Battery Storage and Grid Integration Program

An initiative of The Australian National University

Big Canberra Battery

Co-Design Workshop Report

29th April 2021

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Context to this report

As outlined in the Parliamentary and Governing Agreement of the 10th Legislative Assembly, the ACT Government has committed to delivering a Big Canberra Battery of at least 250 megawatts of 'large-scale' battery storage which will be distributed across the ACT. The procurement may deliver several batteries with a variety of capacities through one or many organisations.

The ACT Government engaged the Australian National University's Battery Storage and Grid Integration Program (BSGIP) to facilitate a co-design workshop where industry stakeholders could share and discuss ideas on how the battery system could be optimised for the ACT's current and future energy system needs. The co-design workshop and report contribute to the ACT Government's broader consultation on battery development options.

The Big Canberra Battery Co-Design Workshop Report (the Report) details the responses from workshop participants and provides independent commentary on the workshop findings. The views expressed in the Report are not necessarily the views of the ACT Government. Nothing stated in the report can be relied upon for future procurement processes (if any). Only documents officially released to the market as part of a formal tender or expression of interest process (if any) should be relied on.

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Contents

Key Terms

AEMO
Australian Energy Market Operator.

Ancillary Services
Ancillary services are used by AEMO to manage the power system safely, securely, and reliably.

Battery Ecosystem
The collective term for a portfolio of different battery storage systems, which could include a small number of large sites as well as a series of distributed distribution-scale or facility-scale batteries.

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.

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

FCAS
Frequency Control and Ancillary Services. FCAS refers to the market mechanism used by AEMO for providing ancillary services.

LSBS
Large Scale Battery Storage.

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

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.

Regulatory Sandbox
A regulatory sandbox is a framework within which participants can trial innovative concepts in the market under relaxed regulatory requirements at a smaller scale, on a time-limited basis and with appropriate safeguards in place.

Storage-as-a-Service
Battery storage provided to a customer as a service offering as an alternative to owning the storage asset.

TNSP
Transmission Network Service Provider. In the ACT, Transgrid is the TNSP.

Vehicle to Grid (V2G)
The process of accessing energy stored in an electric vehicle to supply the energy to a home or back into the grid.

Executive Summary

The Big Canberra Battery project aims to deliver 250 MW of 'large-scale' battery storage (LSBS) across the ACT. The ACT Government engaged the ANU Battery Storage and Grid Integration Program to undertake a co-design workshop process to help inform the design of the project. At the time of this report's publication, the initiative is in its first phase (market sounding). The report findings will be used to inform later project activities.

The co-design workshop was held in April 2021 and attended by a range of key stakeholders. The workshop participants were guided through a range of activities to brainstorm ideas and explore the impacts of these ideas. This report details the responses from the workshop and provides expert independent commentary where required.

The workshop insights were varied, representing the differing views of the different stakeholders. Despite this diversity there were several key themes that were identified throughout the workshop. The themes are:

1. Transmission scale batteries are increasingly well served but financing remains a challenge;
2. There are many opportunities for distribution scale batteries, to support the grid or provide new services to customers and communities;
3. Accessing network support opportunities for distribution scale batteries remains a challenge; and
4. Other opportunities exist for co-locating storage with other energy uses such as EV charging, Vehicle to Grid or Hydrogen projects.

The report uses the workshop findings to develop several potential opportunities to inform preliminary thinking on how the Big Canberra Battery project may be implemented. The opportunities were developed by analysing the findings with respect to the current state of battery technology development, regulation, and other known trials. The ACT Government may consider these concepts as it moves into later project stages. The concept programs identified are:

1. Transmission Scale Battery Co-investment;
2. Distribution Support Battery Program;
3. Battery Co-location Program;
4. Community Energy Storage Systems Program; and
5. Technology De-risking Demonstrations.

These options take a portfolio approach to the investment in battery storage assets. This could allow the ACT Government to invest in battery assets with a range of returns from transmission scale through to a small grant program for highly innovative trial projects.

Key Insights

Several recommendations are made throughout the report. These are identified by italic text and listed below for the ACT Government in implementing the program.

1. *The ACT Government may wish to further investigate the risk profile of LSBS financing to confirm the higher risk profile described in the workshop. Page 17;*
2. *Community batteries are considered an opportunity for the Project to explore further and demonstrate how a community energy model could work in the ACT. Page 17;*
3. *The participants generally agreed that batteries should be co-located within the distribution network and within growth areas such as near the light rail line, high demand point loads such as data centres or hospitals. Page 17;*
4. *Co-location of batteries at schools were identified as a good opportunity with spare space and only used at certain times of the year. Page 17;*
5. *Participants commented that battery locations should link with electrification initiatives to cater for EV or electric bus charging infrastructure. The opportunities for Vehicle-to-Grid services were discussed in multiple groups, highlighting the need for an integrated approach. Page 17;*
6. *Back-up services were raised by multiple groups, as an opportunity for the Project. Page 18;*
7. *Network support services were identified as useful services the batteries could provide. Page 18;*
8. *The Project provides an opportunity to test and demonstrate alternative battery chemistries with a view to de-risking, increasing confidence in different technologies and providing operating reference sites for investors. Page 18;*
9. *The ACT Government should consider whether exploring these alternative technology options fit within the Project objectives. Page 18;*
10. *Batteries could increase the resilience of the energy system in the face of extreme weather events or natural disasters. Page 19;*
11. *The benefits of distribution storage on increasing the hosting capacity for behind the meter PV solar systems. Page 19;*
12. *There was an expectation that these batteries would be able to lower network charges which could be passed on to customers, which was seen as less likely with transmission connected storage. Page 19;*
13. *An option to allow access to batteries for customers that wouldn't otherwise be able to access them was suggested. This would allow more equitable access for residents in apartments with space constraints or low-income residents. This could be offered as a 'storage as a service' offering. Page 19;*
14. *An open question was asked on the how residents would be engaged through the Big Canberra Battery program. The ACT Government should consider the need for engaging residents through this project. Page 19;*
15. *The ACT Government may wish to explore standardising the battery system communications interface with Evoenergy. Page 20;*
16. *The commercial model will need to stack multiple value streams, so clarity on the streams available is key. Page 20;*
17. *The ACT Government may choose to further investigate the benefits that may be achieved through incorporating hydrogen or vehicle-to-grid initiatives into the Project design. Page 20;*

18. *The ACT Government should consider the current state of technical standards for battery deployment, including safety and operating noise requirements, in the design of the Project. Page 21;*
19. *These comments were a consistent theme throughout the workshop and the ACT Government may wish to seek further verification of the financial risks facing LSBS. Page 22;*
20. *Participants raised options such as virtual net metering or exemption or reduction in distribution charges. Page 22;*
21. *The ACT Government may wish to investigate the land requirements for the Project as well as methods to streamline the land provision processes. Page 23;*
22. *There were several ways that participants suggested the ACT Government could reduce this risk:*
    - *Capacity payments, along the lines of the SIPS scheme in Victoria;*
    - *"First loss" approach where the ACT Government takes the riskiest equity stake in the Project;*
    - *ACT Government taking the volatile revenue risk and presenting it as a fixed payment to the battery proponent;*
    - *A contract for difference scheme similar to the existing ACT 100% renewable scheme; and*
    - *Convert battery investment into an annuity. Page 23;*
23. *Participants also suggested that ACT Government could assist proponents significantly with planning and connection process support. This could include actions such as:*
    - *Easing planning approvals process;*
    - *Facilitating discussions with Evoenergy for connection and network pricing;*
    - *Connecting proponents with other stakeholders;*
    - *Sharing knowledge amongst proponents and the general industry; and*
    - *Resolve regulatory blocks such as the treatment of EV chargers and storage assets. Page 23;*
24. *Participants also identified other actions that would assist community batteries directly or indirectly:*
    - *Encourage EVs and V2G in government either in addition or instead of batteries;*
    - *Increase penetration of PV on ACT Government buildings;*
    - *Promotion of the scheme or proponents' projects; and*
    - *Integration with existing ACT Government schemes. Page 24;*
25. *Participants suggested that support should be right sized to the level of risk. For example, large, centralised batteries have a lower risk profile and may need less government investment. Page 24;*
26. *Participants suggested other approaches the ACT Government could take:*
    - *Partnering with NSW;*
    - *Partnering with ARENA, particularly for early-stage and riskier technology trials;*
    - *Clearly identifying potential locations for storage; and*
    - *Vertical integration of supply and storage. Page 24;*
27. *The ACT Government should investigate the current financing arrangements for existing big battery projects and further understand the risk profile of such the related financing. Page 25;*

28. *To achieve a cumulative total of 250 MW for this project, a component of the investment should be towards large scale transmission connected batteries. Page 25;*
29. *Economies of scale also create an incentive to invest in larger transmission scale storage, which need to be weighed up against the additional value streams that may be achieved through distribution connected batteries. Page 25; and*
30. *There appears to be a gap remaining for network support at the distribution transformer level and low voltage distribution network that the ACT Government may wish to further quantify. Page 27.*

Background and Introduction

The ANU Battery Storage and Grid Integration Program (BSGIP) was engaged by the ACT Government Environment Planning and Sustainable Development Directorate (EPSDD) to conduct a co-design workshop as part of the Big Canberra Battery project (the Project).

The Project fulfills an ACT Government commitment to deliver at least 250 MW of new 'large-scale' battery storage (LSBS) distributed across the ACT. This "battery ecosystem" could include a small number of large sites as well as a series of distributed distribution-scale or facility-scale batteries. The initiative will consist of government investment, with an expectation of future revenue streams or cost savings for the ACT Government.

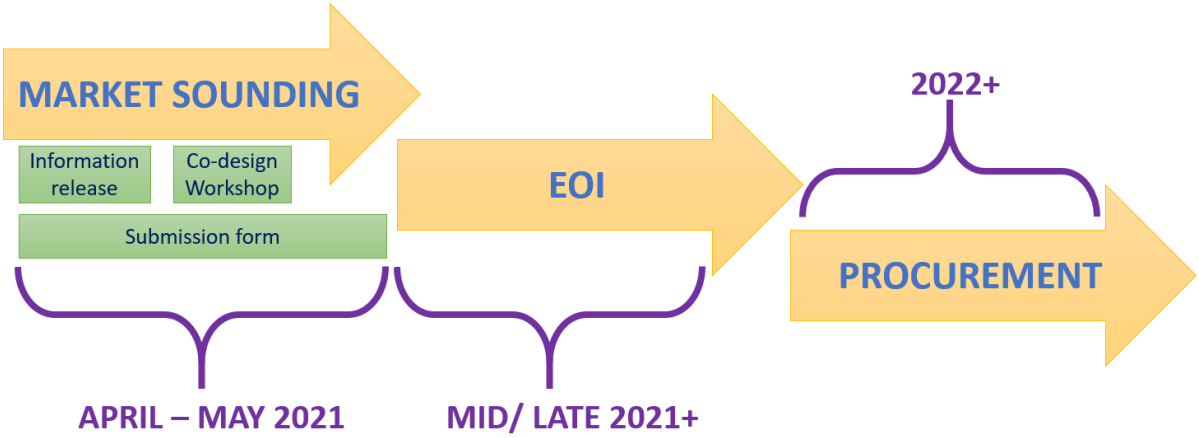
The battery ecosystem may include a combination of:

1. Transmission-scale batteries: Large batteries (typically 5 MW+) that provide market services to the National Electricity market (NEM) (i.e Frequency Control and Ancillary Services), seek to profit from market arbitrage (i.e buy low sell high) or seek to shift renewable supply to periods of high demand (by storing output during peak production and supplying output during peak demand);
2. Distribution-scale batteries: Medium batteries (typically 100 kW to 10 MW) that are integrated into the distribution network and primarily generate revenue from providing local services and can also earn revenue from national markets. A community battery is a distribution scale battery that provide 'storage as a service' (i.e. subscription based access to storage) for solar PV generating households, and can also provide network support to enable a high uptake of rooftop solar and electric vehicles, as well as wholesale and ancillary services; and
3. Facility-scale batteries: Small batteries (typically less than 1 MW) that are placed 'behind the meter' at commercial premises such as industrial sites, depots, hospitals, and commercial centres. Facility batteries store electricity that is either generated onsite or purchased from the grid (typically at periods of low price) to be consumed during periods of peak demand and price. They may also participate in the delivery of energy, ancillary, and network services.

Market Sounding

The first phase of the Project is a market sounding process, which will determine what combinations of services and infrastructure the market can provide. This information will inform analysis of how the available Large-Scale Battery Storage (LSBS) services can be optimised for the ACT's distribution and transmission networks. The co-design workshop and report will contribute to this phase. ACT Government released the following information through its Letter to Industry in April 2021:

Figure 1 Big Canberra Battery Indicative Timeline



Submission form

The ACT Government is seeking ideas and innovative solutions for how the Big Canberra Battery could be built in the ACT. Market participants are asked to provide written submissions including feedback and/or advice on how the Big Canberra Battery could be built in the ACT. The ACT Government may use information you provide as part of the market sounding process to inform its decision-making, assist in assessing risks and issues relating to the Project and develop project requirements, procurement options and approaches. Submissions closed at 5pm on 7 May 2021.

Expression of interest

The ACT Government will hold an Expressions of Interest (EOI) process in mid-2021 to determine market options and interest in the Project, and in specific design parameters. The ACT Government may choose to limit participation and shortlist the EOI's in the future procurement to projects and proponents from the EOI. If a shortlist is created this will be communicated prior to the EOI process opening, and a series of evaluation criteria will be provided that will be used to shortlist proposals.

Procurement

The ACT Government will hold one, or a series of procurement processes, anticipated to commence in 2022. This process may be delivered over a period of around 12 months, with different procurement packages focussing on different types of battery systems, for example, grouped based on size, location, or purpose.

Co-design Workshop Format, Agenda and Attendees

The purpose of the co-design workshop was to gather a broad range of ideas and comments by allowing the workshop participants freedom to explore ideas and provide input regarding implementation of the Project.

The co-design workshop was facilitated by members of the ANU BSGIP team, and held virtually via Zoom and Miro on the 29th April 2021 at 1:30pm.

Attendees

The workshop was an invitation only event, with an attendee list derived from ACT Government's and ANU's network of stakeholders. The final invite list was determined by 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; and
7. Energy consultants.

An invitation was extended to individuals within the selected organisations, with a limit of one representative for most organisations[1]. The workshop was ultimately attended by 48 people including facilitators and ACT Government observers.

Agenda

The workshop consisted of an Acknowledgement of Country, welcome, introductory remarks and presentation, and three sessions where attendees were broken into discussion groups.

The introductory remarks and presentations were given by the ACT Government's Coordinator General for Climate Action (Sam Engele) outlining the Project, its objectives and the project plan. The ANU's Entrepreneurial Fellow and Head, Battery Storage and Grid Integration Program (Lachlan

[1] Exceptions were made for market and regulatory bodies and Evoenergy.

Blackhall) then outlined the objectives of the workshop. A copy of the full workshop agenda can be found in Appendix A.

Four groups were formed using Zoom breakout rooms. Attendees were randomly assigned to rooms. BSGIP provided a facilitator for each room. Each group 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 below.

Figure 2: Workshop Activity 1 Brainstorm

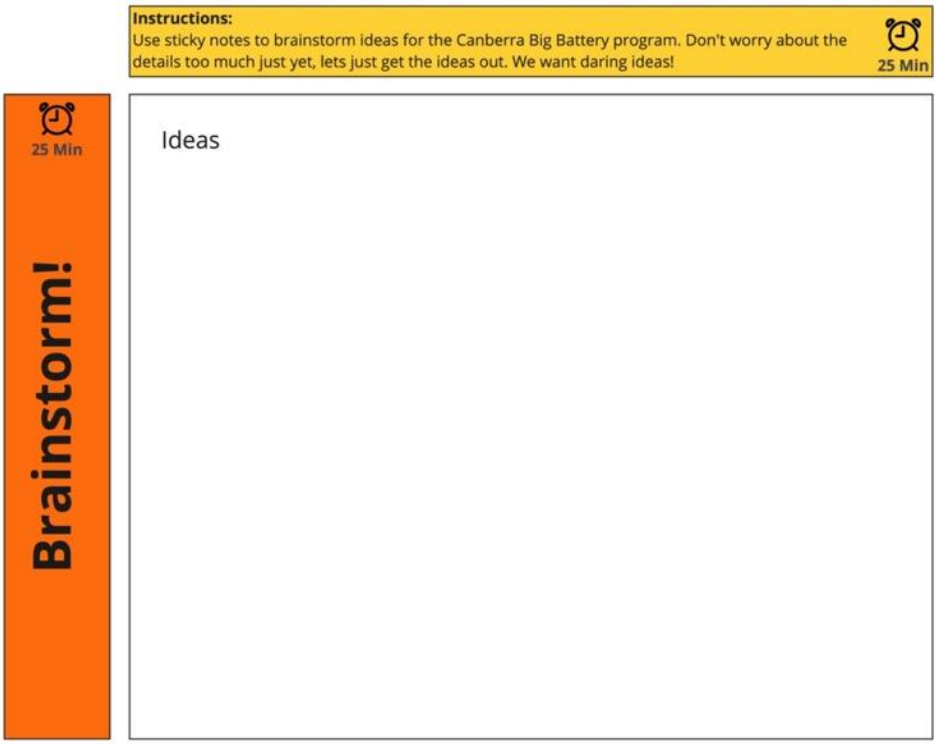


Figure 3: Workshop Activity 2 Impacts

Instructions:
Taking the general ideas above, how could additional battery storage in Canberra provide positive benefits to the ACT community in the following 4 areas. Use sticky notes.

25 Min

25 Min

Impacts!

Benefits to ACT Residents	Innovation (Technical, Services, Financial, Business Model)
Environmental and Sustainability Goals	Jobs and Economic Growth

Figure 4: Workshop Activity 3 Make it Real

25 Min

Make it Real!

What are the gaps that need to be filled to see broad battery deployment?
How can ACT Government help? (Think more than funding)
How should ACT Government approach the market?

Co-design Workshop Key Themes

The key themes, comments and questions raised by the workshop participants are described in this section. The raw workshop templates completed by the participants can be found in Appendix B.

General Themes

The general themes observed throughout the workshop are described below.

Current Battery Market

- Participants noted that the transmission-connected and residential-scale battery markets are already well-served and that large transmission batteries are now commercially viable for investors;
- Many groups noted that a key gap in the battery market is for distribution-scale and facility-scale batteries; and
- Participants expected that decarbonisation and energy bill price reductions will come from medium-sized distribution-scale storage.

Evoenergy Engagement

The workshop participants identified Evoenergy as a critical stakeholder. The follow points were made with respect to the Evoenergy engagement:

1. It is important the ACT Government works together with Evoenergy on how to most efficiently and effectively incorporate the proposed 250 MW of storage on the ACT grid;
2. The Evoenergy annual planning report provides information on constrained parts of the network and should be communicated to proponents explicitly as part of the program delivery;
3. Evoenergy would prefer control or at least last-resort control, of the batteries; and
4. Propose working group between key stakeholders for strategic direction – Evoenergy and the ACT Government.

Workshop Session 1- Brainstorming Results

The following comments were made by workshop participants through the first break-out group activity: Brainstorming ideas. This session asked participants to raise unique ideas and constraints that the ACT Government may consider in later project phases.

Battery Size, Scale and Investment

There was strong support from multiple groups for community batteries or distribution-scale connected batteries, up to 20 MW. These comments were made within the context of assisting the ACT meet its net-zero emissions targets, such that the distribution connected batteries could assist with the integration of electric vehicle charging and phasing out of reticulated gas.

It was generally noted that transmission connected batteries are already gaining momentum within the ACT through the renewable energy reverse auction and subsequent announcements by Neoen for a 300 MW battery at Ginninderry.

Several participants noted the ongoing challenges with financing LSBS, with the developments still not reaching investment grade. Participants believe there is still a role for the ACT Government in de-risking the investment, despite the LSBS developments already underway. *The ACT Government may wish to further investigate the risk profile of LSBS financing to confirm the higher risk profile described in the workshop.*

Evoenergy indicated batteries above 10 MW were not preferable from a network connection integration point of view.

Community Batteries

Most discussion and comments regarding distribution connected batteries focussed on community batteries. This includes utilising the battery for a range of community uses, such as storing excess solar and supplying nearby loads, supplying power back to the grid at peak times, as well as supplying the wholesale and ancillary markets. Participants commented on the extra value available from these uses. Interest was also shown in how the optimisation and control of an aggregated fleet of assets could operate, and how the distribution connected storage could operate with co-located renewables, or tie into the ACT renewables scheme.

Some issues with the community energy concept[2] were identified. Participants also drew attention to the current lack of a viable business model for community energy, and further work is required to allow this to type of storage to scale quickly. *Community batteries are considered an opportunity for the Project to explore further, and demonstrate how a community energy model could work in the ACT.*

Locations

The participants generally agreed that batteries should be co-located within the distribution network and within growth areas such as near the light rail line, high demand point loads such as data centres or hospitals. Schools were identified as a good opportunity with spare space with intermittent energy usage.

Similarly, participants commented that battery locations should link with electrification initiatives to cater for EV or electric bus charging infrastructure. The opportunities for Vehicle-to-Grid services were discussed in multiple groups, highlighting the need for an integrated approach.

A comment was made that location and size should focus on delivering value, and cost-benefit analysis is important. Portable batteries[3] were also put forward as an "out there" idea.

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[2] Community energy is generally defined as 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.

[3] Portable batteries are batteries that can be relocated to different locations as needed. Note: While a battery can be made portable through fitting with skids or trailer mounted, much of the connection infrastructure such as protection and earthing systems is not portable, limiting the real applications for portable batteries.

Services

Back-up services were raised by multiple groups, as an opportunity for the Project. Backup services could increase reliability, increase bushfire resilience, and mitigate other climate risks, by supplying energy to local customers at times when there are outages on the main grid. These services would transform a community or distribution scale battery into an 'islandable' microgrid.

Network support services were identified as useful services the batteries could provide. This could include reactive power support, demand management (peak/trough shaving), power quality, voltage support.

A suggestion was made to incentivise the replacement of existing diesel back-up generators with battery storage, and then aggregating them. BSGIP understanding of battery back-up is the batteries would need to remain fully charged, and therefore not be able to earn other revenues which is likely to impede a positive financial return for batteries deployed for this purpose.

Alternative Battery Technology

Multiple participants cited the interest in exploring alternative battery chemistry technologies. *The Project provides an opportunity to test and demonstrate alternative batteries with a view to de-risking, increasing confidence in different technologies and providing operating reference sites for investors.*

Potential integration with hydrogen projects were also suggested, however a detailed model was not proposed.

These comments were made in the context of a brainstorming session, so *the ACT Government will need to consider whether exploring these alternative technology options fit within the Project objectives.*

Workshop Session 2- Impacts Results

Workshop session 2 expanded on the ideas generated in Workshop Session 1 with the aim to consider aspects beyond technical factors. Workshop participants were asked to consider a broad range of factors and identify opportunities and weaknesses for each. The workshop templates explicitly outlined four factors:

1. Benefits for ACT Residents;
2. Innovation (Technical, Services, Financial, Business Models);
3. Environment and Sustainability Goals; and
4. Jobs and Economic Growth.

The exploration of these factors allows consideration of the triple bottom line for the Project.

Benefits to ACT Residents

The workshop participants identified several benefits to ACT residents during the break-out sessions. Participants identified that:

- *Batteries could increase the resilience of the energy system in the face of extreme weather events or natural disasters.* This is seen as particularly important to communities in and around the ACT following the bushfires in 2020. This theme was raised by multiple groups;
- *The benefits of distribution storage on increasing the hosting capacity for behind the meter PV solar systems.* This theme was also highlighted in context of the new electric only greenfields developments. There were also multiple comments as to whether the risk of curtailed DER output is a real or perceived risk in the ACT[4];
- There are potential bill savings for all customers through the deployment of distribution level batteries. *There was an expectation that these batteries would be able to lower network charges which could be passed on to customers, which was seen as less likely with transmission connected storage. Choosing the right locations would be critical here.* Lower network charges, or at least downward pressure on charges could occur if batteries provide network support services at a lower overall cost than upgrading network assets (poles and wires);
- *An option to allow access to batteries for customers that wouldn't otherwise be able to access them was suggested. This would allow more equitable access for residents in apartments with space constraints or low-income residents. This could be offered as a 'storage as a service' offering; and*
- *Finally, an open question was asked on the how residents would be engaged through the Big Canberra Battery program. The ACT Government should consider the need for engaging residents through this project.*

Innovation (Technical, Services, Financial, and Business Models)

The groups identified several areas for innovation across battery uses, commercial innovation and integration with adjacent technologies such as hydrogen electrolysers, electric vehicles and vehicle to grid systems.

Several options for innovating within the function set of batteries were identified. This included demonstrating synthetic inertia and fast frequency response services from the battery. Synthetic inertia is the ability for the battery to supply energy into the grid during a fault, assisting with grid stability. TNSPs are responsible for ensuring there is adequate inertia in the system, which has led to some TNSPs procuring inertia services[5]. Fast frequency response is the ability for the battery to quickly

[4] Currently DER export is not being limited in the ACT in the way that it is in other areas of the country, primarily due to the relatively lower uptake rates, so these comments likely stem from the broader conversation occurring within the energy industry around the need to manage solar exports

[5] https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/Operability/2020/2020-System-Strength-and-Inertia-Report

respond to frequency deviations, much faster that the current Frequency Control and Ancillary Services (FCAS) requirements. The AEMC is currently developing a Fast Frequency Response market ancillary service[6] which will monetise the fast response of batteries and increasing their FCAS revenues.

Other options identified include services for the DNSP including voltage support and power quality services.

Another identified area for innovation is the integration of the battery control and communications systems with Evoenergy. For a battery to help avoid network upgrades, the battery will need to discharge and discharge at certain times, in line with power flows in the network. The DNSP operational systems (such as the Advanced Distribution Management System) needs to forecast when and how much the battery will be needed and communicate this to the battery. The technology use to communicate this control function could become costly when multiple different battery control system exist, and opting for a standardised communications system is beneficial. *The ACT Government may wish to explore standardising communications with Evoenergy.*

Innovation within the commercial models was highlighted, particularly the desire to lower the barriers for providing network services to Evoenergy and accessing the corresponding revenues. Other comments include the potential to consider dynamic and locational pricing for distribution connected batteries, as well as options to waive NUOS charges for the battery. *The commercial model will need to stack multiple value streams, so clarity on the streams available is key.*

One group identified opportunities to explore the integration of distribution batteries with Vehicle-to-Grid functions or Hydrogen electrolysers. Similarly, ideas for transportable batteries or virtual batteries were suggested. These ideas were proposed at high levels only, and would require further analysis to determine the design elements and understand the viability. *The ACT Government may choose to further investigate the benefits that may be achieved through incorporating hydrogen or vehicle-to-grid initiatives into the Project design*, however the relative immaturity of each technology requires further development to reach investment potential, likely exceeding the time frames specified for the implementation of this project.

Environment and Sustainability Goals

The group discussions around the environment and sustainability goals focussed on three main topics.

Firstly, the groups believed that distribution level batteries could increase the PV hosting capacity within the ACT. Increased hosting capacity will allow additional PV generation onto the system, potentially offsetting fossil fuel-based generation elsewhere.

Secondly, the additional battery capacity in the ACT should assist the decarbonisation of generation within the NEM broadly, through displacing existing fossil fuel generation; Battery storage should take

[6] https://www.aemc.gov.au/rule-changes/fast-frequency-response-market-ancillary-service

the place of gas peaking generation, and consideration should be given to longer duration (up to 8 hour) storage capabilities and its impact on decarbonisation. In addition, the extra battery capacity should be targeted to help the ACT reach its net-zero emissions target.

Finally, a range of environmental impacts directly applicable to the battery units were raised. This includes considering the whole-of-life management of the batteries, including disposal and recycling costs and capacity. The end-of-life disposal and recycling issues were raised by multiple groups, with calls to investigate alternative battery chemistries. Operational risks were also raised including battery safety and operating noise. *The ACT Government should consider the current state of technical standards for battery deployment, including safety and operating noise requirements, in the design of the Project.*

Jobs and Economic Growth

Multiple groups felt that more local jobs would be created through a network of smaller batteries rather than a larger transmission scale battery. With smaller distribution connected batteries there is greater prospect of local installers and engineering companies being involved in the installation and commissioning process.

Groups commented that local manufacturing is unlikely, however there is potential for other services such as installation, testing, operations, maintenance, and recycling.

The scaling and transition towards a network of batteries needs support from education and training institutions as well as research organisations, to ensure sufficient capacity within the work force.

A suggestion was made that ACT could be a valuable proving ground for the development of scalable planning and development tools for the rapid deployment of distribution-scale batteries. Tools such as these will be needed by all DNSPs across Australia to manage the connection of distribution scale batteries. Indeed, new capability will be needed in the form of people, processes, technology and information. Other tools that assist battery operators plan and operate the batteries is also required, especially as the value stack becomes more complex, with many more variables to account for in the business case and ongoing operation.

Workshop Session 3- Make It Real Results

Workshop Session 3 sought to focus the groups attention on the specific steps the ACT Government could take regarding the implementation of the Project. The workshop template guided the participants through the following questions:

1. What are the gaps that need to be filled to see broad battery deployment;
2. How can ACT Government help? (Think more than funding); and
3. How should the ACT Government approach the market.

Gaps

There were several gaps mentioned by workshop participants. These can be grouped into two themes: Financial/risk and regulatory.

Financial

Financial barriers were often identified by participants regarding the risk and bankability of projects including the ability to attract finance on competitive terms. The workshop participants commented that it is difficult to get finance for new business models, even if the technical, contractual, and social hurdles have been cleared, and this is particularly true for volatile or uncertain revenue streams. The Project may stack up economically but can still have issues securing funding due its risk. *These comments were a consistent theme throughout the workshop and the ACT Government may wish to seek further verification of the financial risks facing LSBS.*

Regulations

Energy regulatory gaps were commonly cited. These related to distribution network pricing and connection agreements.

- Network pricing is a significant barrier for mid-sized batteries in the distribution network. Large scale uptake of community storage likely requires some sort of different distribution pricing arrangement;
- *Participants raised options such as virtual net metering or exemption or reduction in distribution charges;*
- Connection agreement processes had also proved problematic for participants. The process can be long and complicated for community scaled assets;
- Batteries can reduce network constraints, but participants found locating data and negotiating agreements with the DNSP challenging. The Regulatory Investment Test-Distribution (RIT-D)[7] process was specifically mentioned as a challenge to identifying revenue streams to underpin battery investment and deployment[8];

[7] https://www.aer.gov.au/system/files/AER%20-%20Final%20RIT-D%20application%20guidelines%20-%2014%20December%202018_0.pdf

[8] The RIT-D process is prescribed by the Australian Energy Regulator to guide a DNSP select the best network upgrade options. The process specifically seeks options for non-network solutions, for which a 3rd party provided battery may be a viable option. At this point in time, there have been no battery based solutions arising from a RIT-D. However, Evoenergy have identified a battery as a potential non-network solution in its Molonglo zone substation project. The RIT-D process for this project is ongoing.

- Embedded networks or microgrids are an alternative to traditional network connection arrangements[9]; and
- Planning rules and land access were also commonly cited barriers. Community batteries require many, small parcels of land which increases complexity of acquisition. *The ACT Government may wish to investigate the land requirements for the Project as well as methods to streamline the land provision processes.*

ACT Government Support

Participants identified two key areas where the ACT Government could help facilitate the types of storage investments raised by the workshop participants. Firstly, the investment risk for battery assets and secondly in providing assistance to expedite or streamline the planning and connection process.

Investment Risk Reduction

Mid-scale energy storage is still seen as a higher risk investment by investors today. Revenue streams are highly volatile and difficult for proponents to manage. *There were several ways that participants suggested the ACT Government could reduce this risk:*

- *Capacity payments, along the lines of the SIPS scheme in Victoria;*
- *"First loss" approach where the ACT Government takes the riskiest equity stake in the Project;*
- *ACT Government taking the volatile revenue risk and presenting it as a fixed payment to the battery proponent;*
- *A contract for difference scheme similar to the existing ACT 100% renewable scheme; and*
- *Convert battery investment into an annuity.*

Some participants also suggested that, depending on the services required, the ACT Government could monetise services not currently valued. For example, this could be for services such as fast frequency response.

Planning and Connection Process Support

Participants also suggested that ACT Government could assist proponents significantly with planning and connection process support. This could include actions such as:

- *Easing planning approvals process;*
- *Facilitating discussions with Evoenergy for connection and network pricing;*

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[9] Embedded Networks are a type of network where network services are provide by a party other than the DNSP. This sort of arrangement moves the connection point for customers upstream and allows local value transfer more easily. Currently these arrangements are challenging to implement due to restrictions in transporting energy across land parcels.

- *Connecting proponents with other stakeholders;*
- *Sharing knowledge amongst proponents and the general industry; and*
- *Resolve regulatory blocks such as the treatment of EV chargers and storage assets.*

Many of these blockers could be resolved through "regulatory sandboxes"[10] while concepts are still at an early stage.

Participants also identified other actions that would assist community batteries directly or indirectly

- *Encourage EVs and V2G in government either in addition or instead of batteries;*
- *Increase penetration of PV on ACT Government buildings;*
- *Promotion of the scheme or proponents' projects; and*
- *Integration with existing ACT Government schemes.*

Participants suggested that support should be right sized to the level of risk. For example, large, centralised batteries have a lower risk profile and may need less government investment.

Approach

Many participants voiced concerns that the requirements of the program were unclear, as they relate to value streams. Participants felt it would be challenging to present a credible proposal to the scheme as it stands. It is challenging for developers to determine which elements of the value stack are accessible without a clear idea of the ACT Government's usage requirements. Participants felt it may be beneficial to undertake an exercise to identify these requirements more clearly. There was general support for a 2-stage process where the first stage helps clarify the scheme objectives.

There was a strong preference for the scheme to be defined in terms of the problem to be solved rather than a particular solution. For example, mandating batteries or a particular model of community participation may lock out other proposals that may better meet the end need.

Participants suggested other approaches the ACT Government could take:

- *Partnering with NSW;*
- *Partnering with ARENA, particularly for early-stage and risker technology trials;*
- *Clearly identifying potential locations for storage; and*
- *Vertical integration of supply and storage.*

[10] A Regulatory Sandbox is a mechanism made available by the AER to provide advice or waive certain rules for the purposes of trial innovation.

Analysis and Insights

This section considers the key themes identified in the workshop and analyses them in the context of the current state of technology developments, project delivery and maturity, and the current and near term regulatory position.

Transmission Scale Batteries

The general view of the group is these batteries are now more mature in terms of the value streams that can be accessed by large scale batteries, but a key issue remaining is how projects obtain suitable finance. Some workshop participants suggested a role the ACT Government in de-risking the investment through this project. BSGIP analysis supports this view and is evident in the funding arrangements of many other battery projects announced to date. For example, the 300 MW Victorian Big Battery Project is progressing with the assistance of the Clean Energy Finance Corporation (CEFC)[11]. *The ACT Government should investigate the current financing arrangements for existing big battery projects and further understand the risk profile of such the related financing.*

The workshop groups highlighted the opportunities for offering network support services from a transmission connected battery will be limited and cannot provide distribution network support. While it's true there will be some opportunities for distribution network support to defer network upgrades, these opportunities are of the 5 MW and below sizes and will be at a limited number of locations. *Therefore, to achieve a cumulative total of 250 MW for this project, a component of the investment should be towards large scale transmission connected batteries.*

Economies of scale also create an incentive to invest in larger transmission scale storage, which need to be weighed up against the additional value streams that may be achieved through distribution connected batteries.

Distribution or Precinct Scale Batteries

The workshop participants talked extensively about the concepts of community batteries and distribution connected batteries. Before analysing the different views, distribution connected batteries will be explained to clarify where they can be connected and what services they can offer.

Firstly, batteries can be connected in the distribution network just like any other load or generator. The size of the battery (in MW or kW) dictates the locations in the network where connections are technically feasible. For the purposes of clarity within this report, the following general principles will be applied:

1. Up to 1 MW can be connected to the LV distribution network;

[11]https://www.cefc.com.au/media/media-release/cefc-backs-300-mw-victorian-big-battery-to-strengthen-grid-and-support-more-renewable-energy/

2. Up to 5 MW can be connected to the MV distribution network with a dedicated transformer at various locations along the feeder; and
3. Up to 20 MW can be connected to the distribution network via dedicated MV Feeders and is more economic close to or co-located with zone substations.

Secondly, distribution connected batteries can provide a range of services and stack value streams as per transmission scale batteries. Distribution connected batteries can provide similar services to transmission batteries, in terms on wholesale and ancillary services markets, providing the other market conditions are met. These conditions relate to market registration and the specific FCAS technical requirements. Generally, there are no impediments to distribution batteries accessing these value streams. Other services, such as the System Integrity Protection Scheme in Victoria are better suited to large scale transmission scale systems[12], as they require high-speed communications-based triggering mechanism that are easier to implement at a single location rather than distributed across a geographically dispersed fleet of batteries.

Distribution Network Support Services

Distribution batteries can unlock additional value streams if they are in the right locations. For example, a distribution battery located in an area of high demand growth could offset the need for a network upgrade. The DNSP is obligated to consider options such as distribution connected batteries as part of the Regulatory Investment Test- Distribution (RIT-D) that it must undertake as part of the network upgrade process. Evoenergy is considering a distribution battery alternative to defer expenditure on their Molonglo Zone Substation project[13]. By locating a battery near the network issues and entering into an agreement with the DNSP to provide network services, a distribution battery can obtain an additional revenue stream.

While the network support revenues are possible and will potentially start within the Evoenergy Network this year, the workshop participants generally noted the difficulty and risk in accessing network support more generally. The analysis conducted for this report reveals several aspects to this argument that appear as barriers to broader network support services:

1. Visibility of network constraints that lead to Network Support services. Evoenergy through its network planning function identify network constraints, in-line with their regulatory obligations and publish them through their Annual Planning Report (APR)[14] as well as a new map view[15]. The requirements of the APR processes focus on the larger capacity (and cost) assets including zone substations, sub-transmission feeders and MV feeders. Many of the issues that may be solved by

[12] The Australian Energy Market Operator will reserve 250 MW from Neoen's 300 MW battery to operate in a control scheme to increase the capability of the Victoria to New South Wales Interconnector (VNI) and respond to unexpected network outages in Victoria. https://aemo.com.au/en/newsroom/media-release/aemo-completes-system-integrity-protection-scheme-procurement-process

[13] https://www.evoenergy.com.au/about-us/about-our-network/network-projects

[14] https://www.evoenergy.com.au/about-us/reports-and-publications/annual-planning-report

[15] https://apr.evoenergy.com.au/

distribution connected batteries is toward the end of feeders, at distribution substations and into the LV network. There remains a gap in both identifying these issues and subsequently publishing their locations in an efficient manner;

2. The analysis also reveals a potential gap between the expectations of the magnitude of network support available. Commentary from the workshop participants appeared to assume there was sufficient need for network support already, and the gap is in the processes to access the revenue. However, Evoenergy have conducted their planning analysis at feeder and zone substation level and have not identified any further opportunities for network support from battery storage. *There appears to be a gap remaining for network support at the distribution transformer level and low voltage distribution network, that the ACT Government may wish to further quantify;* and

3. The regulatory framework that Evoenergy must operate within, as it relates to network support services. Evoenergy operates with the regulatory processes to deliver the supply of distribution services. There are however some potential gaps and issues to the current regulatory framework that hinders smaller batteries. Firstly, the Demand Management Incentive Scheme and its associated reporting creates an overhead cost that outweighs the incentives at small scales. Secondly, as highlighted in point 1 above, there is no regulatory requirement to identify and publish constraint information at the lower levels of the network, which is not to say it isn't done, but instead to indicate that the focus is on achieving the regulatory requirements first.

Community Energy Services

Distribution connected batteries can also provide services to local customers and these batteries are commonly referred to Community batteries. These services may include offering storage as a service to customers that do not have their own storage, acting as a "solar sponge". This functionality would give local customers the ability to export their solar into the battery, and then draw that energy it back when required. This function effectively adds a new value stream on top of the existing value streams available to a distribution connected battery. However, an advanced software control system is required to deliver these functions, and to date, no community battery has been able to demonstrate all value streams concurrently.

Community energy projects are beginning across the country with Ausgrid and Western Power already operating. These projects are investigating different approaches to providing community services, including different customer ownership/payments, different tariffs (including network) as well as combining network support functions. There is considerable interest from community groups in exploring renewable energy projects and incorporating energy storage into these projects is a key point of interest.

ANU research has shown there is support for community energy projects broadly, however network tariffs remain a key barrier[16]. The current network tariff structure generally does not recognise the local value of storage and applies a double counting of energy into the battery and again back into the

[16]https://arena.gov.au/assets/2019/02/operating-a-community-scale-battery-electricity-tarrifs-to-maximise-customer-network-benefits.pdf

home. New tariffs that avoid these issues are being proposed and trialled by Ausgrid in their project and are also being considered in other states for similar trial projects. The new tariffs include a Local Use of System (LUOS) component, to recognise the local nature of the energy transfer that replaces the Distribution Use of System (DUOS) fees for that portion of the energy transaction. The new tariffs are being implemented through Tariff Trials as part of the DNSP's Tariff Structure Statement process with the AER.

This report notes the parallel work occurring explore community energy batteries by the Suburban Land Authority in the Jacka development. This work is well progressed and provides an excellent opportunity to progress distribution connected batteries in a greenfields urban development context. The Jacka Community Battery project is contemplating 5x 1 MW batteries in the first stage, and presents a great opportunity to explore greenfields community batteries, however the ANU research shows there is demand for community batteries broadly across many areas, and the ACT Government may wish to consider existing community locations for community battery solutions as well as the Jacka project.

Behind The Meter Batteries and Co-Location

The workshop participants raised the opportunity to co-locate batteries at key sites or locations of sizeable demand. This arrangement can unlock another value stream in optimising local network demand charges for customers at that site. For example, a large battery could be connected at a school, behind the meter, to assist the school manage its network demand charges, provide energy arbitrage services, increase ability host PV solar systems or managed excess solar generation.

Larger behind the meter system such as this can still access network support services as well as wholesale and ancillary services revenues through aggregation or VPP arrangements.

Opportunities to co-locate storage with electric vehicle chargers or hydrogen electrolysers are other good examples, raised in the workshop, and these arrangements have the added ability to potentially offset network upgrades due to the increased charging demand.

Opportunities for Big Canberra Battery

Several opportunities have been identified through the workshop and subsequent analysis and have been brought together as opportunities for the Big Canberra Battery project. Opportunities were identified across one or more of the breakout groups, and across one or more of the factors explored in the workshop.

The opportunities identified are:

1. Transmission Scale Battery Co-investment;
2. Distribution Support Battery Program;
3. Battery Co-location Program;
4. Community Energy Storage Systems Program; and
5. Technology De-risking Demonstrations.

These opportunities take a portfolio approach to the investment in battery storage assets. This could allow the ACT Government to invest in battery assets with a range of returns from transmission scale through to a small grant program for highly innovative trial projects.

The value streams for each program differ slightly, but all batteries are expected to be aggregated to deliver wholesale and ancillary services revenues. All distribution level batteries aim to deliver network services too, however these revenues are less certain, and the concepts identified in this report propose different mechanisms for the ACT Government to support the battery projects and minimise this risk.

Opportunity Identification Criteria

The development of the opportunity concepts was undertaken considering the following criteria:

1. The technology is sufficiently mature to be considered likely to achieve required technical outcomes;
2. The opportunities have viable pathways to provide an investment return;
3. Are absent of specific known technical challenges;
4. Provide good prospects at delivering benefits beyond financial; and
5. Are innovative and address a market gap.

Transmission Scale Battery Co-Investment

There is an opportunity for the ACT Government to co-invest in large scale transmission battery through concessional finance and/or provision of land. While participants felt the large-scale battery market is well-served currently, the investment returns appear healthy, and present an opportunity for the ACT Government to invest in a large scale transmission connected battery.

The workshop participants noted the ongoing challenges financing big battery projects generally, with projects still presenting investment risks. Participants suggested the ACT Government bears riskier investment portion and incorporates this position in the program design.

Concept Strengths

The investment returns could be used to fund additional innovative energy related projects.

The ACT Government may wish to consider whether a portion of this investment goes towards long duration (i.e. up to 8 hour) storage, with the aim to understand how this would increase decarbonisation within the NEM or any other benefits that might accrue through a diversified battery portfolio.

Concept Weaknesses

This option alone does little to assist other policy initiatives in the ACT such as electrification of transport or the efficient delivery of electric-only suburbs required to meet the net zero targets. This program will also focus jobs creation into a small number of large projects in a sub-sector that is already mobilised. Therefore, further concepts could also be employed to address these gaps.

Distribution Support Battery Program

This program proposes a distribution scale battery network option to build capability within Evoenergy and to develop a scalable network supporting battery suite that can be readily deployed in areas with over/under demand.

Distribution scale storage could obtain additional revenue from Evoenergy in areas where constraints exist, network augmentation is planned and a RIT-D indicates a non-network option is the best outcome for customers. In practice, there are very few locations where this is viable, however Evoenergy have already progressed such an option for the Molonglo zone substation deferral. Evoenergy advise there are no other sites immediately available for large asset deferrals at this point.

However, Evoenergy advise there are smaller distribution substations that are nearing capacity limits in locations that are experiencing load growth from urban infill. These locations could benefit from localised storage.

This program could target the constrained areas and install small scale distributed batteries, likely LV connected, to alleviate the peak demand constraints. The storage would need to be in the order of 300-500 kWh and be suitable to quickly deploy on a nature strip.

The exact volume and location of small systems required is unknown. The planning studies required to determine this require additional resources, new analysis tools and techniques, some of which Evoenergy are developing, while other tools will require specific development. The order of magnitude is volume is in the 100s of systems across the ACT over five years.

Concept Strengths

The program could achieve many of the benefits explored in the workshop, including decarbonisation and economic growth. The batteries would be sited in congested areas in the network, creating more effective capacity for EV charging, PV generation as well as extra load growth as gas is phased out.

The 100s of systems could be aggregated and co-optimised to allow access to other value streams including FCAS.

Batteries of this size and scale are within the capability of local providers, and will create new jobs in the design, installation, operation and maintenance of the systems. This also has the effect of increasing the capability of the local workforce to tackle other programs within the broader Big Canberra Battery initiative.

Concept Weaknesses

The ACT Government may need to underwrite the value of the network support payments required and uncertainty in regulated network tariffs (DUOS), as well as arrange easy access to land and streamlined planning processes.

A barrier to this program is the lack of certainty regarding network support revenue stream for low voltage or distribution substation constraints. This stems from a lack of planning and analysis tooling within Evoenergy at sufficient depth in the distribution network, and then the subsequent development of demand management options analysis and procurement of services. The ACT Government may wish to consider the need for addressing this as part of the program.

Battery Co-location Program

Bulk electric vehicle charging points, such as bus depots, will require significant network upgrades, with “deep” augmentation costs that may be borne by the general customer base though network charges. In these cases a large co-located battery could provide an economically viable alternative by acting as a buffer, slowly charging from the grid and then being able to rapidly charge EVs.

Similarly there are other sites where co-locating batteries is advantageous. Co-locating storage at locations such as government schools provide local access to large amounts of PV, which may be curtailed into the future. Schools also provide access to existing medium sized connection points and generally have land available allowing for larger battery footprints.

The workshop didn’t have sufficient knowledge of EV uptake forecasts and other load patterns to determine the sizes and volumes for co-located batteries. However, back-to-base fleets, bus depots and taxi ranks provide good potential sites, requiring MW scale storage.

The financial imperative in this program is to avoid the deep network augmentations, so the avoided augmentation costs could be shared with the battery operator. These costs could be underwritten in this program by the ACT Government. The ACT Government may also consider options where it can take full ownership of the batteries, such as government owned schools, allowing the full return back to the ACT.

Concept Benefits

The EV charging battery co-location program will create specific benefits in assisting the electrification of transport in the EV, and managing the costs associated with charging infrastructure. These benefits are in addition to the local jobs and economic development likely from distribution scale storage.

Concept Weaknesses

This program will unlikely be able to achieve the same magnitude of network support uses, as locations will be primarily chosen on other drivers.

Community Energy Storage Systems Program

An option for community energy was strongly supported in the workshop, with all groups expressing a desire to explore this option further.

The community energy concept can be best described as local, distribution scale batteries, that provide additional services to the local community. The community energy systems can provide local storage for community members, storing excess solar generation and supplying this back when needed. Community energy storage systems can also provide network support services to the DNSP, helping manage local network issues, and increasing the effective network capacity for additional solar generation and electric vehicle charging. Community energy storage systems could also earn revenues from wholesale and ancillary services markets, contributing back these funds back to the community groups or individuals.

The program could be funded as an equity investment from the ACT government into the Community storage organisation, such that when the community storage starts returning a dividend to shareholder, the ACT government can achieve a financial return.

Community Resilience

We suggest including a specific community energy resilience demonstration. This demonstration will showcase the technical ability of island-able microgrid technology within a community energy context. The workshop participants clearly highlighted potential increased resiliency benefits from battery storage if it can provide backup power during outages. There are technical integration aspects that will need to be explored with Evoenergy to see this capability a feature of community energy storage systems at scale. As such, we recommend funding a specific demonstration project to develop a scalable and integrated solution in partnership with Evoenergy.

Coordinate with Suburban Land Agency Jacka Battery Project

The ACT Government Suburban Land Agency has been investigating community energy storage systems as part of a green fields development at Jacka. This project has advanced the planning and land allocation for sites in the master plan, as well as engaged Evoenergy and other key stakeholders. The Jacka Battery Project learnings could be shared and leveraged where possible.

Concept Benefits

The program would have benefits across a range of factors, including improving community resilience, increasing the PV hosting capacity in local areas, building community capacity for energy projects, building local employment capacity and capability and providing financial returns to the ACT Government.

Concept Weaknesses

A gap in the community energy model, is the capacity and capability for community groups to upskill themselves to deliver on the complex undertaking of a community battery. There are a broad range of challenges to navigate including technical, regulatory, connection agreements, and financing. To fill this gap, we recommend a community energy capacity building program aimed at upskilling community groups through providing technical, regulatory and legal resources to assist eager groups move towards viable community energy projects.

In parallel, the ACT Government may wish to develop an incentivised community energy storage system program that assists currently motivated and capable groups implement projects in the short term. The program could start small and increase its funding available to align with the new capability delivered through the community energy capacity building.

Technology De-risking Demonstrations

The workshop identified several areas for innovation that are still in earlier development phases and would benefit from further real-world demonstrations to build confidence in the technology.

Alternative Battery Chemistries

An option that was identified in the workshop was the trialling of a non-lithium battery chemistry, particularly in the context of managing lithium-ion end-of -life recycling concerns.

The workshop participants generally agreed that alternative battery chemistries such as flow batteries are technically viable but lack the on-ground track record, and hence exhibit an investment risk profile greater than comparable lithium-based battery chemistries.

The objective of this project would be to further demonstrate the viability of alternative battery chemistries.

Grid-Forming Inverters

Grid-forming inverters can support the large-scale uptake of renewable and distributed generation by providing services such as synthetic inertia and system strength, even during contingency and fault conditions. Grid-forming inverters are also a requirement for the island-able backup services described in the community energy storage system program. Transgrid is already developing a synthetic inertia demonstration project, however the opportunity exists to demonstrate this in combination with islanding and back up services at the distribution scale.

The ACT Government may wish to consider a grid-forming inverter demonstrations project, showcasing synthetic inertia and system strength services as well as island forming capabilities.

Concept Strengths

Although these more innovative technologies present some risk, they need not be financed through grants. For example, a portion of the Community Energy Storage Systems Program may include a specific island forming and synthetic inertia demonstration. The ACT Government may wish to incorporate this opportunity with other concepts proposed in this report that allow financial returns whilst still demonstrating these innovative new technologies.

Demonstrating these concepts further cements the ACT as the leader in renewable energy innovation, attracting further development as well as enhancing the capability and capacity within the ACT.

Concept Weaknesses

The concept is a good opportunity to explore innovative opportunities, however this level of technical innovation is not an explicit objective of the Project. The ACT Government may wish to consider how technical innovation fits within the Project or may be explored through other programs such as the Renewable Energy Innovation Fund.

Recommendations

Further to the opportunities described in the preceding section, additional recommendations have been identified for the program based on workshop feedback and subsequent analysis.

Community Engagement

Community engagement was raised in the workshops and coupled with the strong theme of community level batteries, creates a need for strong and effective community engagement.

The community engagement is required at two levels. As mentioned in the community energy storage system program description, a community energy capacity build program is required to ensure community organisations have the capability and support to tackle complex energy projects.

Secondly, the broader program design requires trade-offs between different options, drivers and policies. For example, the mix of investment between large-scale batteries through to community storage options will impact factors such streetscapes, energy pricing and PV hosting capacity. The views of the community could be considered when making these program level decisions.

The ACT Government may wish to develop an engagement plan with the community and residents of the ACT to further inform the Project design.

Evoenergy Engagement

Evoenergy are a key stakeholder in the integration of distribution connected batteries, as well as the key navigators of the transition to net-zero energy. Several of the programs presented herein would benefit from a partnership approach with Evoenergy in their capacity as the regulated distribution

network system operator. The ACT Government may wish to consider an appropriate partnering arrangement with Evoenergy in its regulated capacity.

Finance De-Risking

The workshop participants raised the issue of financial risk sharing. The ACT Government may wish to develop consider a financing and risk sharing model in project design. This may include considering options such as

- De-risking the most volatile revenue streams, for example underwriting DNSP related revenue such as network support payments or the volatility arising from the new network tariff trials (DOUS). This may also include creating payments for new services, for example providing back-up services in the distribution network;
- The ACT Government takes the highest risk equity option; and
- The ACT Government makes a fixed capacity payment based to the battery operator based on a predetermined metric such as MW/MWh.

Appendix A Workshop Agenda

1:30- 4:00 pm 29th April

1:30- Introduction and background

Welcome and housekeeping- Andrew Fraser

Program objectives and background- Sam Engele

Workshop opportunities for ideas- Lachlan Blackhall

Workshop Intro- Andrew Fraser

1:55 Break into groups,

using Zoom breakout rooms, groups are preset

2:00 Brainstorm Session

Brainstorm ideas for the Big Canberra Battery program

Facilitators report back ideas

2:30 Impacts Session

Consider of ideas and how to improve them

Facilitators report back ideas

3:00 Make it real Session

Answer key questions on the the program procurement and delivery

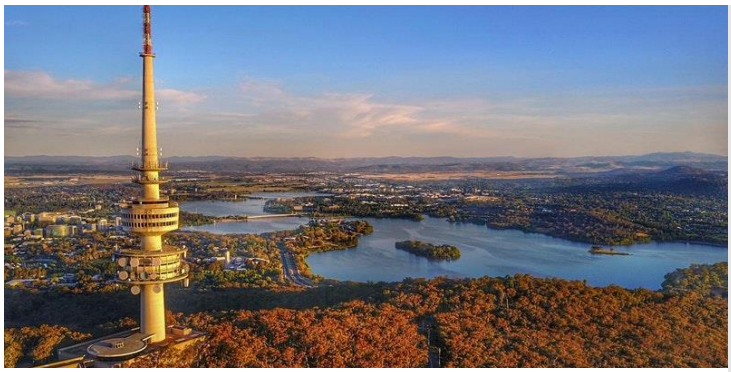
3:30 Summary and Close

Groups report back

Close

Appendix B Workshop Raw Notes

The workshop was conducted using the Miro platform and the raw notes are attached below.



Big Canberra Battery Co-design Workshop

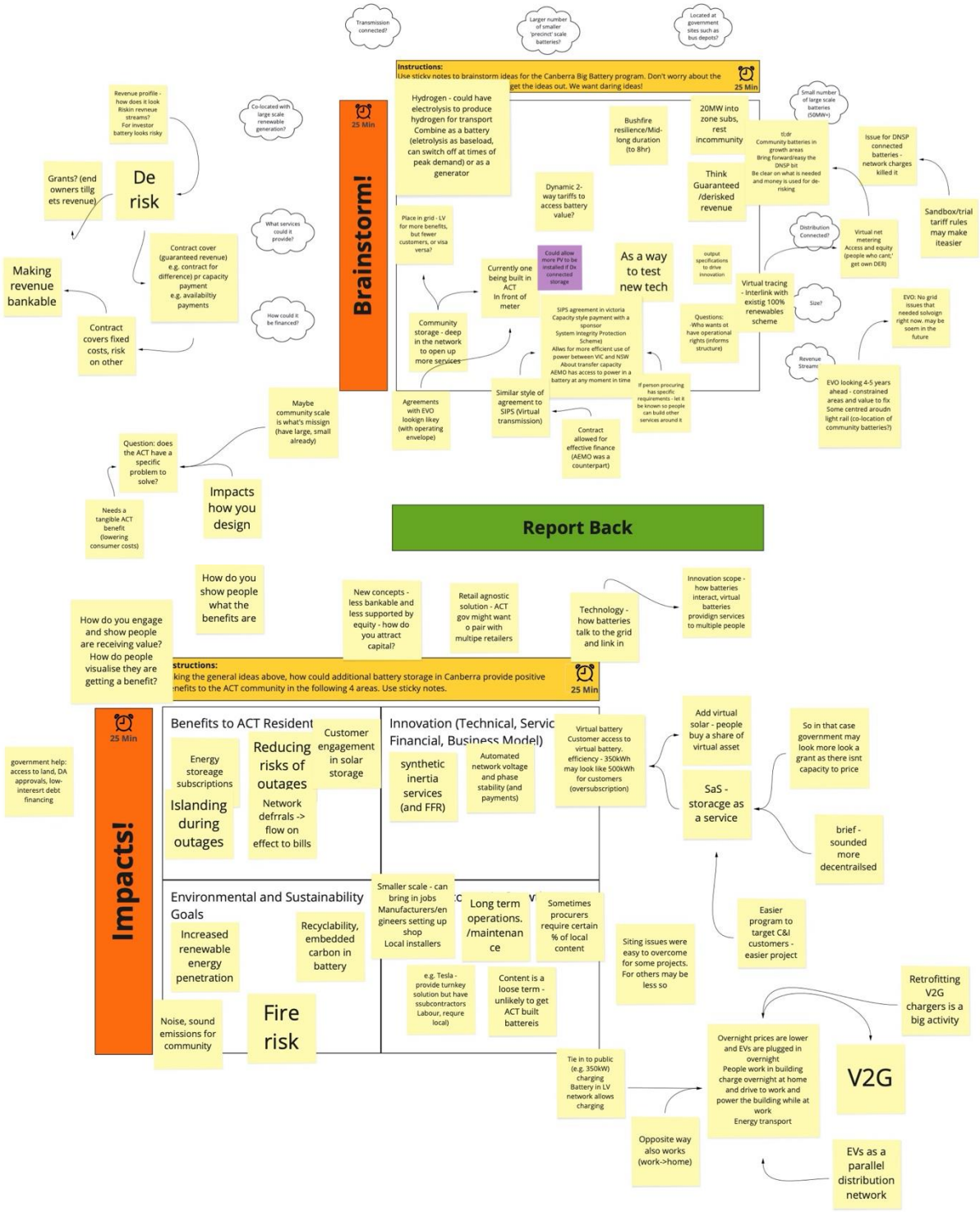
ACT Government

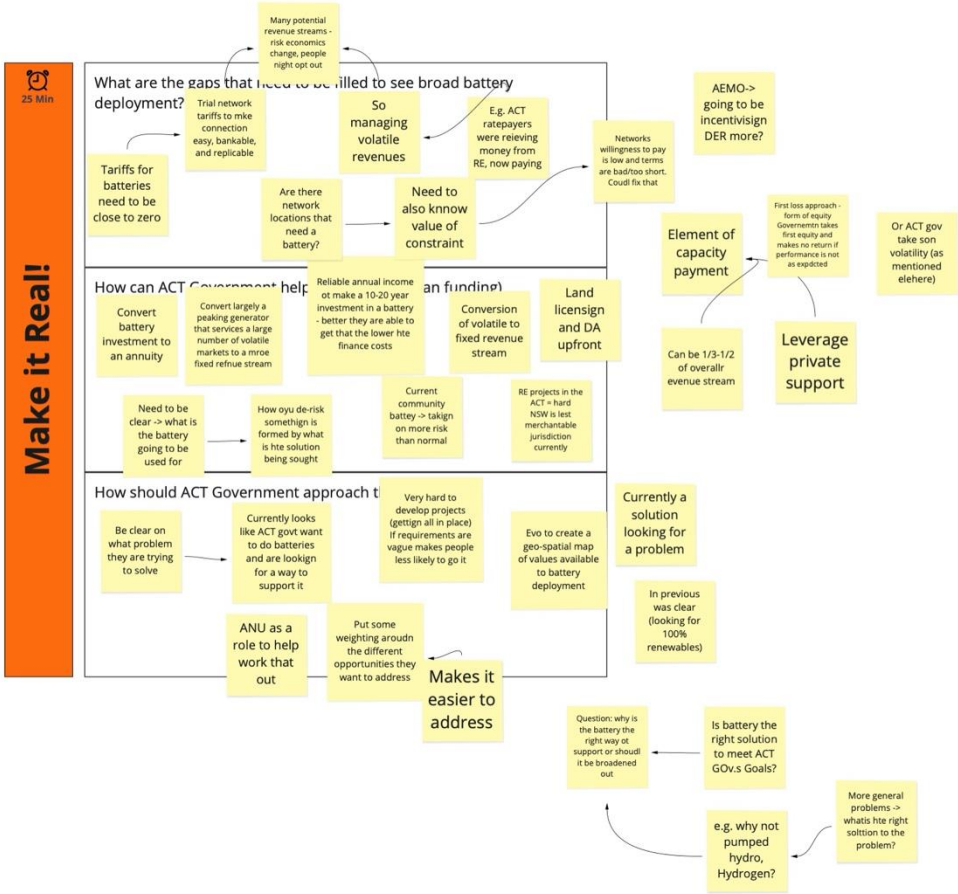
Australian National University

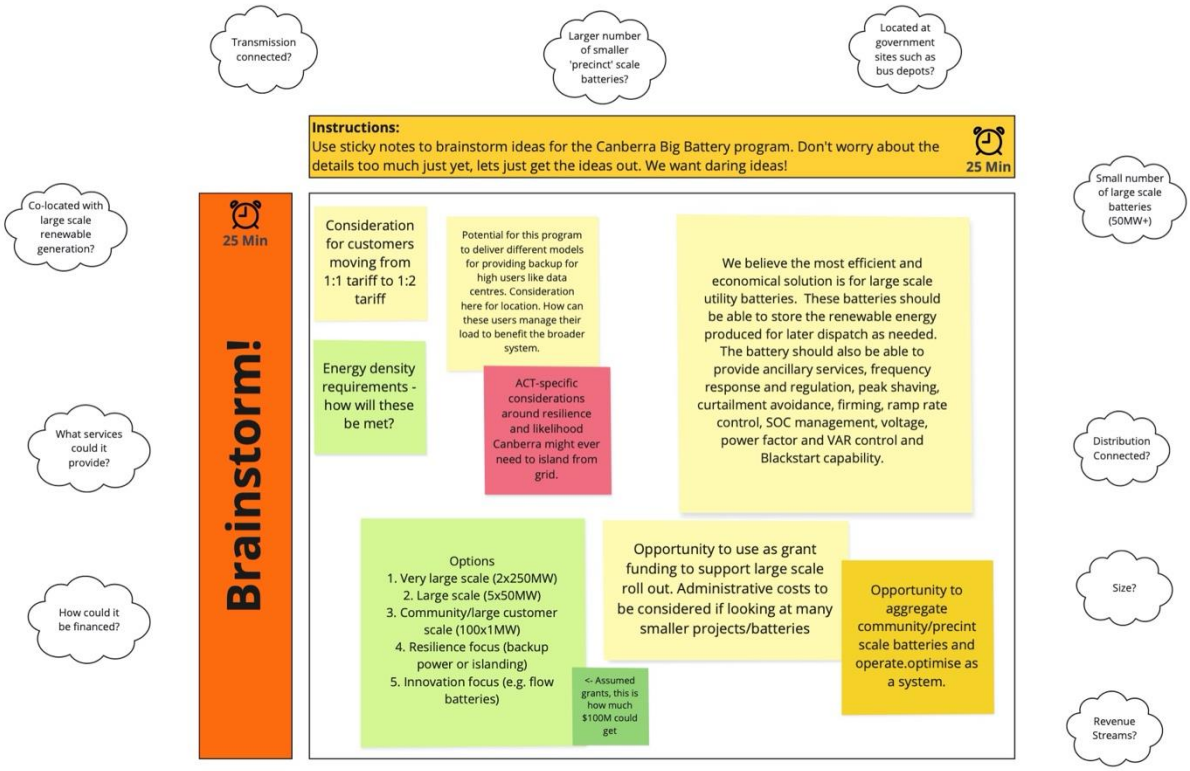
Battery Storage and Grid Integration Program

New to Miro?

This workshop will use Miro.
If you haven't used Miro before and would like to become acquainted ahead of the workshop, please go to:
https://academy.miro.com/learn/course/running-workshops-in-miro/onboarding-new-participants-to-miro/miro-basics-guide-for-participants?wvideo=lh33rqorv6


Transmission connected?
Larger number of smaller 'precinct' scale batteries?
Located at government sites such as bus depots?
Instructions:
Use stickv notes to brainstorm ideas for the Canberra Big Battery program. Don't worry about the
get the ideas out. We want daring ideas!
25 Min
Brainstorm!
25 Min
Hydrogen - could have electrolysis to produce hydrogen for transport Combine as a battery (eletrolysis as baseload, can switch off at times of peak demand) or as a generator
Bushfire resilience/Mid-long duration (to 8hr)
20MW into zone subs, rest incommunity
Small number of large scale batteries (50MW+)
tl;dr Community batteries in growth areas Bring forward/easy the DNSP bit Be clear on what is needed and money is used for de-risking
Issue for DNSP connected batteries - network charges killed it
Sandbox/trial tariff rules may make iteasier
Revenue profile - how does it look Riskin revnue streams? For investor battery looks risky
Co-located with large scale renewable generation?
De risk
Grants? (end owners tillg ets revenue)
What services could it provide?
Contract cover (guaranteed revenue) e.g. contract for difference) pr capacity payment e.g. availability payments
Making revenue bankable
How could it be financed?
Contract covers fixed costs, risk on other
Place in grid - LV for more benefits, but fewer customers, or visa versa?
Dynamic 2-way tariffs to access battery value?
Think Guaranteed /derisked revenue
Distribution Connected?
Virtual net metering Access and equity (people who cant,' get own DER)
Could allow more PV to be installed if Dx connected storage
As a way to test new tech
output specifications to drive innovation
Currently one being built in ACT In front of meter
Virtual tracing - Interlink with existig 100% renewables scheme
Size?
EVO: No grid issues that needed solvoign right now. may be soem in the future
Community storage - deep in the network to open up more services
SIPS agreement in victoria Capacity style payment with a sponsor System Integrity Protection Scheme) Allws for more efficient use of power between VIC and NSW About transfer capacity AEMO has access to power in a battery at any moment in time
Questions: -Who wants ot have operational rights (informs structure)
Revenue Streams
EVO looking 4-5 years ahead - constrained areas and value to fix Some centred aroudn light rail (co-location of community batteries?)
Agreements with EVO lookign likey (with operating envelope)
Similar style of agreement to SIPS (Virtual transmission)
If person procuring has specific requirements - let it be known so people can build other services around it
Contract allowed for effective finance (AEMO was a counterpart)
Maybe community scale is what's missign (have large, small already)
Question: does the ACT have a specific problem to solve?
Needs a tangible ACT benefit (lowering consumer costs)
Impacts how you design
Report Back
How do you show people what the benefits are
New concepts - less bankable and less supported by equity - how do you attract capital?
Retail agnostic solution - ACT gov might want o pair with multipe retailers
Technology - how batteries talk to the grid and link in
Innovation scope - how batteries interact, virtual batteries providign services to multiple people
How do you engage and show people are receiving value? How do people visualise they are getting a benefit?
structions:
king the general ideas above, how could additional battery storage in Canberra provide positive
nefits to the ACT community in the following 4 areas. Use sticky notes.
25 Min
Impacts!
25 Min
government help: access to land, DA approvals, low-interesrt debt financing
Benefits to ACT Resident
Energy storeage subscriptions
Reducing risks of outages
Customer engagement in solar storage
Islanding during outages
Network defrrals -> flow on effect to bills
Innovation (Technical, Servic Financial, Business Model)
synthetic inertia services (and FFR)
Automated network voltage and phase stability (and payments)
Virtual battery Customer access to virtual battery. efficiency - 350kWh may look like 500kWh for customers (oversubscription)
Add virtual solar - people buy a share of virtual asset
SaS - storacge as a service
So in that case government may look more look a grant as there isnt capacity to price
brief - sounded more decentrailsed
Environmental and Sustainability Goals
Increased renewable energy penetration
Recyclability, embedded carbon in battery
Smaller scale - can bring in jobs Manufacturers/engineers setting up shop Local installers
Long term operations. /maintenance
Sometimes procurers require certain % of local content
e.g. Tesla - provide turnkey solution but have ssubcontractors Labour, requre local)
Content is a loose term - unlikely to get ACT built battereis
Siting issues were easy to overcome for some projects. For others may be less so
Easier program to target C&I customers - easier project
Noise, sound emissions for community
Fire risk
Retrofitting V2G chargers is a big activity
Tie in to public (e.g. 350kW) charging Battery in LV network allows charging
Overnight prices are lower and EVs are plugged in overnight People work in building charge overnight at home and drive to work and power the building while at work Energy transport
V2G
Opposite way also works (work->home)
EVs as a parallel distribution network


Make it Real!
25 Min
What are the gaps that need to be filled to see broad battery deployment?
Many potential revenue streams - risk economics change, people night opt out
Trial network tariffs to mke connection easy, bankable, and replicable
So managing volatile revenues
E.g. ACT ratepayers were reieving money from RE, now paying
Networks willingness to pay is low and terms are bad/too short. Coudl fix that
AEMO-> going to be incentivisign DER more?
Tariffs for batteries need to be close to zero
Are there network locations that need a battery?
Need to also knnow value of constraint
Element of capacity payment
First loss approach - form of equity Governemtn takes first equity and makes no return if performance is not as expdcted
Or ACT gov take son volatility (as mentioned elehere)
How can ACT Government help [illegible] an funding)
Convert battery investment to an annuity
Convert largely a peaking generator that services a large number of volatile markets to a mroe fixed refnue stream
Reliable annual income ot make a 10-20 year investment in a battery - better they are able to get that the lower hte finance costs
Conversion of volatile to fixed revenue stream
Land licensign and DA upfront
Can be 1/3-1/2 of overallr evenue stream
Leverage private support
Need to be clear -> what is the battery going to be used for
How oyu de-risk somethign is formed by what is hte solution being sought
Current community battey -> takign on more risk than normal
RE projects in the ACT = hard NSW is lest merchantable jurisdiction currently
How should ACT Government approach t[illegible]
Be clear on what problem they are trying to solve
Currently looks like ACT govt want to do batteries and are lookign for a way to support it
Very hard to develop projects (gettign all in place) If requirements are vague makes people less likely to go it
Evo to create a geo-spatial map of values available to battery deployment
Currently a solution looking for a problem
In previous was clear (looking for 100% renewables)
ANU as a role to help work that out
Put some weighting aroudn the different opportunities they want to address
Makes it easier to address
Question: why is the battery the right way ot support or shoudl it be broadened out
Is battery the right solution to meet ACT GOv.s Goals?
More general problems -> whatis hte right solttion to the problem?
e.g. why not pumped hydro, Hydrogen?


Transmission connected?
Larger number of smaller 'precinct' scale batteries?
Located at government sites such as bus depots?
Instructions:
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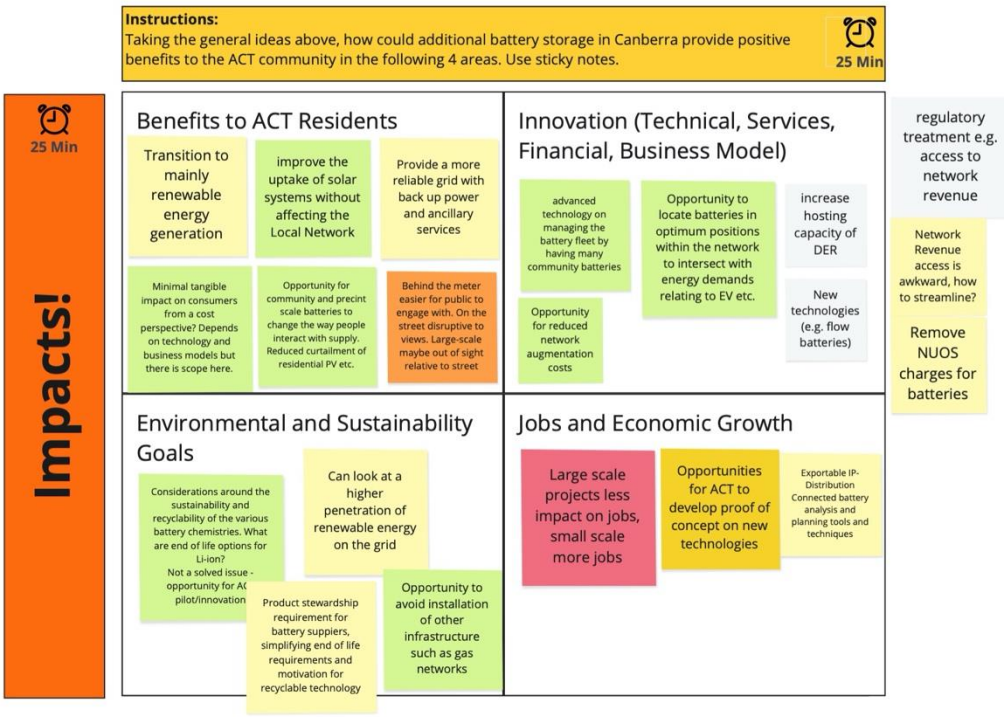
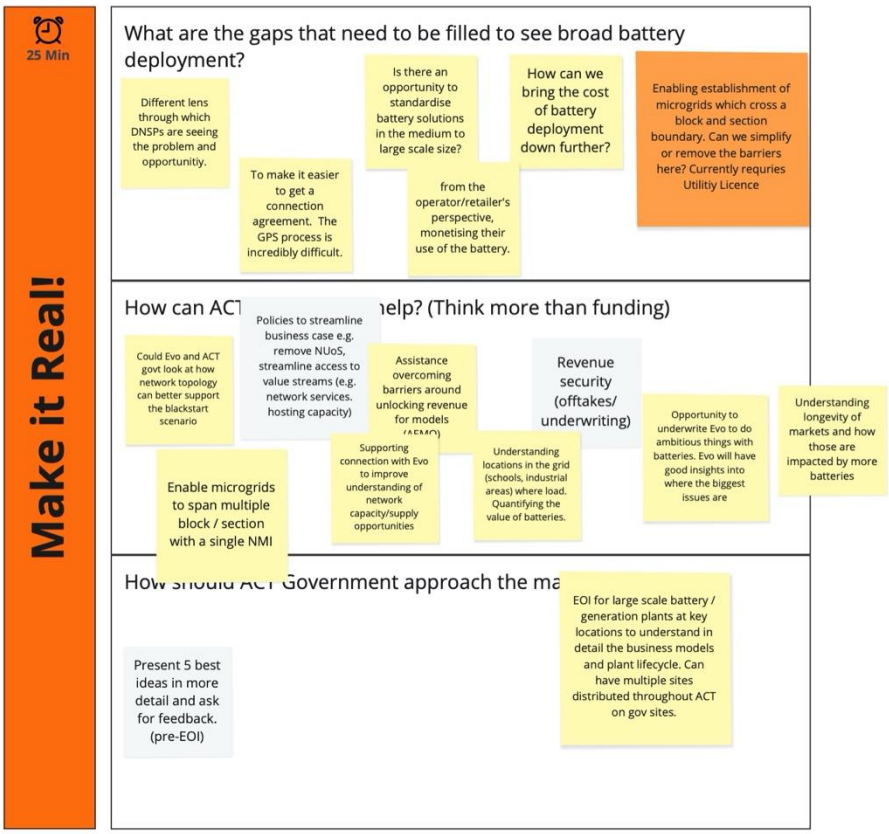
25 Min
Co-located with large scale renewable generation?
Small number of large scale batteries (50MW+)
Brainstorm!
25 Min
Consideration for customers moving from 1:1 tariff to 1:2 tariff
Potential for this program to deliver different models for providing backup for high users like data centres. Consideration here for location. How can these users manage their load to benefit the broader system.
We believe the most efficient and economical solution is for large scale utility batteries. These batteries should be able to store the renewable energy produced for later dispatch as needed. The battery should also be able to provide ancillary services, frequency response and regulation, peak shaving, curtailment avoidance, firming, ramp rate control, SOC management, voltage, power factor and VAR control and Blackstart capability.
Energy density requirements - how will these be met?
ACT-specific considerations around resilience and likelihood Canberra might ever need to island from grid.
What services could it provide?
Distribution Connected?
Options
1. Very large scale (2x250MW)
2. Large scale (5x50MW)
3. Community/large customer scale (100x1MW)
4. Resilience focus (backup power or islanding)
5. Innovation focus (e.g. flow batteries)
Opportunity to use as grant funding to support large scale roll out. Administrative costs to be considered if looking at many smaller projects/batteries
Opportunity to aggregate community/precint scale batteries and operate.optimise as a system.
<- Assumed grants, this is how much $100M could get
How could it be financed?
Size?
Revenue Streams?


Instructions:
Taking the general ideas above, how could additional battery storage in Canberra provide positive benefits to the ACT community in the following 4 areas. Use sticky notes.
25 Min
25 Min
Impacts!
Benefits to ACT Residents
Transition to mainly renewable energy generation
improve the uptake of solar systems without affecting the Local Network
Provide a more reliable grid with back up power and ancillary services
Minimal tangible impact on consumers from a cost perspective? Depends on technology and business models but there is scope here.
Opportunity for community and precint scale batteries to change the way people interact with supply. Reduced curtailment of residential PV etc.
Behind the meter easier for public to engage with. On the street disruptive to views. Large-scale maybe out of sight relative to street
Innovation (Technical, Services, Financial, Business Model)
advanced technology on managing the battery fleet by having many community batteries
Opportunity to locate batteries in optimum positions within the network to intersect with energy demands relating to EV etc.
increase hosting capacity of DER
Opportunity for reduced network augmentation costs
New technologies (e.g. flow batteries)
regulatory treatment e.g. access to network revenue
Network Revenue access is awkward, how to streamline?
Remove NUOS charges for batteries
Environmental and Sustainability Goals
Considerations around the sustainability and recyclability of the various battery chemistries. What are end of life options for Li-ion?
Not a solved issue - opportunity for AC pilot/innovation
Can look at a higher penetration of renewable energy on the grid
Product stewardship requirement for battery suppiers, simplifying end of life requirements and motivation for recyclable technology
Opportunity to avoid installation of other infrastructure such as gas networks
Jobs and Economic Growth
Large scale projects less impact on jobs, small scale more jobs
Opportunities for ACT to develop proof of concept on new technologies
Exportable IP-Distribution Connected battery analysis and planning tools and techniques

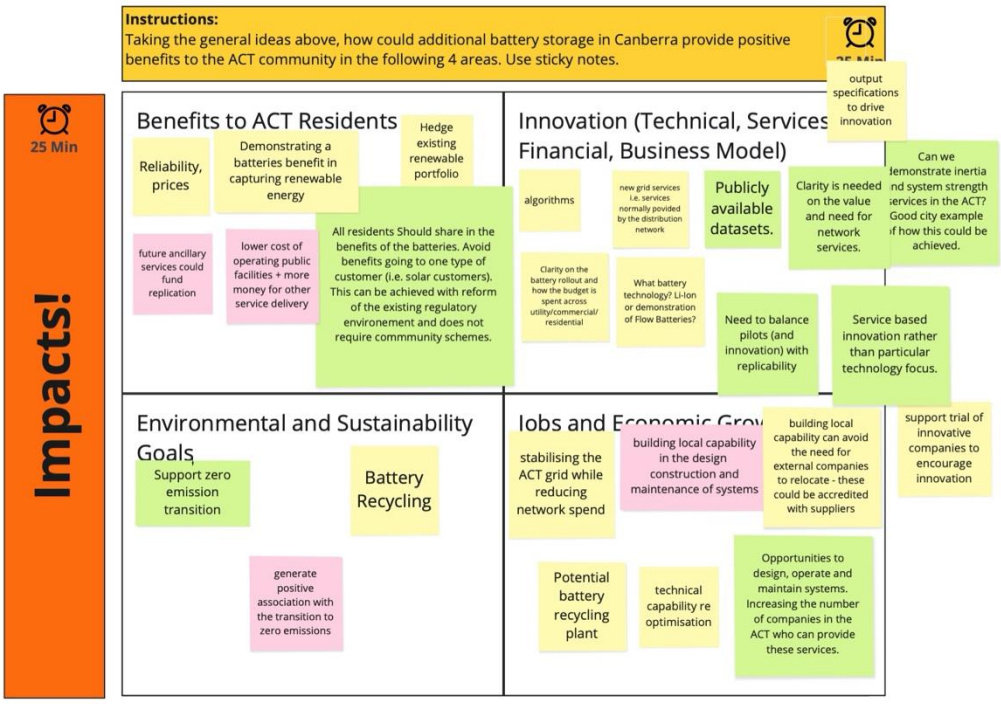

25 Min
Make it Real!
What are the gaps that need to be filled to see broad battery deployment?
Different lens through which DNSPs are seeing the problem and opportunitiy.
To make it easier to get a connection agreement. The GPS process is incredibly difficult.
Is there an opportunity to standardise battery solutions in the medium to large scale size?
from the operator/retailer's perspective, monetising their use of the battery.
How can we bring the cost of battery deployment down further?
Enabling establishment of microgrids which cross a block and section boundary. Can we simplify or remove the barriers here? Currently requries Utilitiy Licence
How can ACT
elp? (Think more than funding)
Could Evo and ACT govt look at how network topology can better support the blackstart scenario
Policies to streamline business case e.g. remove NUoS, streamline access to value streams (e.g. network services. hosting capacity)
Assistance overcoming barriers around unlocking revenue for models
Revenue security (offtakes/ underwriting)
Supporting connection with Evo to improve understanding of network capacity/supply opportunities
Understanding locations in the grid (schools, industrial areas) where load. Quantifying the value of batteries.
Opportunity to underwrite Evo to do ambitious things with batteries. Evo will have good insights into where the biggest issues are
Understanding longevity of markets and how those are impacted by more batteries
Enable microgrids to span multiple block / section with a single NMI
Government approach the ma
EOI for large scale battery / generation plants at key locations to understand in detail the business models and plant lifecycle. Can have multiple sites distributed throughout ACT on gov sites.
Present 5 best ideas in more detail and ask for feedback. (pre-EOI)


Distributed energy and storage lowers supply/demand risks
Transmission connected?
Make sure battery recycling is in place
Larger number of smaller 'precinct' scale batteries?
Financial opportunities with arbitrage and on site RE generation
Located at government sites such as bus depots?
Integration with microgrids
Hydrogen Renewable Methane storage? In or out?
Instructions:
Use sticky notes to brainstorm
details too much just yet, lets ju
Ensure geographic spread
Where are the supply choke points across the ACT?
schools
co locate batteries with RE generation
benign chemistry -- reduce fire hazards and chem haz
Co-located with large scale renewable generation?
Propose working group between key stakeholders for strategic direction - Evoenergy, and the ACT Government
Small-scale batteries should be required to participate in jurisdictional network innovation trials
Evoenergy's Annual Planning Report provides information on constrained parts of the network
Constraint map available at: https://apr.evoenergy.com.au/ Also shows locations of key network elements
Define large scale and what's the advantagee of this?
What ACT Gov locations are available?
large scale robust batteries besides each substation
What are the specific challenges that the ACT Gov is trying to address? Defining the purpose is important. BESS design and location can accommodate many different purposes.
Criteria for choosing battery size/location/purpose to support should focus on delivering value. Cost-benefit analysis is important.
Total value stack needs to deliver certainty over sufficient length to achieve financing. ACT Gov contracting for specific services could help.
Pilot project to trial dynamic connection agreements for grid-side batteries
Battery locations need to be tied with other electrification initiatives such as electric bus and EV charging infrastructure
Evoenergy would prefer control, or at least last-resort control, of the batteries
Batteries above 10MW are not preferable
Does ACT Gov have a particular storage duration in mind?
Don't pay site rent - use existing ACT
location PV sites -- existing transmission capability
Household batteries would be best to support power quality (especially with high PV penetration and improvements in appliance efficiency - capacitive loads)
Need to understand the key driving points of the battery prior to sizing (no point in oversizing if the energy won't be used)
What services could it provide?
Network Support Services - Reactive power support, Demand Management (peak/trough shaving), Power Quality / Voltage support
One size fits all approach wouldn't work. Battery sizing would be informed by location and use cases
Transmission level resources don't help with distribution challenges - especially with relation to net-zero transition
Place battereis at sites of known high consumption eg future EV Bus depots and Canberra Hospitals
Battery should be combination of large scale and small scale
Battery sizi should correspond with PV size - the more distributed the PV the more distributed the batteries should be.
Think of ESCRI commercial model - network ownership, leased to market participants - worked at Tx level, can it work at Dx level
Community storage - deep in the network to open up more services
A large number of relatively small batteries increase reliability and security - if one fails / underdelivers impact is not widespread
Need to provide financial support for business models which are not yet commercially viable (e.g. EV buses where there are not EV buses yet)
If community storage, how could consumer contracts work? If the model is replicable it could scale quickly
Focus on commercial model to capture market and network value streams
Re-define the role that AEMO will play, to encourage LT-storage
If the batteries are to help with net-zero transition, the batteries need to be connected to the distribution network
Limit curtailment of large-scale and BTM solar exports
How could it be financed?
use the battery to ensure reliability as ongoing climate risks may result in outages
Size?
ACT Government underwrite DUOS till tariff reforms are implemented
Might not be as useful in Canberra, but new precincts (with both houses and apartments) are more likely to install solar and might be curtailed which storage can help to reduce network connection costs
Think of opportunity in context of Snowy 2.0 - is it better to aim deeper in the network at opportunities at Distribution level - opens up more value streams
Could AER sandbox be used to test innovative commercial models
Left field: Could Canberra be a hub for fleets of V2G and movable storage - - locate charging hubs in strategic areas
Think of incentivizing replacement of all/many use cases for diesel gen-sets with batteries and aggregating them
Use to assist charging of electric buses as ACT moves to electify the bus fleet
Revenue Streams?
Remove TUOS from all distribution connected community storage projects


Instructions:
Taking the general i
benefits to the ACT
battery storage in Canberra provide positive
. Use sticky notes.
25 Min
ACT Government wants a majority of new developments to be in established suburbs. There's significant opportunity for avoiding network expenditure there through distribution batteries.
Benign devices will not require Them-haz & Fire-haz systems
Impacts/benefits (particularly if location is in distribution network to adress constraints) are likely to change in time depending on EV takeup.
Impacts!
Benefits to
Avoided network investment which means lower energy costs for customers
Higher reliability if implemented in the distribution network
Locations are key for realisation of customer benefits
Strategic positioning and specs could deliver greater cost vs. benefit as a non-network option
Can mitigate electricity price rises
Smooth Transition to Net Zero 2045
More capability for exports (solar, battery, V2G)
If Dx connected could allow more PV connections
Education on transition to clean energy system
Community battery provides choice for renters/apartment dwellers who don't have space for BTM batteries
Providing climate resilience from extreme climate events (e.g. bushfires)
Innovation (Tech
Financial, Busine
Encourage two-way communication w Gen5 SCADA
Potential for optimal outputs for everyone through more cost-reflective pricing models (dynamic, locational pricing)
Reduced network expenditure for peak events
Transportable BESS for grid support
Increases potential for smart energy solutions and business models
Should be considered in conjunction with EVs
Should be considered with using daytime RE peak with H2 generation
big move-able batteries
Fleets EV charging facilities in strategic network locations
Opportunity to test innovative commercial models
Opportunity to drive innovative tech - e.g. V2G, community storage, hydrogen
Quality of building envelope impacts on energy demand/supply and therefore role of batteries
Environmental and Sustainability Goals
Long term storage (defined as 8+ hrs) decarbonises quickly
Must consider end of life use otherwise we may inherit a disposal problem
Help meet the Govt 2040 zero emissions target
Reduced solar clipping / curtailment
Help displace thermal peakers elsewhere in NEM
Long life devices (25+ years) with no degradation
Distribution batteries have potential to reduce transmission and distribution losses
Provides confidence that the grid won't be constrained if ACT decides to move to electrifying households
Could allow more PV to be installed if Dx connected storage
Jobs and E
Needs to be supported by educational institutions
Supports ACT Government's objective of making ACT a hub of R&D in renewable energy technologies
New industries
Financial analysis needs to include whole of life and whole of system calculations
Create local battery maintenance industry
Reduce the cost of transition to net-zero carbon emissions
Create local battery planning and supply industry
Create local battery recylcing industry
Some of the funding available can be used for network innovation projects and capability uplift


25 Min
What are the gaps that nee
deployment?
Technical viability / limitations to battery operation at different locations
Regulatory barriers in DNSPs being able to own (part of a) battery
Land availability at the right locations
Move away from fuel excise & charge for road use
connection processes need to be easier and quicker
lack of clarity around network charges -- more to be done for network charges
Whole of lifecycle information and impacts
Commercials aren't compelling enough yet - too much uncertainty on stationary storage
technology to control batteries of different scale
standardised (internet) communication protocols
Technology costs - not something that the gov can materially change. But broad deployment (e.g. households) needs costs to come down.
Where are the supply chokepoints?
Network chargers / tariffs
if government has a windfall - where does that money go? should go back to energy sector
How can A
Streamlining of DA approval process for distribution batteries
Build case studies
Use the education sector to promote the initiative
Possibly consider a CFD for storage services
Provide knowledge sharing to businesses to support innovation
Build partnerships to allow installation of PV + storage on Govt property (e.g. Schools)
payment for battery services that are not currently monetised or too uncertain
Joint Evoenergy and ACT Government energy storage roadmap development / working group
Enable the debt capital markets to understand & appreciate the different chemistries & treat them as 'assets'
Promote, promote, promote
Focus on EV play via multiple angles
Address different treatment of EVs and batteries while EVs can provide the same services (if not more) with appropriate funding and regulations
Define the specific challenges it is aiming to address, so industry can seriously consider the potential design/business case/value stack of BESS solutions. Gov support would reflect the services the BESS provides. Ideally contracts would be long enough and certain enough to be useful for financing.
Standardise BESS value stack model
Standardise BESS connection & data standards
Act as the innovator to start the decarbonisation of industries
Make big commitment to EVs across all Govt fleets
Encourage additional stakeholders to be involved
Education to industry bodies
communicate clearly what are the objectives of this funding
d ACT Government approach the marke
Define the (multiple) objectives and allocate a % of $ and effort according to importnsnce
Could you fund V2G technology development and deployment to get the same outcomes?
Provide clear objectives / goals / motivations for the program
Improve investment certainty
Define the market and market participants
Consider the vertical integration of supply and storage
Is it financial, environmental, something else?
Partner with NSW
Have outcomes with best value for customers in ACT


Transmission connected?
Larger number of smaller 'precinct' scale batteries?
Located at government sites such as bus depots?
Instructions:
Use sticky notes to brainstorm ideas for the Canberra Big Battery program. Don't worry about the details too much just yet, lets just get the ideas out. We want daring ideas!
25 Min
Co-located with large scale renewable generation?
Small number of large scale batteries (50MW+)
25 Min
Brainstorm!
Ideas
Multiple utility scale batteries.
Must ensure customer, environmental outcomes are met.
Using ACT schools to host batteries. Schools are also used as evacuation centres so opportunities for broader impact.
Scale benefit of big high-voltage connection point.
Distribution scale battery might have lowest benefits when compared to residential or utility scale.
C&I
What services could it provide?
Use batteries to reduce network expenditure and investment in substations..
Environmental outcomes
More opportunities when closer to customer or at utility scale.
At school or C&I can do demand charge reduction which isnt applicable for large scale deployment.
Replicable models are good to reduce design and implementation costs. One off pilots can be costly.
Distribution Connected?
Values of storage at distribution scale take into account network operation issues.
Govt institutions and savings for ACT rate payers
Co-locating with customers allows additional value for customers.
Cultural value of seeing batteries in the suburbs.
How could it be financed?
Size?
Defn: Community Battery = Distribution scale battery + community overlay. These two components are separate.
Avoid assumptions of benefits and focus on data driven evidence and holistic outcomes
Value of model will depend on desired outcomes from ACT Government..
Revenue Streams?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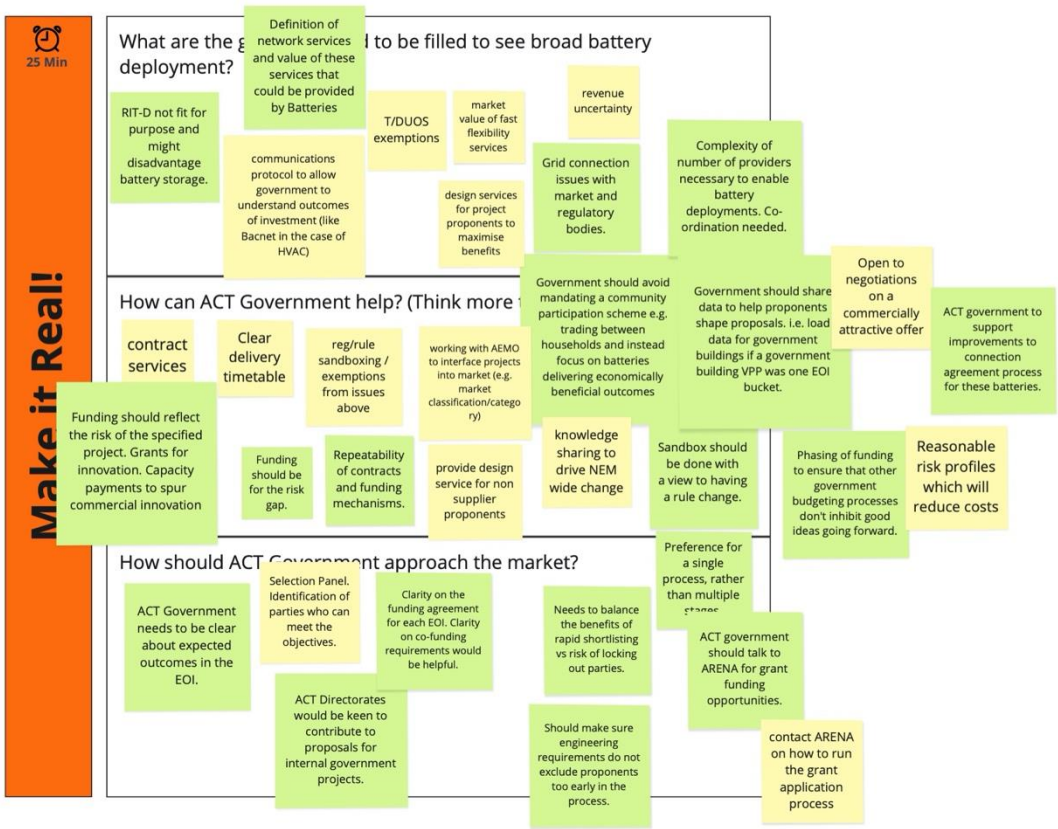
Impacts!
Benefits to ACT Residents
Reliability, prices
Demonstrating a batteries benefit in capturing renewable energy
Hedge existing renewable portfolio
future ancillary services could fund replication
lower cost of operating public facilities + more money for other service delivery
All residents Should share in the benefits of the batteries. Avoid benefits going to one type of customer (i.e. solar customers). This can be achieved with reform of the existing regulatory environement and does not require commmunity schemes.
Innovation (Technical, Services Financial, Business Model)
output specifications to drive innovation
algorithms
new grid services i.e. services normally povided by the distribution network
Publicly available datasets.
Clarity is needed on the value and need for network services.
Can we demonstrate inertia and system strength services in the ACT? Good city example of how this could be achieved.
Clarity on the battery rollout and how the budget is spent across utility/commercial/ residential
What battery technology? Li-Ion or demonstration of Flow Batteries?
Need to balance pilots (and innovation) with replicability
Service based innovation rather than particular technology focus.
Environmental and Sustainability Goals
Support zero emission transition
Battery Recycling
generate positive association with the transition to zero emissions
Jobs and Economic Grow
stabilising the ACT grid while reducing network spend
building local capability in the design construction and maintenance of systems
building local capability can avoid the need for external companies to relocate - these could be accredited with suppliers
support trial of innovative companies to encourage innovation
Potential battery recycling plant
technical capability re optimisation
Opportunities to design, operate and maintain systems. Increasing the number of companies in the ACT who can provide these services.


25 Min
Make it Real!
What are the g l to be filled to see broad battery deployment?
Definition of network services and value of these services that could be provided by Batteries
RIT-D not fit for purpose and might disadvantage battery storage.
communications protocol to allow government to understand outcomes of investment (like Bacnet in the case of HVAC)
T/DUOS exemptions
market value of fast flexibility services
revenue uncertainty
Grid connection issues with market and regulatory bodies.
Complexity of number of providers necessary to enable battery deployments. Co-ordination needed.
design services for project proponents to maximise benefits
How can ACT Government help? (Think more
contract services
Clear delivery timetable
reg/rule sandboxing / exemptions from issues above
working with AEMO to interface projects into market (e.g. market classification/category)
Government should avoid mandating a community participation scheme e.g. trading between households and instead focus on batteries delivering economically beneficial outcomes
Government should share data to help proponents shape proposals. i.e. load data for government buildings if a government building VPP was one EOI bucket.
Open to negotiations on a commercially attractive offer
ACT government to support improvements to connection agreement process for these batteries.
Funding should reflect the risk of the specified project. Grants for innovation. Capacity payments to spur commercial innovation
Funding should be for the risk gap.
Repeatability of contracts and funding mechanisms.
provide design service for non supplier proponents
knowledge sharing to drive NEM wide change
Sandbox should be done with a view to having a rule change.
Phasing of funding to ensure that other government budgeting processes don't inhibit good ideas going forward.
Reasonable risk profiles which will reduce costs
How should ACT Government approach the market?
Preference for a single process, rather than multiple stages
ACT Government needs to be clear about expected outcomes in the EOI.
Selection Panel. Identification of parties who can meet the objectives.
Clarity on the funding agreement for each EOI. Clarity on co-funding requirements would be helpful.
Needs to balance the benefits of rapid shortlisting vs risk of locking out parties.
ACT government should talk to ARENA for grant funding opportunities.
ACT Directorates would be keen to contribute to proposals for internal government projects.
Should make sure engineering requirements do not exclude proponents too early in the process.
contact ARENA on how to run the grant application process