The Jacka Community Battery: Concept Design Workshop Report

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Executive summary

The Suburban Land Agency (SLA) of the ACT Government is investigating the installation of several community batteries, up to 1MW/1MWh scale, in the greenfield, all-electric suburb of Jacka. In preparation for a market sounding, SLA engaged the ANU Battery Storage and Grid Integration Program (BSGIP) to facilitate a concept design workshop to help inform project requirements and to establish priority issues.

The workshop was held on May 5th 2021, and attended by a range of key stakeholders. Workshop participants were guided through three activities to brainstorm ideas around who should own the battery, how to encourage and ensure community involvement in the battery, and to identify current barriers to implementation. Following discussion of potential barriers, the workshop discussion focused on how best to use ACT Government support to address these barriers and to make the Jacka community battery project as effective and successful as possible.

Overall, workshop participants agreed that the very high penetration of solar PV and the greenfield development of Jacka is a good opportunity to trial community-scale batteries. Participants discussed DNSP (Evoenergy), private and community **ownership**. Combinations of these are possible through co-investment or co-ownership, and could be a flexible way for community, Evoenergy or ACT Government to be more directly involved. Participants drew a useful distinction between ownership and management – realising that a battery could be community owned, but not necessarily community managed and operated, and vice versa.

DNSP ownership is allowed but not favourable under the current regulatory system. For community ownership, an energy services company (ESCo) was suggested as a useful way to manage project complexity, as well as a solution for engaging and managing community energy groups and projects at scale. Private ownership was thought to be feasible, though investors must understand that the battery cannot be operated purely in pursuit of market signals. Indeed, community needs, network needs, and market price signals will often compete for battery services, and choices must be made around which of these to prioritise, regardless of the ownership model.

For household **billing**, three schemes were discussed:

1. A community model, where all households participate. This opt-out scheme has no complicated subscription, billing or metering requirements. Households simply receive a small financial discount on their electricity bill, based on the retailer passing on the discounted reduced network tariff.
2. Jacka households pay a subscription fee in exchange for access to the battery as a virtual storage device for their own solar PV. This may require special metering devices to be installed at each household.
3. No direct household billing arrangement. Instead, Jacka households or other ACT residents, businesses or government agencies could be given the opportunity to co-invest in the battery project.

Note that these schemes are not mutually exclusive – some combination could be implemented. Many workshop participants suggested that the model should be flexible

over time, as the Jacka community grows and changes. Participants also wanted the ACT Government to keep in mind that **cost and economics are not the only important factors for households when it comes to energy services**. Jacka households, for example, will likely want to play a role in defining and governing the battery objectives, for example environmental objectives versus profit margins and network support services.

Based on the collated workshop discussion, the following **next steps** are recommended:

(1) The Jacka project can be used to test ownership models and actual interfaces for value stacking, including network support and network deferment, retailer partnerships for FCAS and arbitrage. **The development of these revenues and contractual partnerships is seen as the biggest gap for the broader roll-out of community-scale batteries.**
(2) This project can inform the longer-term energy storage strategy in the ACT, with important insights from **Evoenergy** who **are keen to use this project to understand new systems and subsequently replicate this technology throughout the ACT** with more urban infill coming in.
(3) A reduced network tariff is required for the business model to stack up and Evoenergy can only justify a discount if the battery supplies network support where it's needed. SLA or ACT Government could underwrite network support payments until the potential of the battery to provide network support is demonstrated.
(4) The **community model** for customer billing fits with identified priorities including fairness, transparency and simplicity. The feasibility of this billing option should be explored with electricity retailers who might consider this for Jacka households.
(5) Private or co-investment ownership models should be further explored, including with potential project proponents. Co-investment partners could include households, government, private investors, or Evoenergy.
(6) SLA and Evoenergy should support project proponents to ensure the battery energy management system is integrated with the wider Jacka energy management system (e.g. heating & electric vehicle charging), to achieve maximum energy efficiency.
(7) An **appropriate governance structure** (including the Jacka community) for the battery scheme should be established, including the rules and guidelines around the functions of the battery, the establishment of performance metrics and a Q&A process, and the enforcement of these.
(8) **SLA and ACT Government** could support this project by providing financial security for battery developers as well as practical assistance in implementing both the Jacka batteries and for developing scale-able models for community batteries to be rolled out across Australia. This could be given as upfront subsidies ongoing payments or underwriting the whole project. Importantly, financial support should be given in a way that doesn't interfere with the evolution of the most efficient and effective energy storage model.

Key terms

AER
Australian Energy Regulator. The AER regulates wholesale and retail energy markets, and energy networks, under national energy legislation and rules.

BSGIP
ANU Battery Storage and Grid Integration Program.

Community Battery
A distribution scale battery that provides services to customer located near the battery, such as storing excess solar energy and providing energy for local loads.

Distributed Energy Resources (DER)
The smaller generation units that are located on the consumer's side of the meter, including but not limited to roof top photovoltaic units, battery storage, electric vehicle and demand response.

DUOS
Distribution Use of System.

ESCo
Energy Services Company.

DNSP
Distribution Network Service Provider. In the ACT, Evoenergy is the DNSP.

Network Support
The service provided through a DNSP contract with a third party to supply energy into the network to avoid augmenting or deferring expenditure on the network.

Low Voltage Network (LV)
The 230 volt level of distribution network that connects customers to the broader electricity grid.

SLA
The Suburban Land Agency of the ACT Government.

Project background

Jacka is a greenfield suburb in the Gungahlin area of the ACT. Stage 2 (Jacka 2) is expected to be home to over 600 dwellings and the ACT Government's Suburban Land Agency is planning for Jacka to be an innovative and sustainable suburb. This includes requiring solar panels, demand management systems and electric vehicle charge points for each household. The suburb has also been future-proofed for community-scale batteries with space allocated at each distribution substation. While construction in Jacka has not yet started, the planning documents have been submitted for approval. While there is currently no community in Jacka, it is expected to be diverse and change over time.

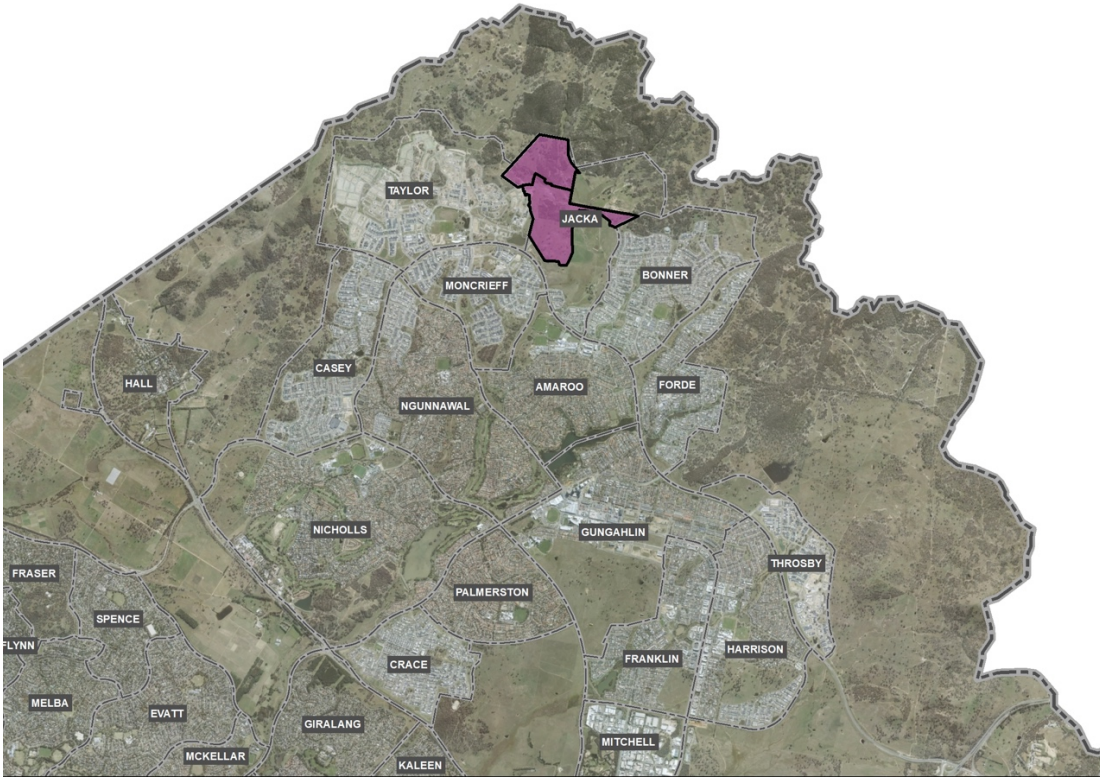

Fig 1. Geographical location of Jacka in the ACT

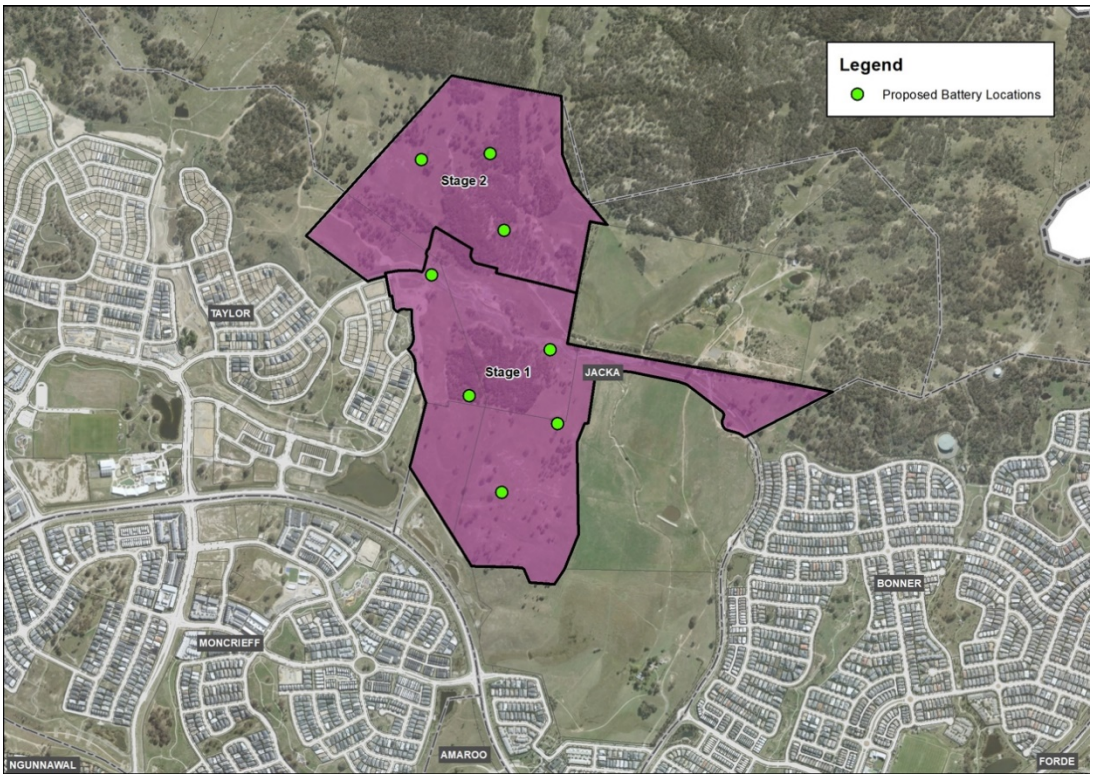

Fig 2. Detailed view of Jacka including the proposed location of community-scale batteries (shown by the green dots).

Why Community-scale batteries?

Community-scale batteries have the potential to play an integral role in Australia's transition to one powered by renewable and distributed energy generation and storage. There is widespread interest in this scale of storage, from industry, governments, new technology businesses, and the community at large. Community batteries are typically of the scale 0.5-5MW/MWh and are connected in front of the meter to the distribution grid. Recent studies[1] as well as successful trials in WA[2] have shown that the location and sizing of this type of storage makes it uniquely suited to providing social, economic and technical benefits to the broader energy system. Community-scale battery trials have also recently been announced in NSW[3] and Victoria[4].

[1] https://arena.gov.au/knowledge-bank/implementing-community-scale-batteries/

[2] https://westernpower.com.au/energy-solutions/projects-and-trials/powerbank-community-battery-storage/
https://www.synergy.net.au/Our-energy/Future-energy/Alkimos-Beach-Energy-Storage-Trial

[3] https://www.ausgrid.com.au/In-your-community/Community-Batteries

[4] https://www.yef.org.au/our-stories-and-events/seeking-victorias-first-solar-sponge-community-battery-network/

The feasibility of community-scale batteries will hinge on their ability to provide multiple services simultaneously. The first service is to increase the solar self-sufficiency of the suburb. This service ensures the bulk of the solar energy produced in Jacka is also consumed in Jacka - minimising energy imports and exports from the wider grid. The second service is to provide network support, including demand management and management of thermal and voltage constraints. Market services, including participation in markets for energy and ancillary services can boost the economic feasibility of the project. Finally, the battery could also be used strategically to achieve sustainability goals e.g. emissions reductions. In practice, there will be trade-offs in deciding which of these services the batteries should prioritise.

The ability of community-scale batteries to simultaneously provide multiple services has motivated the implementation of these batteries in the national electricity market (NEM), as early as 2021. In general, trials and demonstrations of community-scale batteries on the NEM can proceed within current rules and regulations, although network-owned batteries will require regulatory exemptions for operating the battery for anything other than regulated network services. **The ACT, as a world-leader in the transition to a zero-carbon economy, can provide an environment where community-scale battery models can be developed and demonstrated, and subsequently scaled-up for implementation around Australia**.

The overall goal of the project is to provide an innovative social, technical, and economic solution for Jacka to support its electrified and rooftop PV-dense community. Community-scale batteries are innovative due to their relationship with households and the community. They are also technically innovative – simultaneously providing multiple services (financial, social, technical and environmental) with one asset. Importantly though, these potential benefits may or may not be realised, depending on how the battery is owned and operated.

Project stakeholders and their objectives

The **ACT Government** strongly supports an increasing amount of renewable electricity supply. This supply accommodates the forecast growth in peak electricity demand in new and existing areas of Canberra, and diversifies and grows the ACT economy. The ACT Government is aiming to reduce emissions by 50–60% (below 1990 levels) by 2025 and achieve net zero emissions by 2045. The **Suburban Land Agency (Agency)** is responsible for delivering the ACT Government's suburban development program, including Jacka 2. The Agency seeks to create communities that are socially, environmentally and economically sustainable. The **battery owners or investors** may be seeking an appropriate commercial return, with a known investment risk profile. This could be seen as a potentially 'green' investment.

Evoenergy owns and operates the ACT electricity distribution and transmission network. They are obligated to supply Jacka in line with performance and reliability obligations. Further to this, they are keen to support projects – like the Jacka community batteries -- that could improve the utilisation and efficiency of the network. Evoenergy have not connected a battery of this size but are keen to use this project to understand new systems and subsequently replicate this process throughout the ACT. **Continuing to work closely**

with Evoenergy was identified as crucial for the success of the project, as well as for the wider roll-out of energy storage in the ACT.

The Australian National University (ANU) **Battery Storage and Grid Integration Program (BSGIP)** is a research partner in this project. **Jacka 2 residents**, as with all ACT householders, are expected to be seeking energy services that are potentially cheaper, simple to understand, more convenient, better for the environment and with added community benefits.

Workshop purpose

In preparation for a market sounding, the aim of the workshop was to better understand potential ownership models as well as what new technology capabilities, regulations and market mechanisms will be necessary to support the large-scale roll-out of community-scale batteries within the physical and operational limits of distribution networks.

Prior to the workshop, a draft concept design was sketched out to frame the discussion and understand the critical elements and actors (Fig. 3), including:

(1) an equitable, transparent and simple community/customer model;
(2) the financial party/investors owning or investing in the battery;
(3) an appropriate governance structure;
(4) the batteries hardware and the software and capabilities to operate them, including the battery locations, the battery chemistry, size, safety, aesthetics etc.;
(5) the network (Evoenergy), including the network services the battery would provide and the network tariff the network would charge the battery;
(6) the environmental services the battery can provide; and
(7) ACT Government support for the battery project.

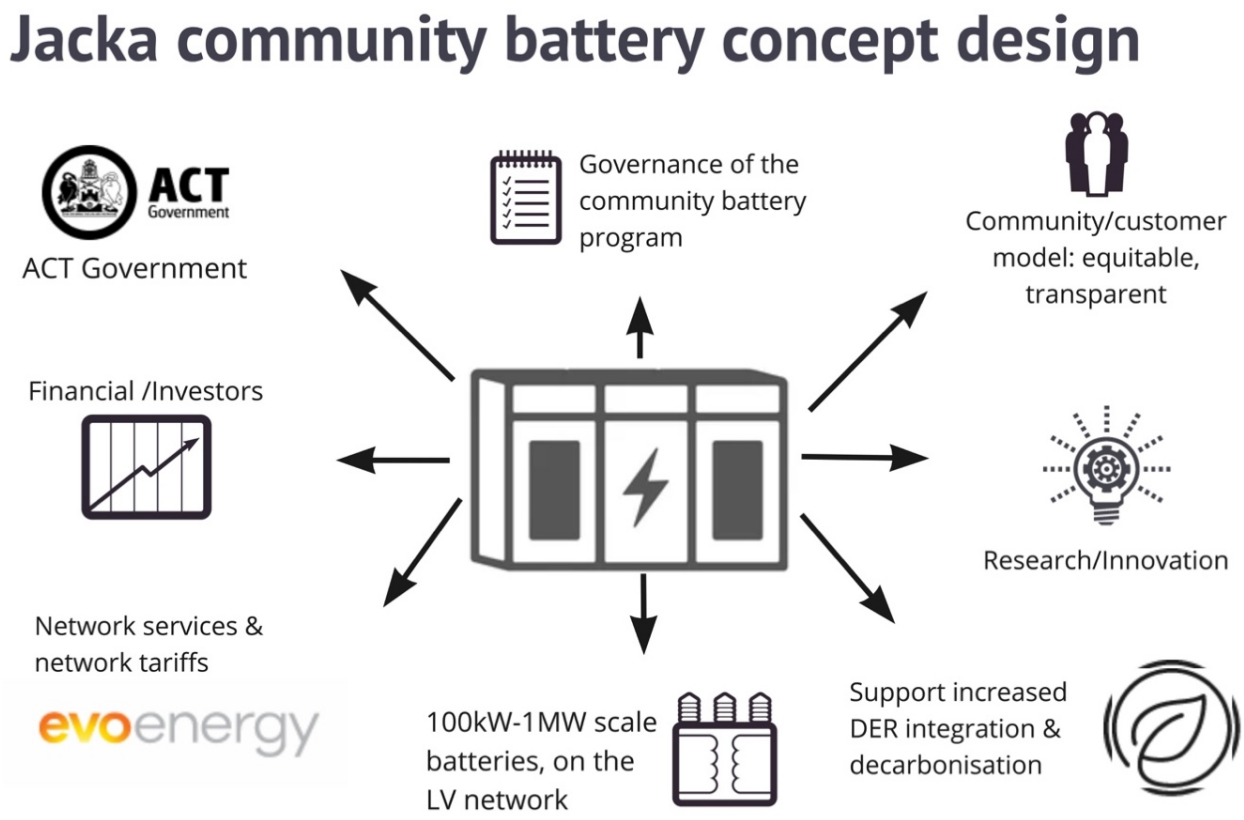

Figure 3. A concept design was sketched out prior to the workshop, with the goal of understanding the critical elements of the Jacka community battery.

Overview of workshop discussion

This section provides an overview of the workshop discussion, with more detail provided in the next section. Broadly, workshop discussion focused on (1) battery ownership and operation, (2) different models of customer engagement, (3) current gaps that could pose a barrier to the project, as well as (4) suggestions for how the ACT Govt/SLA could best provide support for the project.

Regarding ownership, workshop participants discussed DNSP, private and community ownership, as well as co-investment and co-ownership. **Participants drew a useful distinction between ownership and management – realising that a battery could be community owned, but not necessarily community managed and operated, and vice versa.** There was support for DNSP ownership or part-ownership, if the regulatory system changed to make it favourable. There was concern around private ownership, if it was operated purely in pursuit of market signals, that could ultimately increase costs to the

broader community. Community ownership was popular, with helpful suggestions for managing the complexity and expense of the project if it was community owned.

The project was seen as an opportunity to trial innovative billing ideas. Three potential non-mutually exclusive ideas were discussed: a community model (all households participate, potentially with a small financial return on customer bills, based on network tariff savings), as well as subscription and co-investment models.

Workshop participants identified gaps that could pose a barrier to the successful implementation of the project, including regulatory challenges and tariffs, as well as battery operation and communication hardware and software. It was noted that, in general, these products do not currently exist for this scale of storage. Finally, gaps were anticipated around installation Q&A processes, standards around battery hardware, safety, data sharing and communications. These gaps are detailed below and we recommend they be investigated further.

Workshop discussion: main themes in detail

Who should own and operate the Jacka batteries?

Workshop participants noted that owning and operating a community battery is not trivial. In addition to ongoing management, 24-hour fault response and maintaining safety, the batteries and their components will need to be upgraded and replaced over time. Participants discussed ownership by the DNSP (Evoenergy) as well as private and community ownership.

Although the current rules make owning a battery unfavourable for Evoenergy, there was support for the idea of DNSPs owning or part-owning community batteries in the future. At least one participant felt that they could provide the most value.

Regarding private ownership, one participant raised the issue that this model could lead to increased costs to the broader community if the battery was operated only in pursuit of market signals, leading to increased demand peaks which may in turn lead to increased future network augmentation costs. This highlights an essential consideration around operating a battery of this scale; community needs, network needs, and arbitrage based on market price signals will often compete for battery services, and choices must be made around which of these to prioritise, regardless of the ownership model.

In terms of community ownership, some commercial participants felt that ownership is too complex for community groups, who typically don't have the skills/literacy to manage the battery project over its lifetime. Perhaps more relevant to the wider roll-out of community-scale batteries, one participant suggested it would be helpful to consider how to engage with community groups at scale, rather than requiring them to engage individually. There was also the suggestion that community groups simply couldn't afford the batteries.

However, others pointed out that there are a variety of models for feasible community ownership, including an energy services company (ESCo), a co-op, local councils and community energy groups. One participant suggested the community battery scheme be included in the ACT Government social housing support strategy. Workshop discussion raised the idea of splitting the financial and the operational ownership, through co-investment/shares etc.

In general, many workshop participants like the "community owned" idea. There was widespread support for the idea of enabling this through a co-investment scheme with the local community. This approach would allow households to either ignore the battery or to be shareholders who (potentially) receive dividends. This idea has been adopted with the

Yarra Energy Foundation Community Battery in Melbourne[5] and could also accommodate retail investors in parallel. A benefit of this model was thought to be that it would allow the community to play a bigger role in defining the battery objectives e.g. environmental objectives rather than a singular focus on profit margins. Another advantage is that co-investment is good for returning savings to the community in which the battery in installed. A disadvantage of the co-investment model is that, on its own, it is inaccessible to those that can't afford to invest, creating social equity issues.

How could Jacka residents be involved?

As pointed out by one workshop participant, the Jacka battery project is essentially two components – a distribution scale battery and a community participation scheme. With respect to community participation, workshop participants raised the following points:

- Both solar and non-solar households should have equal ability to participate and benefit.
- Both 'engaged' and 'non-engaged' households should have equal ability to participate and benefit.
- Households have competing and contradictory desires. They simultaneously want control and engagement, whilst also wanting to forget about it and have cheap bills. Different customer options should be accommodated.
- Understanding the needs and priorities of the Jacka community will be challenging, since the community does not yet exist. Even when residents begin to populate Jacka, community energy may not be a priority for new residents. However, batteries can be operated flexibly and are easily scale-able. Over time the battery ownership, operational and business models could change to fit the needs and priorities of the community and the network.
- Cost and economics are not the only drivers for households.
- This project is an opportunity to trial innovative billing models. One participant suggested that having multiple batteries in Jacka – or around Canberra – provides an opportunity to test different participation models.

[5] https://www.yef.org.au/our-stories-and-events/seeking-victorias-first-solar-sponge-community-battery-network/

Three potential **non-mutually exclusive** models for customer participation around the Jacka batteries were raised by workshop participants.

Community model:

For this model, all Jacka residents could be part of the community battery scheme (unless they opt-out), with the battery used to store their excess solar for use later in the evening. All ACT residents benefit in the longer term, as reduced network expenditure results in cheaper network tariffs. Jacka households could also benefit more directly if the reduced local network tariff is passed on as a direct saving via their electricity bills. Although one workshop participant was concerned that this would require the households to be linked to a particular retailer, this is in fact not that case (and is also not allowed according to the National Energy Rules). Households will likely also have the knowledge that the solar energy they are producing will be locally consumed in Jacka. BSGIP social research found this is often a priority for households[6]. A potential downside of the community model was that some workshop participants felt it would be inadequate as some households may want more involvement and benefits.

Subscription model:

A simple subscription model could be used, similar to Western Power's $1/day model[7]. Customers would be allocated a virtual slice of storage, which would likely require special metering devices to be installed at each household. Workshop participants were concerned that this model might clash with opportunities to make money from arbitrage, ancillary or network services. In practice, however, the battery can be used for whatever service (arbitrage, FCAS, network support) the battery operator chooses, regardless of the allocation of household virtual storage, which is effectively a financial arrangement and not an allocation of physical electrons.

Co-investment model:

There was widespread interest in a co-investment model. This was seen as a way to allow the community to be involved in the project, and a good way to return profits to the community. One participant suggested that if the community owns a percentage of the battery, it could actually be managed and operated elsewhere, and still effectively be a community battery. Evoenergy, ACT government or local business could also potentially

[6] https://arena.gov.au/knowledge-bank/stakeholder-views-on-the-potential-role-of-community-scale-storage-in-australia/

[7] https://www.westernpower.com.au/our-energy-evolution/projects-and-trials/powerbank-community-battery-storage/

invest. A disadvantage of the co-investment model is that, on its own, it could be unfair to those who can't afford to invest.

Communication and education

Workshop participants felt that clear communication and education is a priority for the project to be a success. Clear definitions are needed. For example, what does 'community' mean? what is a 'community battery' and what does 'community energy' mean?

In particular, the community battery term is confusing for Jacka, when there is currently no community. There was some preference for the term 'neighbourhood battery'. For some participants, it was felt that energy must be locally generated to be 'community energy' e.g. charging the battery from the grid off-peak may not be what households consider to be a community battery.

On a similar note, it should be made clear what 'economic value' means for the project - what value accrues to who and how it is perceived will be important. Clarity will be needed around the relationship between networks and retailers, to ensure that benefits flow to households.

Because Jacka is not yet a community and because it will have a mixed demographic, it will be important to have a good education campaign from the beginning and 'take households on the journey'. Residents should understand the concept of community batteries before they purchase/decide to move to Jacka, and the emphasis should be on optionality.

In practice, workshop participants pointed out that **communication will be a balance of transparency and simplicity.** Some messages are clear and should be communicated with clear data e.g. safety concerns around the battery chemistry and risk of fire. Also, how will this impact me? will it reduce my bills? is it about living in a green suburb? Networks might have a role here to work with retailers to engage appropriately with households – consistent messages with households, with the focus on fairness. Workshop participants discussed other information that may or may not be required, and this issue probably requires careful management. Some workshop participants suggested that residents will want to know what type of energy is being used to charge the battery, whereas others felt that exposing all the flows to the community might be counterproductive. Some participants suggested that households might not even need to know there is a battery there.

These are important issues around how the project is communicated with the community and will need to be managed carefully. Some participants recommended looking at how this type of communication has been managed before and how effective that was, for example;

- The Ausgrid community battery trial
- Australian Renewable Energies Insights report
- Edge (ARENA)

- Ausnet VIC – 3 years engagement 1000 households in northeast – regional Victoria
- Western Power Trial community engagement (which found that not all households were happy with the subscription model)

Overall, workshop participants raised a number of points that will be important to communicate and discuss with proponents, investors and Jacka households. Those points are summarised in tables 1 and 2, below.

Workshop participants suggested the following information will be required by proponents/developers to evaluate the feasibility of their business model:

- ❑ The mandatory solar level per house/apartment
- ❑ Information about ACT generation/demand patterns
- ❑ Other technology likely to be installed in Jacka – e.g. behind-the-meter batteries, EVs, smart meters. EVs will increase demand considerably – each EV is ~70kWh
- ❑ Demographic information about Jacka, e.g. how it is expected to grow over time

Other information may be useful for proponents to know:

- ❑ Network parameters e.g. padmount substations are typically 315-750kW
- ❑ How to unlock network support services to get extra local value from batteries
- ❑ How much certainty will be required from Evoenergy, regarding the network support that the battery can provide. This includes what will happen after 10yr life of the battery
- ❑ The level of control of the battery that Evoenergy will require and likely % of time (expected to be minimal)

Table 1: Information to communicate/discuss with proponents/developers

Information that was identified as important to communicate to households included:

- ❑ The concept of community batteries should be communicated to Jacka residents before they purchase/decide to move to Jacka.
- ❑ Mandated PV creates a unique value proposition for Jacka – a large amount of solar generation which is a valuable resource to be efficiently and effectively managed for the benefit of Jacka residents.
- ❑ With respect to data sharing, need to ensure households understand what data they're sharing and with whom.
- ❑ How can new households join in the future? What commitment is included in the land price? Is it a body corporate type asset where all house lots in the development automatically are "in" but also can't leave?
- ❑ Do all households automatically get a stake in the battery through the purchase of land? Are all households in? Can they leave? Can they buy their own behind the meter battery?
- ❑ How is the battery being charged? From solar only, or also from the grid?
- ❑ What does 'economic value' mean for the project - what value accrues to who and how?
- ❑ Safety concerns around the battery chemistry and risk of fire.

Table 2: Information to communicate/discuss with Jacka households

Regulatory issues

Workshop participants felt that regulatory impediments are real and need to be addressed. Challenges discussed included registration for market trading (both arbitrage and FCAS), retailer contracts, network services payments and metering. With respect to registration, the discussion was around the appropriate classification for batteries. Currently batteries can register as both a generator and as an FCAS provider, but this is expensive. One suggestion was that the battery should be allowed to participate in the market, without actually registering as a generator (not currently allowed). A workshop participant reported that the market participant classification for batteries is currently under consideration by the AEMC[8], but that workshop participant was concerned that the rule change may be designed for large batteries so may not downscale well.

With respect to retailer contracts, one suggestion was to allow multiple trading relationships (MTRs), which would allow a separate contract for solar being exported from households and for buying back energy from the battery. It was reported that this is a possibility being explored by the Energy Security Board (ESB). One workshop participant felt it may be important to consider how to facilitate the management of multiple trading relationships for this project, which will allow the community battery revenue model to stack up more easily.

In terms of making use of regulatory sandboxes for this project, one workshop participant suggested that ACT Government should consider the Victorian model where the local regulator has taken over some responsibilities of the Australian Energy Regulator (AER). A regulatory sandbox was used for the AEMO virtual power plant (VPP) trial, to simplify metering requirements, and that could potentially be replicated here if needed.

[8] https://www.aemc.gov.au/sites/default/files/2020-12/Integrating%20energy%20storage%20-%20Options%20paper.pdf

Tariffs

There was general discussion around the need to reform tariffs. Of particular urgency for community batteries is the need for tariffs that resolve the DUOS double-charging barrier[9]. For the Jacka project, this may not be a particular issue. With planned commencement in 2021/2022, Evoenergy has established a trial tariff for batteries (both large and residential) that accommodates two-way flows. The tariff recognises that large batteries have the potential to provide savings (i.e. avoiding network augmentation) but can also impose additional costs on the network, which shouldn't be borne by the rest of the community. Since the workshop, the trial tariff has now been approved by the AER[10]. Details of the tariff are included in Evoenergy's pricing proposal which is published on the AER's website[11].

Aside from DUOS, workshop participants also raised the following issues:

- The Community Battery Trial in Western Australia is sending the wrong signals, and, as a result, incentivising households to generate more excess solar, and to increase peak demand.
- One participant felt that current Evoenergy tariffs incentivise behind-the-meter batteries.
- If there is a trial tariff, it will be important to ensure that it is continued throughout the battery lifetime.
- Consideration should be given to the implementation of community batteries in light of the recent AEMC rule-change[12] allowing solar export charging e.g. the local batteries will soak up excess solar and this will be advantageous to households.
- One workshop participant raised the issue that some households want local energy markets that do not involve AEMO or the wholesale market, as is currently the case in some international energy markets[13].

[9] This is in reference to the issue that the network tariff is double-charged for in-front-of-meter batteries, once when energy is transported on the local grid to charge the battery, and once when energy is transported on the local grid to discharge the battery.

[10] https://www.aer.gov.au/system/files/Evoenergy_2021-22%20Electricity%20Network%20Pricing%20Proposal_13%20May%2021%20Public.pdf

[11] https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/evoenergy-annual-pricing-2021-22

[12] https://www.aemc.gov.au/news-centre/media-releases/new-plan-make-room-grid-more-home-solar-and-batteries

[13] For example, the Local Energy Market in Cornwall. https://www.centrica.com/innovation/cornwall-local-energy-market

Battery requirements: hardware, software, communications and standards

Safety and end-of-life questions are high on the list of battery requirements, according to workshop participants. Further, the limitations of different technology/chemistries need to be understood. For example, does the battery have the discharge speed to access FCAS markets? One workshop participant suggested that alternative technologies like flow batteries should be considered, based on their better safety and longer battery life.

Although the Jacka pre-planning feasibility study found that the ideal battery size would be around 1MW/1MWh, workshop participants suggested that SLA should be relatively open to the size and arrangement of battery storage, as they go out to test the market. Evoenergy has stated that they are keen to explore smaller sized batteries as padmount substations are typically 315-750kW.

Importantly, an installation quality and assurance (Q&A) process will be required. The process should be based on achievable performance metrics for installers and should demand qualified engineers when needed.

Integration and interoperability

Integration and interoperability encompasses software, communications, standards and IT. Several participants raised the issue that the hardware and software required to operate community batteries, including battery communications, doesn't exist. Developers must develop software themselves, at considerable cost, which hinders the feasibility of projects. These once-off costs for IT are expensive – and replication will be the key to reduce costs.

Evoenergy will need to communicate with the battery operators about the network status, so the battery can help smooth network power flows. With a battery, the goal is to provide enough load smoothing to ultimately result in the avoidance of future network augmentation or deferral of augmentation. This saves consumers' money in avoiding the cost of network upgrades.

It will also be important to ensure that telemetry data is sent to the network for adequate visibility. Potentially, the battery operating system could also be integrated with customer home energy management systems (HEMS) e.g. smart charging, hot water, and so on. Several workshop participants suggested that it will be important to consider the whole energy system in Jacka, not just electricity. How will heat be managed? Could the battery tie into local technology including hot water cylinders etc.? The goal should continue to be to maximise household consumption. Finally, one workshop participant suggested that privacy issues with data should be considered.

Taking a longer-term view

Benefits will need to be clearly demonstrated in this trial, as a showcase for the rest of Australia. Data collection and sharing is critical to assess this trial and provide this demonstration, and also for the future rollout of these projects and models. At the same time, it will be important to learn from other jurisdictions and models.

Evoenergy is keen to use this project to understand new systems. They have not connected a battery of this size before and see this as a learning opportunity that they will embrace. They would like to replicate this process throughout ACT with more urban infill coming. Workshop participants felt that the DNSP might have a role to provide relevant information for community groups / community battery project developers, although they also acknowledged that it might be difficult for the Network to handle lots of requests.

There are some issues that should be kept in mind for the future viability of community-scale storage. First, network support payments and mechanisms will be critical. Even if these are not included in the current trial, the future scalability of this type of storage depends on accessing it. Currently, there are limited price signals[14]. The network will need to plan for the lifetime of the battery. One participant suggested that it is currently unclear whether this type of energy storage will fulfil network support requirements. One idea could be, for greenfield developments in the ACT, to leave space next to substations to add batteries at a later date, once the technology has proven to be useful and network support payments can add to the value stack.

[14] Note that these services are emerging e.g. the Victorian Big Battery is being financially compensated through the System Integrity Protection Scheme (SIPS), for backup power flow services during the summer months.

Appendix A

Concept design workshop format

The concept design workshop was facilitated by members of the ANU Battery Storage and Grid Integration Program, and held virtually via Zoom and using the Miro whiteboard (miro.com) on the 5th May 2021 from 10am-12midday.

The purpose of the concept design workshop was to gather a broad range of ideas and comments regarding the program, allowing the workshop participants freedom to explore ideas for the subject of the program - big batteries, but also provide input into how the program is implemented by the ACT Government.

Attendees

The workshop was an invitation only event, with an attendee list derived from ACT Government and ANU contacts. The final invite list was determined by selecting individuals from the broad range of organisation types required at the workshop. Special attention was given to inviting a broad range of stakeholders from diverse backgrounds as well as battery developers and suppliers. The range of identified stakeholders included representatives from:

1. Government
2. Market and regulatory bodies
3. Consumer advocates
4. Network service providers
5. Retailers and generators
6. Battery developers and suppliers
7. Energy consultants

An invitation was extended to individuals within the selected organisations, with a limit of one representative for most organisations. Exceptions were made for market and regulatory bodies and Evoenergy.

The workshop was ultimately attended by 48 people including facilitators and ACT Government observers. The list of organisations who attended the workshop can be found in Appendix A.

Agenda

The workshop consisted of a welcome, introductory remarks and presentations from SLA, ANU and Evoenergy. Workshop discussion was carried out in three break-out sessions where attendees were broken into discussion groups.

The introductory remarks and presentations were given by Matthew Keighley, SLA, outlining the Jacka development and the Jacka community-scale battery proposal. Marnie Shaw (BSGIP) then outlined more details around the proposed battery. Emily Brown (Evoenergy) then gave an overview of Evoenergy's support for this project as well as the specific details around the network tariffs that will apply and will directly impact the feasibility of the project.

Four groups were formed using Zoom breakout rooms, and attendees were assigned to rooms designed to evenly distribute the SLA/Evoenergy and developer attendees. Each group then worked through a series of three templated workshop activities, reporting back to the group at the end of each session. The three templates can be seen in the workshop miro board (Appendix C, attached).

Agenda

10:05-10:10 Welcome by Andrew Fraser, BSGIP. Acknowledgement of country. Outlines the purpose of the workshop and how it will run. Quick overview of miro.

10:10-10:17 Jacka and the Jacka community battery trial (Matt Keighley, SLA)

10:17-10:22 The Jacka community battery model (Andrew Fraser, BSGIP)

10:22-10:25 The ACT electricity network, new network tariffs (Emily Brown, Evoenergy)

10:25: BSGIP outlines workshop goals (Marnie Shaw, BSGIP)

10:25-10:55 First break out room - Customer/community engagement models.

10:55-11:00 Report back

11:00-11:25 Second break-out room - What are the gaps?

11:25-11:30 Report back

11:30-11:45 Third break-out room - Make it real.

11:45-11:50 Report back

11:50-11:55 General discussion / questions / suggestions (Andrew Fraser, BSGIP)

11:55-12:00 Reflection / next steps (Andrew Fraser, BSGIP)

Organisations represented at the workshop

ActewAGL
AGL Energy
Australian National University
Citipower PowerCor
ENEA Consulting
Enosi
Evoenergy
Grids
InFinET Energy Analytics
NoCarbon
Ready.Energy
Relectrify Pty Ltd
Reposit Power
Sumimoto
United Energy