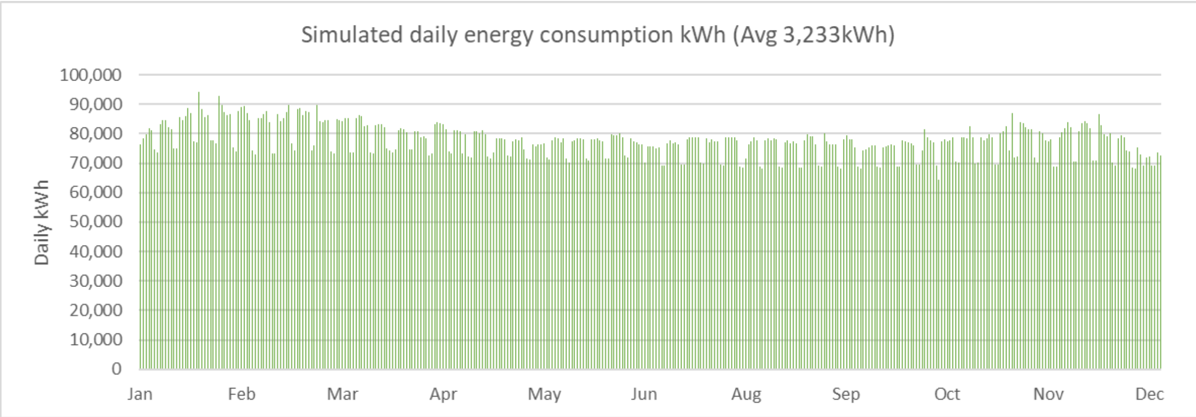



## Load characteristics

The list of sites is provided below.

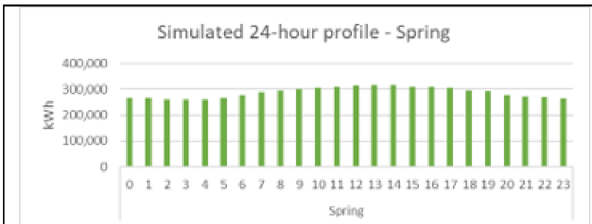
| SITE | NAME | ADDRESS |
|---|---|---|
| 1 | Springfield Lakes State School | 63 Springfield Lakes Blvd. |
| 2 | Springfield Central State High School (1) | 90 Parkland Drive, Springfield |
| 3 | Springfield Central State High School (2) | 90 Parkland Drive, Springfield |
| 4 | Spring Mountain State School | 56 Dublin Ave, Spring Mountain |
| 5 | Springfield Police Station | 112 Augusta Parkway, Augustine Heights |
| 6 | GE building | 6 Yoga Way, Springfield Central |
| 7 | Shopping precinct | 118 Augusta Parkway, Augustine Heights |
| 8 | Polaris Data Centre | 4 David Henry Way, Springfield Central |
| 9 | Springfield Tower | 145 Sinnathamby Blvd, Springfield Central |
| 10 | Polaris Data Centre | 15 Barry Alexander Drive, Springfield Central |
| 11 | University of Southern Queensland | 37 Sinnathamby Blvd, Springfield Central |
| 12 | University of Southern Queensland | 37 Sinnathamby Blvd, Springfield Central |
| 13 | Brookwater Golf & Country Club | 30 Tournament Drive, Brookwater |
| 14 | Springfield TAFE | 25 Sinnathamby Blvd, Springfield Central |
| 15 | Substation | 4 Augusta Parkway, Augustine Heights |

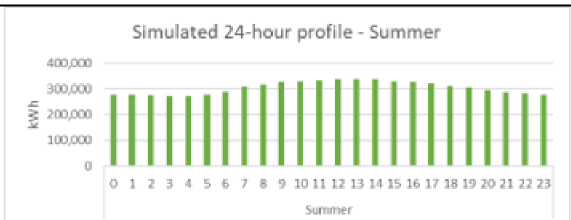
The aggregated interval data is presented with increasing resolution in the following section.

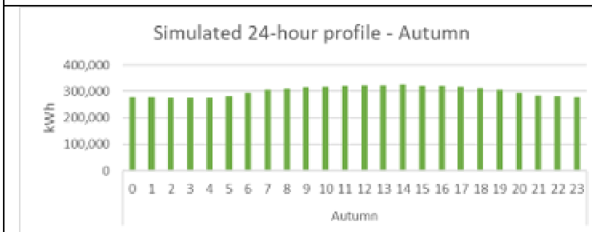


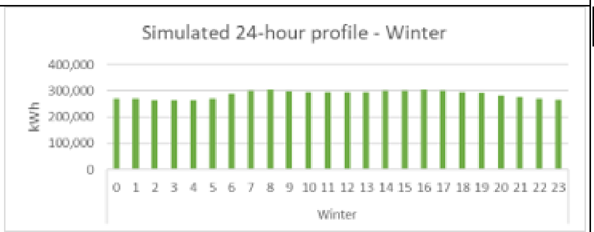

Of note in the chart above is the 'sawtooth' profile that corresponds to weekdays, reflecting the presence of education facilities in the sample loads. It is also noted that the profile is remarkably constant across the year with little apparent seasonal variation.

Looking at the average daily profile across the seasons also reveals a relatively flat and consistent profile.



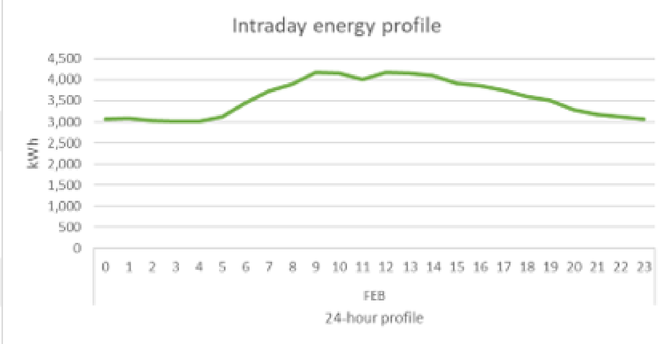
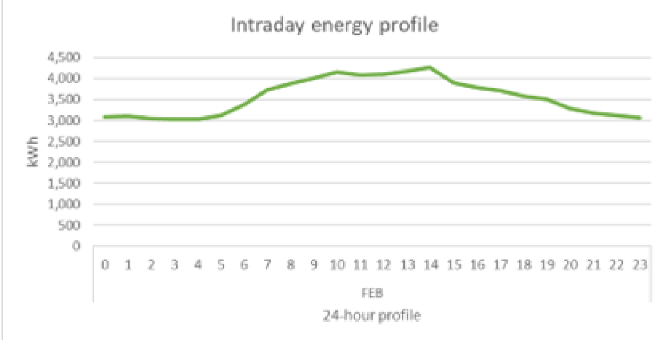



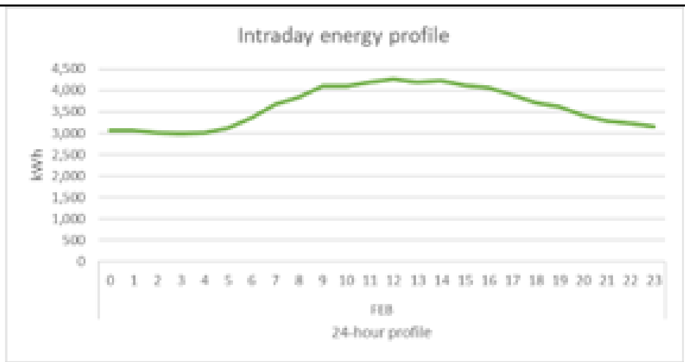
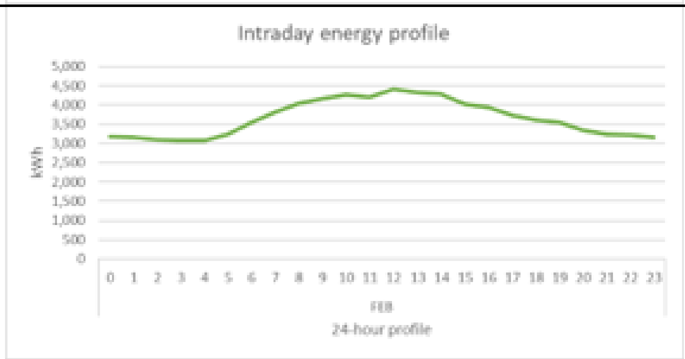
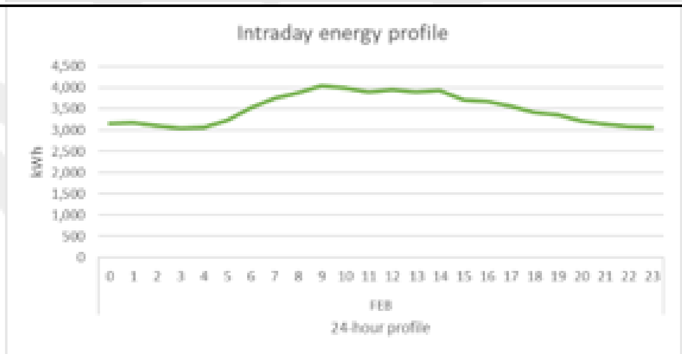
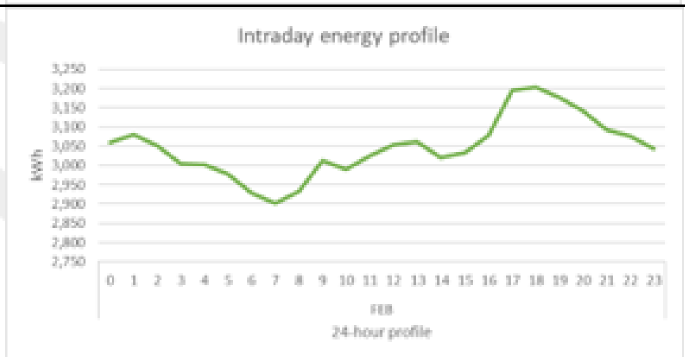
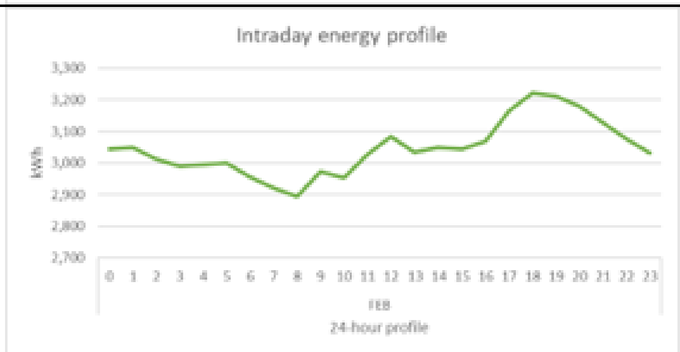



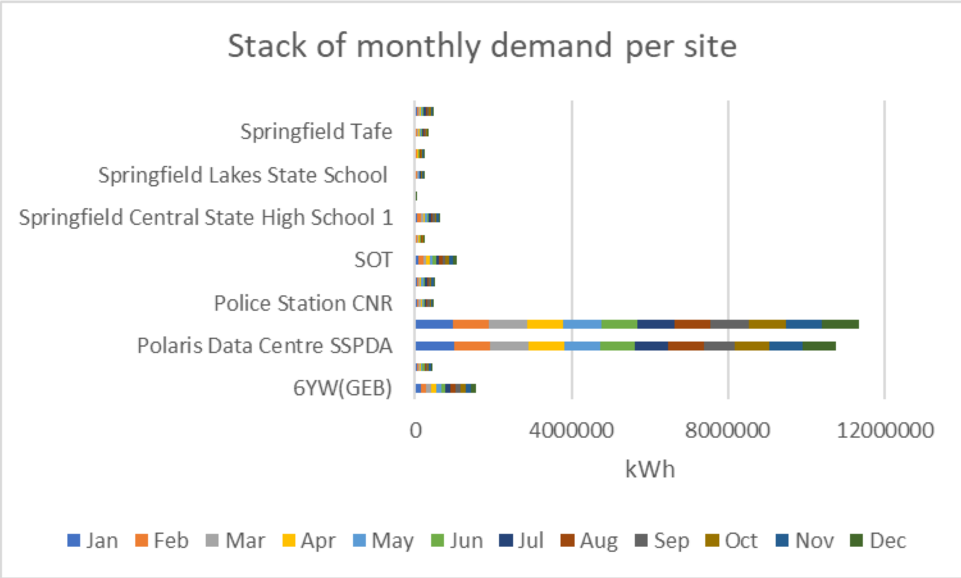

However, these averages lose granularity that can be important, such as the incidence of peak usage which could correspond with problems or opportunities in the network.

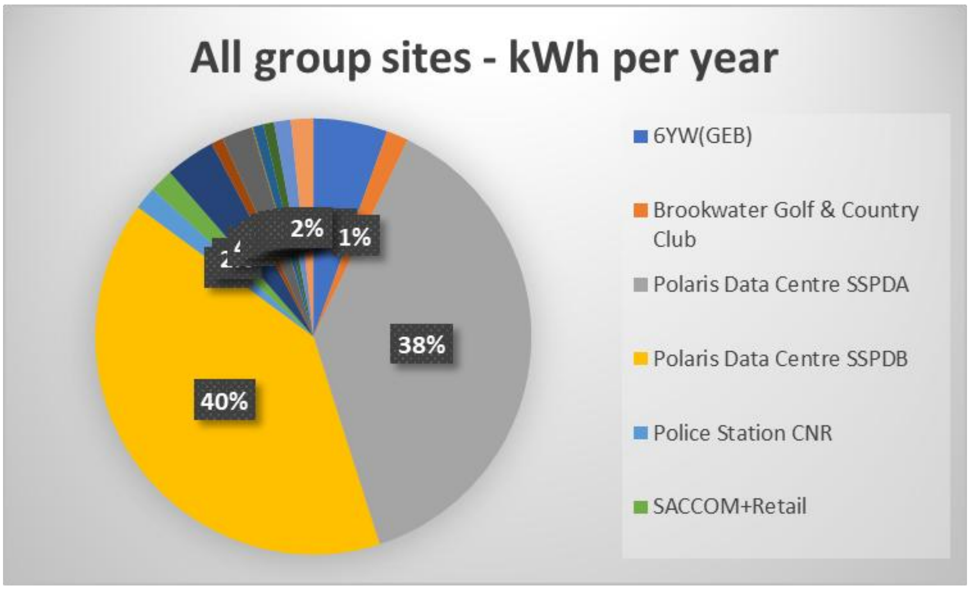
We examined 7 days in February corresponding with high demand spikes in the annual profile chart.

| | |
|---|---|
| Monday 12th February 2025 Indicates an overnight 'resting' demand at around 3,000kW, rising to around 4,000kW during school/office. Note the small 'divot' around the middle of the day – due to the impact of rooftop solar. |   |
| Tuesday 13th February 2025 Standard weekday shape but with a noticeable peak and decline at 2pm. There was no rainfall of particular heat that day so the cause is hard to imply. |   |

| | |
|---|---|
| Wednesday 14th February 2025<br>Standard weekday shape |  |
| Thursday 15th February 2025<br>Standard weekday shape |  |
| Friday 16th February 2025<br>Standard weekday shape |  |
| Saturday 17th February 2025<br>Radical change in load shape and much reduced demand, apart from at 18:00. Lowest demand between 05:00 and 08:00. |  |
| Sunday 18th February 2025<br>Similar profile to Saturday. The reduced daytime demand is on account of both reduced activity and rooftop solar PV. |  |

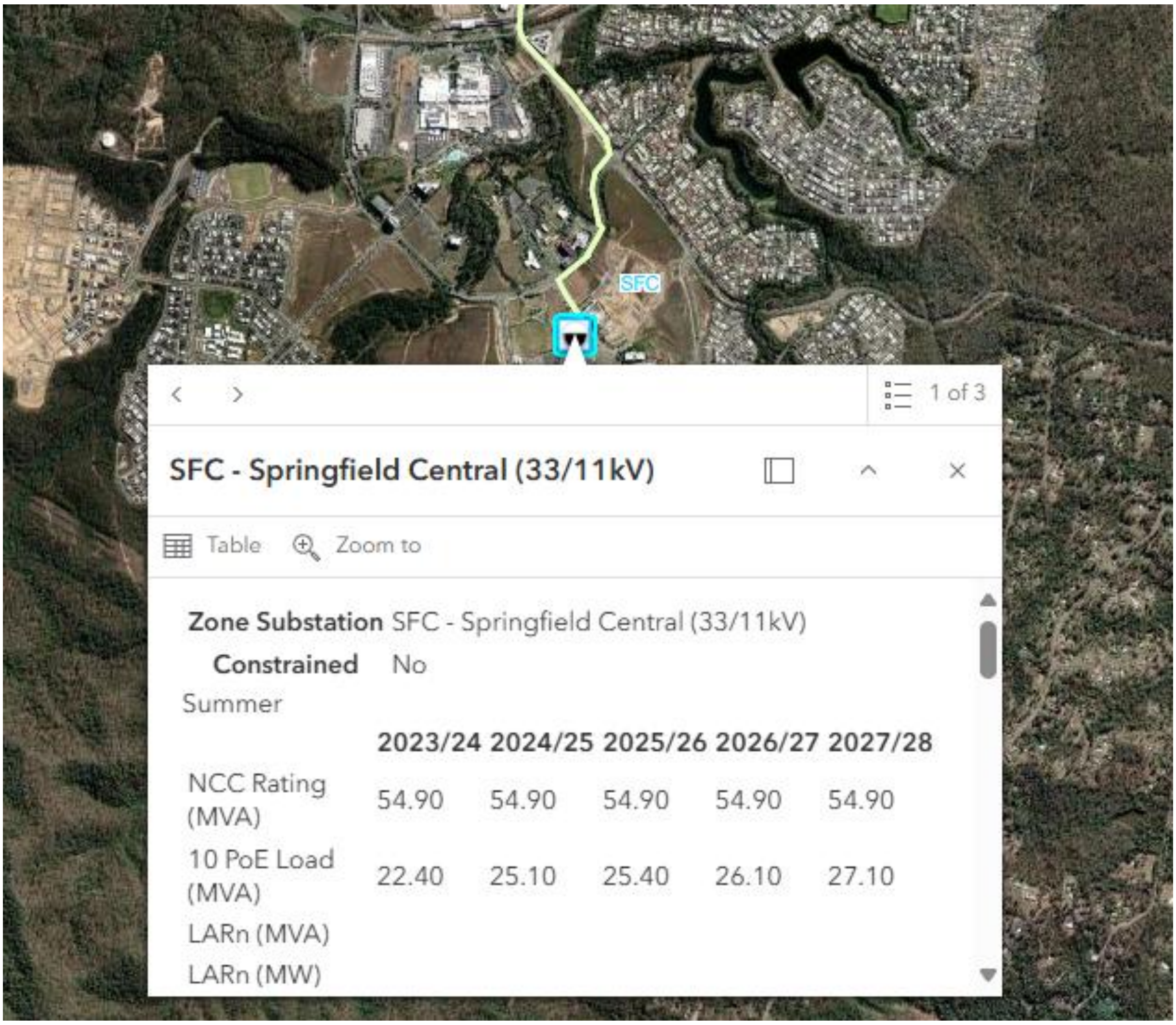
In order to understand why the annual and daily profile of the bundle of sites was relatively flat, it is useful to view aggregate demand of each site in comparison. The bar chart below shows that one site (with two NMIs) accounts for the vast bulk of demand. Presented as a pie chart, we can see that 78% off annual demand is due to the data centre and data centres have a very constant demand.




## Springfield Zone Substation Profile

To understand the potential impact of an energy sharing program in Springfield, it is essential to consider the characteristics of the relevant ZSS. The Energex Distribution Annual Planning Report excerpt below shows that the ZSS is not constrained. On account of being sized to accommodate future development, the substation is currently loaded at less than 50% capacity, although this is expected to increase over time.



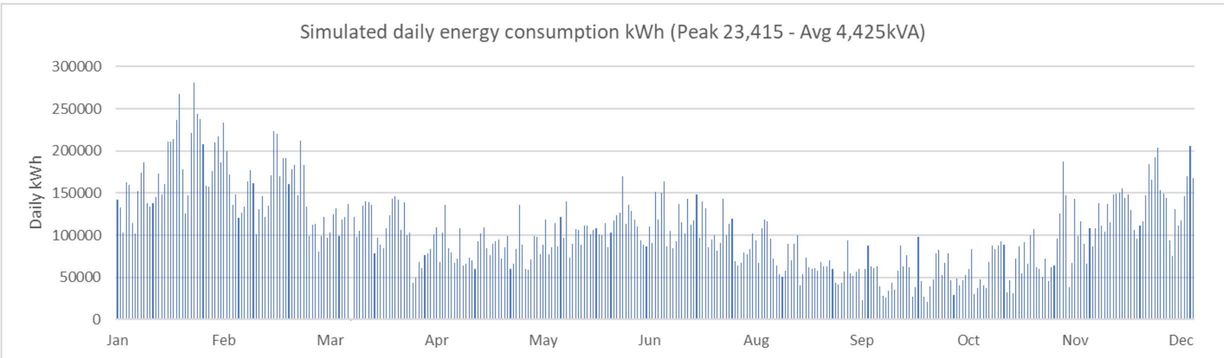

In the context of this report, the finding that this region has no obvious constraint to further development and increased load (such as in West Ipswich) is important. This implies that drivers for participating in a virtual energy trading mechanism do not include values around easing strain on the network.

In this case, financial and social drivers are more likely to dominate decisions around participation in an energy sharing program. Nonetheless, we have examined the ZSS data and imposed an artificial limitation to demonstrate the problems and opportunities that exist elsewhere and could well appear in Springfield with increased development and electrification.

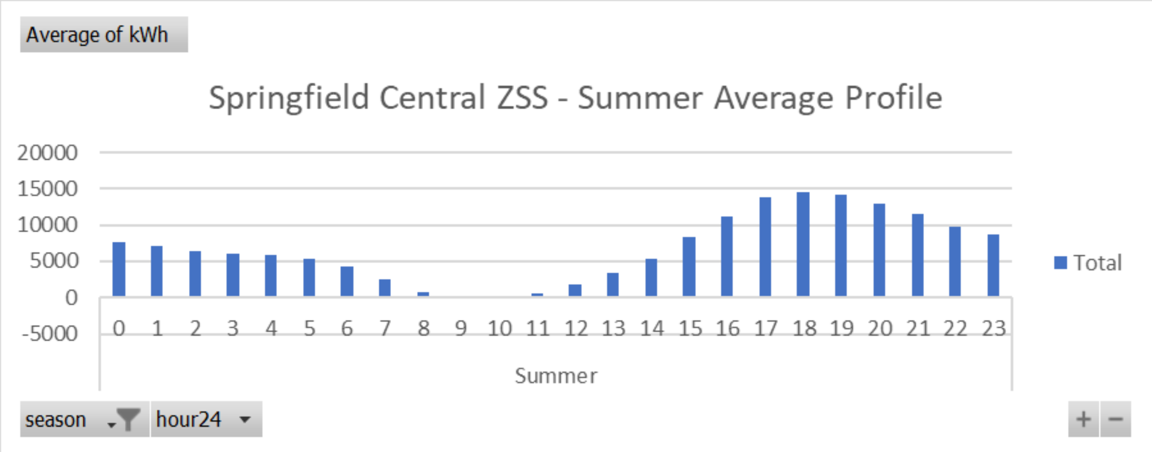
The DAPR excerpt below includes the Cooneana ZSS which is marked in red to indicate constraint at 26.3MVA.

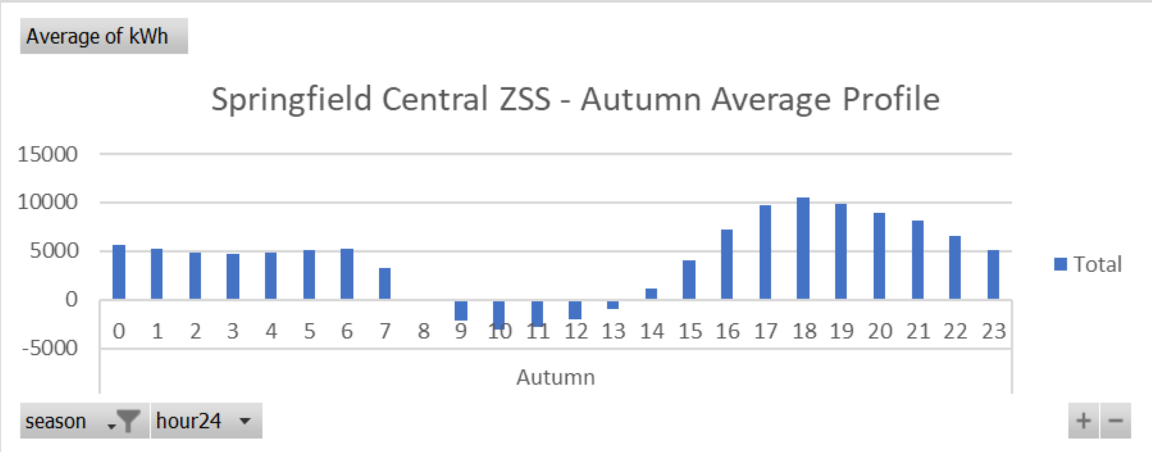
Energex DAPR 2023

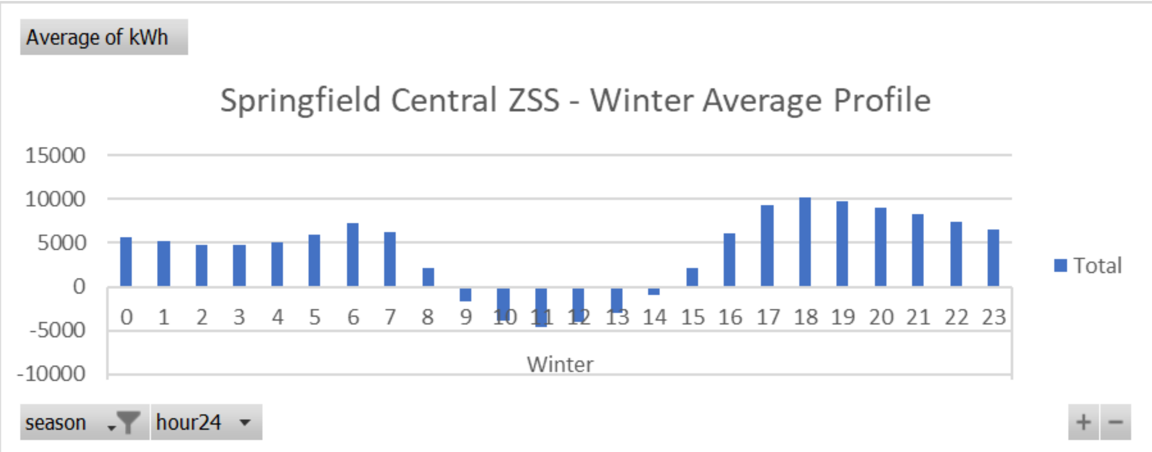

The following chart displays the demand profile seen by the Springfield Central ZSS in 2024. Note the significantly more pronounced daily and seasonal variability than in the study subset of loads above. This is anticipated as loads for building space cooling dominate the summer months. Moderate climate conditions in spring and autumn result in minimal demand and a there is an increase in winter demand due to longer nights (lighting) and some space heating.

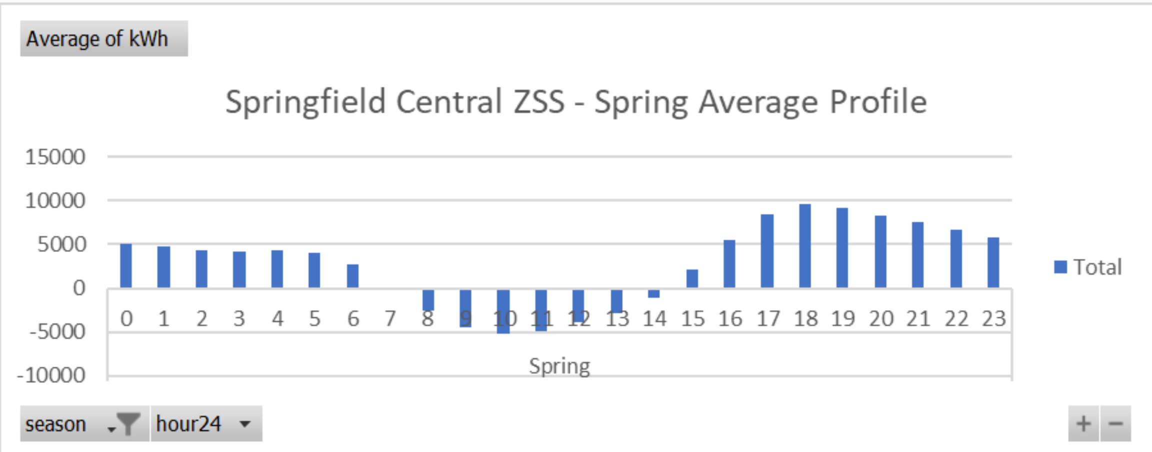



The profile indicates that, if there were a constraint, it is most likely to occur in the peak summer months. It is useful to drill into this further because constraints often only occur for a short period – a few hours. The following table displays average consumption for each of the 24-hourly intervals over a season.


Average of kWh
Springfield Central ZSS - Summer Average Profile
20000
15000
10000
5000
0
-5000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Summer
Total
season
hour24


Average of kWh
Springfield Central ZSS - Autumn Average Profile
15000
10000
5000
0
-5000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Autumn
Total
season
hour24

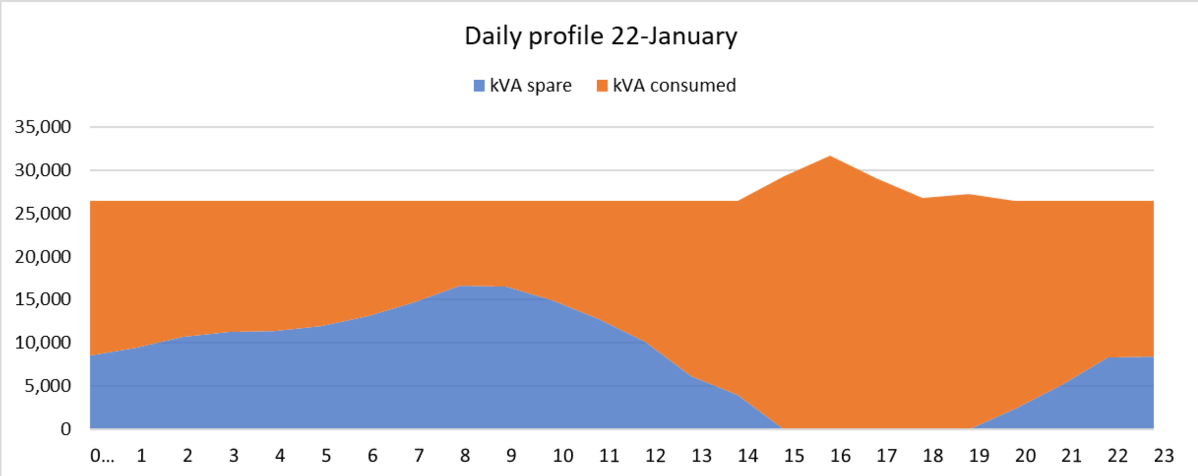

Average of kWh
Springfield Central ZSS - Winter Average Profile
15000
10000
5000
0
-5000
-10000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Winter
Total
season
hour24


Average of kWh
Springfield Central ZSS - Spring Average Profile
15000
10000
5000
0
-5000
-10000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Spring
Total
season
hour24

It is immediately apparent that embedded solar within the homes and buildings connected to the ZSS is capable of meeting and exceeding daytime load - to the extent that for most days of the year there are periods when the ZSS 'runs backwards', feeding energy into the national grid.

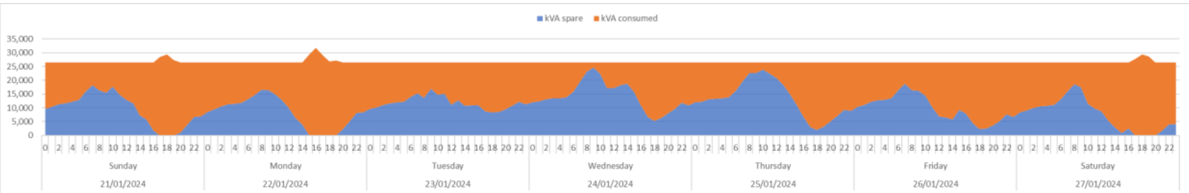
Also apparent is that peak consumption is typically around 18:00 or 6pm.

For the sake of demonstration, let's consider that the Springfield ZSS was installed at the same capacity as Cooneana—i.e., 26.4MVA. By choosing a day in January and visually representing the ZSS load as inverted, we can clearly see instances of exceeding ZSS capacity and also where more load or less load would be desirable.




This chart shows that 8 – 9 am would be the optimal time to introduce more load – such as EV charging or BESS charging – and 3 – 8pm would be the optimal time to reduce load – such as meeting site demands with BESS or switching certain devices off.

If we examine the week of the 22nd we see some variability but the same basic pattern emerging.




We can also interrogate on an annual basis, the number, type and quantum of ZSS exceedance events.

| Row Labels | Over threshold by Weekday |
|---|---|
| Sun | 6 |
| Mon | 8 |
| Tue | 3 |
| Wed | 0 |
| Thu | 0 |
| Fri | 8 |
| Sat | 4 |
| **Grand Total** | **29** |

| Row Labels | Over threshold by Month |
|---|---|
| January | 15 |
| February | 10 |
| March | 0 |
| April | 0 |
| May | 0 |
| June | 0 |
| July | 0 |
| August | 0 |
| September | 0 |
| October | 0 |
| November | 0 |
| December | 4 |
| **Grand Total** | **29** |

| Row Labels | kWh Overload |
|---|---|
| January | 27,151 |
| February | 11,931 |
| March | 0 |
| April | 0 |
| May | 0 |
| June | 0 |
| July | 0 |
| August | 0 |
| September | 0 |
| October | 0 |
| November | 0 |
| December | 2,145 |
| **Grand Total** | **41,228** |

This analysis enables us to quantify the interventions that would have enabled the ZSS to run in that period without any exceedance events. The events all occur from December to February in the highest solar producing months and we already know that there is an excess of solar energy available in the area – although not from the cohort grouping. For this reason, we can simply consider the volume of energy that would have been sufficient to meet the demand and imagine that this energy was 'soaked up' by a battery for later release when needed.

**Exceedance event volume**

- January. 15 days totalling 27,151kWh. Ie approximately 1,800kWh per day.
- February. 10 days totalling 11,931kWh. Ie approximately 1,200kWh per day.
- December. 4 days totalling 2,145kWh. Ie approximately 540kWh per day.

Taking the maximum requirement of 1,800kWh per day and noting that this must be delivered to the grid typically in a period from 2 – 4 hours (5pm-9pm), we can estimate that the BESS required has a minimum discharge capacity of 900kW. Indicatively, a 1MW / 2MWh BESS would be capable of alleviating the worst constraint – even though this would be 'oversized' for the rest of the year.

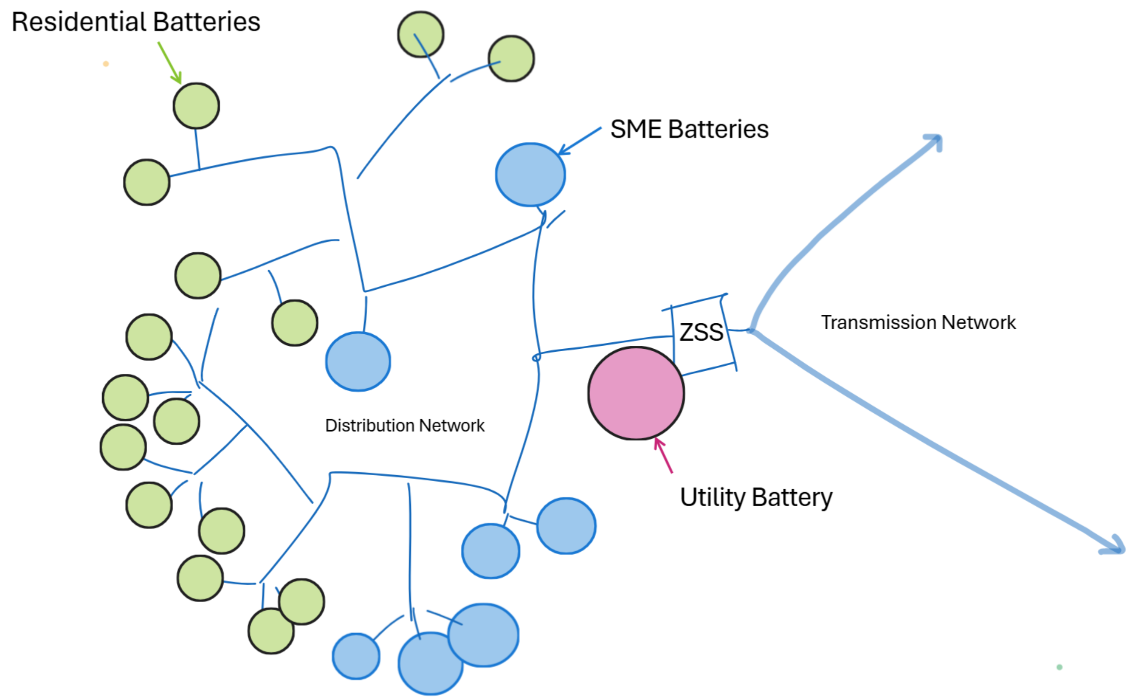
## Approach to implementing BESS capacity

It is important to note that changing the nature of generation or implementing large scale utility storage in the Transmission Network will have no impact on alleviating a local Distribution Network constraint at the ZSS or Feeder powerline level.

The image below shows how the Distribution Network can be viewed like a tree with the trunk connected to the Transmission Network via a Zone Substation, then larger branches leading to heavier loads or groups of small branches and twigs that ultimately connect to households. Batteries installed anywhere in *this* network will have an impact on the amount and timing of electricity flowing though the ZSS.

From a Regional Development perspective the question becomes, how best to install batteries in a way that optimises local socio-economic impact. This corresponds to the 3 scenarios we have considered for this report, small, medium and large.

| Model | Participant Cohort | Indicative BESS size | Key to figure |
|---|---|---|---|
| Small | Mainly residential or small business | 5 – 15kWh | Green dot |
| Medium | SME or C&I such as trades and light manufacturing | 50 – 250kWh | Blue dot |
| Large | Large industrial facilities or grid-connected BESS provider | 1,000 – 5,000kWh | Pink dot |




In broad terms the following guide can be applied for the capital cost associated with each approach to providing at least 1,800kWh storage.

| Application | No. units | kWp | kW sum | Install $/kWh | Install $/kW | Capex |
|---|---|---|---|---|---|---|
| Houseold 12kWh | 167 | 5 | 833 | $ 1,000 | $ 1.20 | $ 2,000,000 |
| Enterprise 150kWh | 13 | 70 | 933 | $ 800 | $ 0.86 | $ 1,600,000 |
| ZSS 2000kWh | 1 | 1000 | 1000 | $ 500 | $ 0.50 | $ 1,000,000 |

Modelling was completed for each BESS application to provide an indication of the value that may be derived in each scenario.

## Residential BESS

The operational and financial performance of residential batteries is primarily geared to reducing the amount of electricity purchased from the network, particularly in peak demand times. While reducing the amount of electricity exported results in the loss of a few cents revenue, avoidance of purchase saves around 30c/kWh and in addition a household battery can reduce the overall peak demand which reduces this component of the bill too. Finally, residences can participate in Virtual Power Plant programs managed by Retailers that will aggregate the performance of many household batteries to provide grid services.

Solar Quotes publishes a table comparing the various VPP plans available in QLD and while there are 16 at the time of writing with a wide range of structures, most offer sign-up credit to join of around $200 and then around $1/kWh for each VPP event. According to SolarQuotes and Energy Matters, it is reasonable for consumers to expect between $300 and $500 value in bill credits per year, specifically from VPP participation.

Because of variability in context and demand it is difficult to determine an average figure for bill savings to a household with a battery installed. However, based on an internal review of market offers and the experience of friends and associates, it seems reasonable to consider that a family of four in an average suburban house will save at least $1,500 per year from the installation of solar + 10kWh battery storage.

The value a Retailer makes out of each consumer is very difficult to determine however a 2022 report by the Institute of Energy Economics and Financial Analysis indicated that margins are generally "quite thin" do to operational costs and that most of the value is passed on to consumers. Taking the mid-range of the VPP credit shown above ($400) per year and applying a 20% retailer margin indicates about $80 of value to the Retailer.

In the context of Springfield and this study, it is technically feasible to coordinate the identified 167 household battery installations to reduce solar export by about 2,000kWh and then provide 1,800kWh of electricity between 5pm and 7pm, thereby reducing the peak in electricity flowing through the ZSS.

In approximate terms, the value created by meeting the required exceedance event demand with household batteries is provided in the table below.

| BESS installed | Resident value | Res. VPP $ | Retailer margin | Total |
|---|---|---|---|---|
| 12kWh | $ 1,500 | $ 400 | $ 80 | $ 1,980 |
| 167 | $ 250,500 | $ 66,800 | $ 13,360 | $ 330,660 |

## Commercial BESS

Results for commercial systems vary widely in response to load shape and size and tariff structure. For this reason, actual modelled results have been rounded to an indicative range as per the table below. The table contains ranges for annual revenue from Peak Demand reductions (as reduced cost to the load owner), NEM arbitrage from trading energy at wholesale prices and FCAS revenue for participating in network power quality markets (both revenue streams facilitated by a Retailer).

| Min | Max | 1000 kW installed | | |
|---|---|---|---|---|
| $ 50 | $ 100 | Peak DR | $ 50,000 | $ 100,000 |
| $ 15 | $ 20 | NEM Arbit. | $ 15,000 | $ 20,000 |
| $ 100 | $ 250 | FCAS | $ 100,000 | $ 250,000 |
| $ 165 | $ 370 | Sum. | $ 165,000 | $ 370,000 |
| -$ 15 | -$ 35 | O&M | -$ 15,000 | -$ 70,000 |
| $ 150 | $ 335 | Net | $ 150,000 | $ 300,000 |

If it is true that 13 units can be installed for $1.6 million as indicated above, then in simple terms the 'payback' period for this approach ranges from 10.7 to 5.3 years. Note this payback is for battery only. The addition of behind-the-meter solar in combination with the battery significantly reduces payback periods.

## Utility scale BESS

A critical component to financial success for utility connected BESS without integrated solar generation is the difference between the amount paid for energy to fill the battery and the amount earned for emptying it! FCAS revenues have been an important component to BESS revenue to date, around 50% according to a 2024 report by Alvarez and Marshal, but this is projected to fall substantially over the coming years as more BESS enters the market and buffers the tendency for wild fluctuations in pricing.

In this case study a BESS of 2,000kWh has been chosen to alleviate the evening peak demand peak of 1,800kWh on the ZSS. Examining arbitrage in isolation reveals the following, noting that two purchase cost figures are indicated: 5c/kWh if the energy to charge the BESS was 'soaked up' from residential solar excess and there were no network fees, and 30c/kWh if the energy was simply purchased from the grid via a standard connection agreement.

| | kWh/d | kWh/yr | $ Value/yr |
|---|---|---|---|
| BESS Capacity | 1,800 | 657,000 | |
| Purchase cost | $ 0.05 | 657,000 | -$36,135 |
| Purchase cost | $ 0.30 | 657,000 | -$216,810 |
| | | | |
| Sale price | $ 0.15 | 657,000 | $ 98,550 |
| Sale price | $ 0.25 | 657,000 | $ 164,250 |
| Sale price | $ 0.35 | 657,000 | $ 229,950 |

Sale price is indicated at 3 values representing the lower limit of $150/MWh, which is close to the future NEM average pricing, and 2 higher ranges representing the potential average achieved by exporting during high wholesale price periods and events.

In the table below, the resulting revenue is compared against the Capex of $1,000,000 for a single large BESS to provide a simple 'pay back' indicator.

| Ave sale value | Ann. Margin no network fees | Simple Payback | Ann. Margin with network fees | Simple Payback |
|---|---|---|---|---|
| 15c/kWh | $ 134,685 | 7.4 | -$118,260 | -8.5 |
| 25c/kWh | $ 200,385 | 5.0 | -$52,560 | -19.0 |
| 35c/kWh | $ 266,085 | 3.8 | $ 446,760 | 2.2 |

This table clearly indicates the critical nature of network fees and buy/sell price differential in BESS financial performance. FCAS Revenue and capacity payments would improve the business case and if we accept that this amounts to ~40% of project revenue in the medium term, then payback periods will be significantly shorter than indicated above. For the 15c/kWh base case this moves the revenue from ~$135,000 to ~$190,000

Finally, it is possible that in specific parts of the Distribution Network, additional fees and or tariff relief can be garnered from the Network Service Provider. Some NSPs are trialling Dynamic Tariff Agreements that create an incentive to operate in a way that reduces peaks and fills troughs in daily demand profiles. Additionally, if it can be shown that the modified approach pushes back the need for network upgrades, then a mechanism called the Regulatory Investment Test provides for NSPs to pay project proponents in recognition for not having to fund a large infrastructure project.

Another way of estimating likely value of a grid connected battery is to examine reported performance as recorded by AEMO in their Quarterly Energy Dynamics reports. As reported by George Heynes in Energy Storage News (Feb 2025), BESS in the NEM averaged $148,000/MW in 2024. Interestingly, “The top performing BESS in the NEM was Genex Power’s 50MW/100MWh Bouldercombe battery in Queensland, which earned AU$336k/MW over the year, 227% above the average.” And “… a 4-hour battery that starts operations in 2026 is projected to generate an average annual revenue of AU$263,000/MW over its lifetime. Batteries in Queensland are expected to lead at AU$281,000/MW.”

## Discussion.

All three approaches modelled in Springfield to address the same network constraint and/or energy sharing opportunity have arrived at broadly comparable financial values.

- Household - $330,600 p.a.
- SME/C&I - $150,000 p.a to $300,000 p.a
- Utility scale - $150,000 p.a to $300,000 p.a

In order to evaluate which approach might deliver the optimal outcome from a Regional Development perspective we have considered the following.

| roject | Potential $ value liberated | Incentives/rebates | Ownership | Community | Complexity | Benefit |
|---|---|---|---|---|---|---|
| Household | $ 330,000 | Yes. | Private | Low | Simple | 90% to home owner |
| SME/C&I | $ 300,000 | Not really | Mixed | Medium | High | 70% to owner, 30% to community |
| Utility scale | $ 300,000 | Possibly | Entity | Low | Moderate | Contingent on DNSP |

The following section raises potential pros and cons for each approach at a high level.

Implementation – Household.

- Appeals to current owners of homes with solar.
- Self-interest, financial incentives and social normalisation will support uptake.
- Requires collaboration with Retailer (which may require larger scale and/or limit flexibility)
- May be difficult to ‘sell’ community benefit at the expense of personal benefit
- $ Multiplier effect related to personal income
- Large number of installs to establish
- Normalised, fast process from decision to install and operation
- Little requirement for Operation and Maintenance

Implementation – SME/C&I.

- Clear value to business reflected in business tariff
- Potential challenge designing, receiving approval and installing BESS
- Potential ownership/permission challenges
- Potential issues with existing retail contracts or embedded network constraints
- Small number of installs to establish
- Bespoke solution and installation for each business/NMI
- Small amount of Operation and Maintenance required
- $ Multiplier effect related to commercial output, investment and jobs

Implementation – Utility scale.

- Site selection can be problematic due to ownership/security/safety issues
- Complex, expensive and time-consuming network application process
- Financial performance and benefit to community contingent on DNSP tariff
- Potential high benefit to DNSP in constrained circumstances.
- If configured as HV customer, significant Operation and Maintenance requirements.

For RDA there is not a ‘natural fit’ to be ‘competing’ in the residential space, which is already contested with a large number of solar providers vying for business.

Similarly, RDA is not well suited to becoming a developer of utility scale BESS that requires a high degree of expertise and does not necessarily delivery community benefit.

RDA is well positioned to offer programs that support local businesses. A reduced number of high-impact targets resulting in a meaningful program could be achieved with a small number of commercial scale 2-hour sub 100kW batteries.

## Social Findings: Large-scale (organisational and commercial)

The project stakeholder group identified the large-scale model as encompassing organisations such as schools, emergency services, hospitals, and industrial park occupants. Analysis conducted by Constructive Energy indicated that just a small number of participants would be required to realise an equivalent value to the residential and utility-scale BESS approach, thus establishing a social enterprise for the community with minimal effort and impact.

During Project Period One, the RETC engaged several organisations to discuss energy sharing opportunities. Notable findings included the capacity of these entities to invest in renewable assets to enhance their generation and storage capabilities.

Unlike the small and medium-scale models, large-scale customers may not need the same motivational attributes for participation. Organisational ESG commitments increase the likelihood of these entities seeking solutions that align with government climate targets, providing a promising entry point.

The potential for these organisations to save on energy costs while delivering community benefits makes participation in a social enterprise appealing. Ninety per cent of respondents indicated they would be likely or very likely to participate. Findings from our large-scale research yielded several recommendations structured around four key themes: trust, education, communication, and transparency.

Organisations' overarching advantage lies in saving on energy costs, meeting ESG targets, and delivering community benefits. Given the smaller number of participants required to realise energy sharing, the large-scale model emerges as the most viable option among the three investigated by the project team.

Figure 14: Ideal Customer Persona

## Large-Scale Embracer

- Commitment to sustainability.
- Robust management systems.
- Innovation-driven culture.
- Long-term strategic planning.
- Employee engagement.
- Transparent reporting capability.
- Adaptable and flexible.
- Community/business Influencer.

# Conclusion

The RETC stakeholder research on the three energy share models—small, medium, and large—reveals that medium and large-scale options are the most viable for promoting community energy sharing. The complexities associated with coordinating larger numbers of customers and the need for robust systems and governance make the small-scale model (at this stage) less appealing for an organisation like RDA to deliver.

The medium and large-scale models demonstrate significant potential, requiring fewer participants and benefiting from corporate accountability driven by ESG (Environmental, Social, and Governance) commitments. These frameworks enhance the likelihood of successful implementation and community engagement.

This report has highlighted and broadly quantified the opportunity but also found that substantial effort is required to meet the task of identifying, recruiting, engaging and managing a cohort to participate at a meaningful scale. Investment is required to:

- Provide for a community-based coordinator with a budget for administration and communication
- Embed an action-learning approach to customer research, identifying participant characteristics and drivers
- Identify technical partners to engage and manage suppliers
- Identify technical and research partners to assess program impact
- Provide for financial incentives that encourage participants to engage in the trial
- Provide for the installation of energy monitoring and control devices to enable individual and fleet feedback and control

As a social enterprise, the RETC aims to address social challenges while promoting environmental sustainability. Effective management requires clarity in key areas, including a well-defined mission and vision, sustainable business models, thorough market research, strong financial management, and an appropriate legal structure. While the RETC has made progress, further research is needed to refine these components.

The guiding principle of **"Keep Energy Local"** emphasises the potential to alleviate pressure on the energy network, reduce costs for participants, and deliver significant community benefits. However, challenges remain, particularly in identifying a community-based organisation (CBO) that embodies social responsibility, has social currency with the target groups, and possesses the expertise to manage stakeholder relationships effectively.

Understanding community sentiment, especially in socio-economically disadvantaged areas like Ipswich, is vital. The project's findings indicate a largely negative perception of renewable energy, driven by frustrations with aggressive marketing tactics. This distrust presents a significant challenge that the RETC must address to foster community engagement.

Selecting the right CBO will be crucial for the success of any energy-sharing initiative. The role of a Coordinator is essential for developing and managing these programs, balancing operational needs with participant expectations. Further qualitative research is necessary to gain insights into the motivations of various customer cohorts.

Ultimately, trialling either the medium or large-scale energy share models represents the most promising path forward. By engaging a smaller group of aligned participants, the RETC can validate technical elements and gain valuable insights into social dynamics. This approach will serve as a practical example for potential participants in smaller models, illustrating the feasibility of effective energy sharing.

## Recommendations

| | |
|---|---|
| #1 | **Define and champion the Medium and/or Large-Scale Model within the Ipswich Region**<br>It is recommended that the RETC define and implement either the medium or large-scale energy share model specifically within the Ipswich region. This initiative will enable the assessment of practical applications and the identification of key community dynamics essential for the successful deployment of energy sharing frameworks elsewhere. |
| #2 | **Conduct Market Research to Uncover Root-Cause Insights**<br>It is imperative to conduct comprehensive market research aimed at uncovering root-cause insights that will inform the development of a robust strategy to position energy sharing positively within the community. This research should focus on understanding local perceptions and addressing concerns, ultimately enhancing community engagement and support for energy sharing initiatives. |
| #3 | **Meter, monitor and manage the asset base for collective impact**<br>Install energy monitoring and control devices capable of facilitating individual and fleet views, automatically controlling devices (within the agreed site owners operating envelope) and enabling data to report on outcomes. |
| #4 | **Underwrite a 'Project Officer' position**<br>Provide resourcing capacity until such point as the program become self-sustaining |
| #5 | **Provide working capital**<br>Establish a fund for project expenses and incentives to engage participants, such as dispersed grants and low/no interest loans. |

## Closing

The social findings from the RETC project highlight a clear tension between the technical feasibility of energy sharing and the current lack of social readiness. While modern technology and cohort-based energy sharing models can drive sustainable practices, ease financial burdens and unlock local network benefits, their success hinges on harnessing the innovation and resources of committed organisations and businesses.

To move the medium and large-scale models from concept to reality, RETC seeks funding for four critical enablers:

- A place-based pilot trial of either the medium or large-scale model within the Ipswich region
- Comprehensive market research to uncover root-cause insights and shape a positive community narrative
- Resourcing a dedicated Project Officer (local coordinator) to recruit participants, manage governance and facilitate benefit sharing
- Initial working capital to underwrite participant incentives, monitoring hardware and operational expenses

Securing this support will allow RETC to demonstrate tangible proof of concept, quantify community and network impacts, and refine engagement strategies. We urge Advance Queensland to consider this next phase as a pivotal step toward validating energy sharing's worth and delivering real value to regional communities.

By extending the RETC project's lifecycle, stakeholders can transform theoretical frameworks into scalable, place-based solutions. This initiative aligns directly with the Australian Government's Regional Investment Framework, which prioritises:

- Investment in people: listening to local voices and partnering with communities

- Investing in places: supporting adaptive, accessible, sustainable and liveable regions
- Investing in services: enhancing connectivity, accessibility and equity of services
- Investing in industries and local economies: creating the conditions for growth and diversification

Advance Queensland's collaboration and funding will catalyse a coordinated, community-driven energy sharing model that eases network constraints, retains economic benefits locally, and charts a blueprint for regional energy innovation.

## Thank you

Regional Development Australia Ipswich & West Moreton would like to thank our project partners, including CS Energy, Department of State Development Infrastructure and Planning (SEQ West Regional Office) and Constructive Energy for their insightful guidance and technical expertise. Your contributions have enriched our understanding and enabled us to navigate the complexities of energy sharing effectively.

We would also like to thank the following contributors for their support, Springfield City Group, TAFE Queensland, West Moreton Health, Queensland Fire Department, Department of Education, Advance Queensland, and the many community members who provided information and feedback.

Together, we have embarked on a meaningful endeavour that promises to foster a more sustainable and obtainable energy future. Thank you for your support and collaboration.