



Network Innovation Advisory Committee

25 March 2021



Agenda

#	SESSION	FACILITATOR	TIMING
1	Introductions & updates from Committee	Junayd Hollis	10.30 – 10.40
2	Review of actions	Junayd Hollis	10.40 – 10.50
3	Network Innovation Program Dashboard	Alex Moran	10.50 – 11.05
4	Community Battery Update	Mark Appleton & Felix Keck	11.05 – 11.25
5	Potential DSO Demonstration Project	Alida Jansen van Vuuren	11.25 – 11.55
	BREAK		11.55 – 12.10
6	HV Microgrid Trial – River Communities	Matt Webb	12.10 – 12.35
7	Network Innovation Investment Reprioritisation	Alex Moran	12.35 – 12.55
8	Recap & next steps	Junayd Hollis	12.55 – 13.00

	For Information	Slide No.
A	Advanced Voltage Regulation – Statcom Trial Update	44
B	Stand Alone Power Systems Update	48



Review of Actions

Review of Actions

	Action Items	Status	Comments
1	Compare innovation priorities to the feedback on priorities from customers in the CCC and report back by exception.	In Progress ●	No exceptions identified to date, to be considered under co-design process
2	Reference findings of ECA Consumer Expectations research when defining measures of success for SAPS.	Complete ●	See project update for detail
3	Provide a view on the potential benefits of the travelling wave technology and the potential scale of a rollout if the trial is success	In Progress ●	In progress as part of project development
4	Provide more information on customer interface for community battery trial	Complete ●	See slides 14 & 15 for detail
5	Provide committee with customer partner models for community battery trial	Complete ●	See slide 16 for detail
6	Provide committee with any technical documentation available for neutral integrity monitoring trial	In Progress ●	In progress as part of project development

A close-up photograph of a person's hand holding a black handheld device, possibly a scanner or diagnostic tool, over the engine compartment of a car. The engine cover is black and has some blue markings. The background is dark and slightly blurred.

Network Innovation Program Dashboard

Network Innovation Program Dashboard

Workstream	Project Score	Estimated Budget \$m	Actual Spend \$m	Committed Spend \$m	Status	Update/Comments/Feedback	High Level Project Timeframes				
							2020	2021	2022	2023	2024
Advanced Voltage Regulation	3.45	\$3.50	\$0.34	\$0.50	●	First LV STATCOM commissioned at Nords Wharf and is successfully operating.					
Network Insight Program	3.82	\$12.33	\$2.46	\$5.12	●	Evolve project IT development underway and customer sign-up commencing at two trial locations. Priority 1 tranche of DM&C refurbishment complete, Priority 2 commencing.					
Fringe of Grid Optimisation	3.71	\$4.97	\$0.23	\$2.38	●	Community engagement commenced and RFI evaluation in progress with preliminary shortlisting complete.					
HV Microgrid Trial	3.44	\$19.00	\$0.00	\$0.05	🖐️ ●	Feasibility studies underway.					
Advanced EV Charging Platform Trial	3.53	\$1.30	\$0.00	\$0.00	○	Not yet commenced.					
Grid Battery Trials	3.81	\$3.04	\$1.71	\$2.37	🖐️ ●	First site installed in February. Customer partner approved and offer in development.					

LEGEND

- Project not yet commenced. Remains within timeframes
- Project on track to meet budget and key milestones
- Project may be at risk if issues are not addressed. Attention required.
- Project is at risk of being over budget and/or significantly behind in meeting key milestones.

- Task completed
- Task on track
- Task not on track
- NIAC input required

Note: Expenditure as at 28/02/2021

Network Innovation Program Dashboard

Workstream	Project Score	Estimated Budget \$m	Actual Spend \$m	Committed Spend \$m	Status	Update/Comments/Feedback	High Level Project Timeframes				
							2020	2021	2022	2023	2024
Portable All-in-One Off-Grid Supply Units	2.51	\$0.50	\$0.00	\$0.03	●	Some candidates identified during SAPS RFI process with evaluation to commence in first half of 2021.					
Self-Healing Networks	3.58	\$0.63	\$0.17	\$0.20	●	Testing of Castle Cove has commenced, impacted by COVID and equipment issues.					
Dynamic Load Control	2.83	\$0.70	\$0.00	\$0.04	●	Market immature. Will continue to explore options to develop market.					
Asset Condition Monitoring	3.17	\$2.79	\$0.29	\$2.79	●	Bulk smart meter data ingestion into Ausgrid systems has commenced with evaluation for neutral integrity issues to begin once analysis software acquired.					
Line Fault Indicators	2.75	\$0.70	\$0.05	\$0.04	●	One trial device failed lab testing. Further review of devices underway.					

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Note: Expenditure as at 28/02/2021



NIAC Feedback: What other information would the committee like to see as projects progress? An example could be notification of external media opportunities.

A close-up photograph of a person's hand inserting a black charging cable into a vehicle's charging port. The port is illuminated with a blue light and has the letters 'LB' printed on it. The background is dark and slightly blurred, showing the interior of the vehicle's charging compartment.

Community Battery Project Update

Progress to Plan

Stage 1 criteria

- ✓ Positive Cost Benefit Analysis results (KPMG feasibility study)
- ✓ Implementation team confirmed

Stage 2 criteria

- ☐ Positive customer feedback
- ✓ Suitable sites identified
- ✓ Hardware solution confirmed
- ✓ Regulatory exceptions approved
- ✓ Research partners confirmed
- ☐ Commercial partners confirmed
- ☐ Settlement solution confirmed

Stage 3 criteria

- ☐ Successful hardware testing
- ☐ Successful software testing

*Total estimate: \$5.8m
(previously \$2.37m)*

Stage 1

Stage 2

Stage 3

Key activities



Q4 '19 – Q1 '20

- Customer testing
- Implementation preparation
- Contract & terms negotiation
- Partnership agreements



Q2 2020 – Q2 2021

- Contract execution
- Order placement
- Construction & installation



Q2 2021 onwards

- Commercial & technical operation

Project update – Engineering & Timeline

Engineering

- Commissioning delays due to operating requirements and Critical Infrastructure Licence Conditions
- Local control requirements and settings finalised
- Centralised control requirements for later phases in development

Timeline



Northern Beaches – post launch update

Traditional media results

- Between 15 Feb – 24 Feb “Ausgrid community batteries” has had 106 mentions in the media.
- Reached over 2 million people through these traditional platform. including 1.5million via TV and radio and 775k via online news articles.
- **Top stories include** ABC Breakfast radio Sydney, Channel 7, 9 and 10 news Sydney, Daily Telegraph online and Renew economy.

Social media

- **Facebook** Community batteries posts were seen by **40,000** users (first 48 hrs)
- **Twitter** mentions and engagement **increased 150%** on the previous week
- **LinkedIn 26,000** saw or interacted with Ausgrid’s post and Richard and RAL’s LinkedIn posts also drove additional views, with the post to RAL’s profile generating 42% percent of all LinkedIn “likes”.
- **11.6 million** = Combined total reach of people who saw the community battery story on a social media platform (others sharing, tweeting or posting about it)

Website / Corporate Comms

- The Community Battery web page received 5,852 unique page views.
- 217 people have registered their interest in hearing more about community batteries since the media launch on 15 Feb.22 in trial area.

Council

- Launch covered on Northern Beaches website and in Council EDM, distributed to 150k residents.
- 2 Councillors attended site briefing 19/2, Clr Sue Heins and Clr Penny Philpot both very supportive of the program. Ausgrid to provide a briefing to Councillors.

Click image for ABC
Breakfast interview



Control Click image
for 2SER interview



Northern Beaches – customer responses - kerbside drop-in

Key Statistics

Attendees

26 members of the public; 2 x members of Ausgrid team; 1 x Council representative

Attendees with solar

Approximately half

Attendees considering upgrading solar

Approximately four

Attendees considering installing solar

Approximately 10

Reason for attending

Most explicitly identified the invitation letter

Average age of attendees

Most >50, though a small number (<5 were less than 50)

Length of time spent at the kerbside

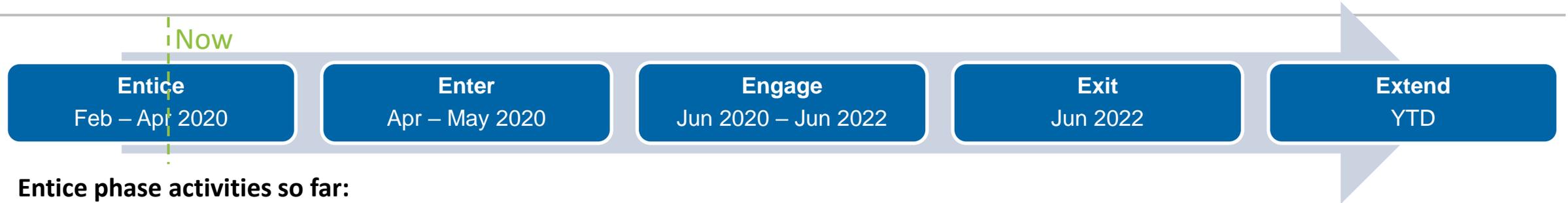
Most people (approx. 15) stayed for nearly one hour. All others stayed for between 5 - 20 min.

Key questions raised

- What will the financial benefit, and how is the benefit calculated?
- What is the relationship between Ausgrid and retailers?
- Discussion about solar capacity and whether to upgrade solar panels
- Discussion about how participation works if a household already has a battery
- What level of kWh solar generation will make it worthwhile participating?
- How is billing undertaken?
- Can a household participate if they don't yet have solar?
- Why was the location chosen?
- Does the battery emit any harmful EMF?
- Broad discussion about the technical construction of the battery



Project update – Customer Engagement Results (Beacon Hill)



Entice phase activities so far:

1. Media launch and postcard drop to customers in the trial area (week of 15 February)
2. Letter invitation to register interest and curb side drop in (week of 8 to 12 March)
3. More targeted Entice activities to follow if required

Online registration of interest form results as at 15 March 2020

	Small exporters	Medium Exporters	Large Exporters	Solar other	Non-solar	Total
Trial interest: Customers in trial area	10	2	9	5*	7	33
Trial interest: Customers outside trial area but in Beacon Hill suburb		21			8	29
Trial interest: Customers outside of Beacon Hill		155			37	192
Total registered customers		202			53	255

* Solar sites that require data and further analysis

Curb side drop in

(11 March, 4pm)

Over 25 local residents came to talk to the Ausgrid community battery team

Summary of online interest

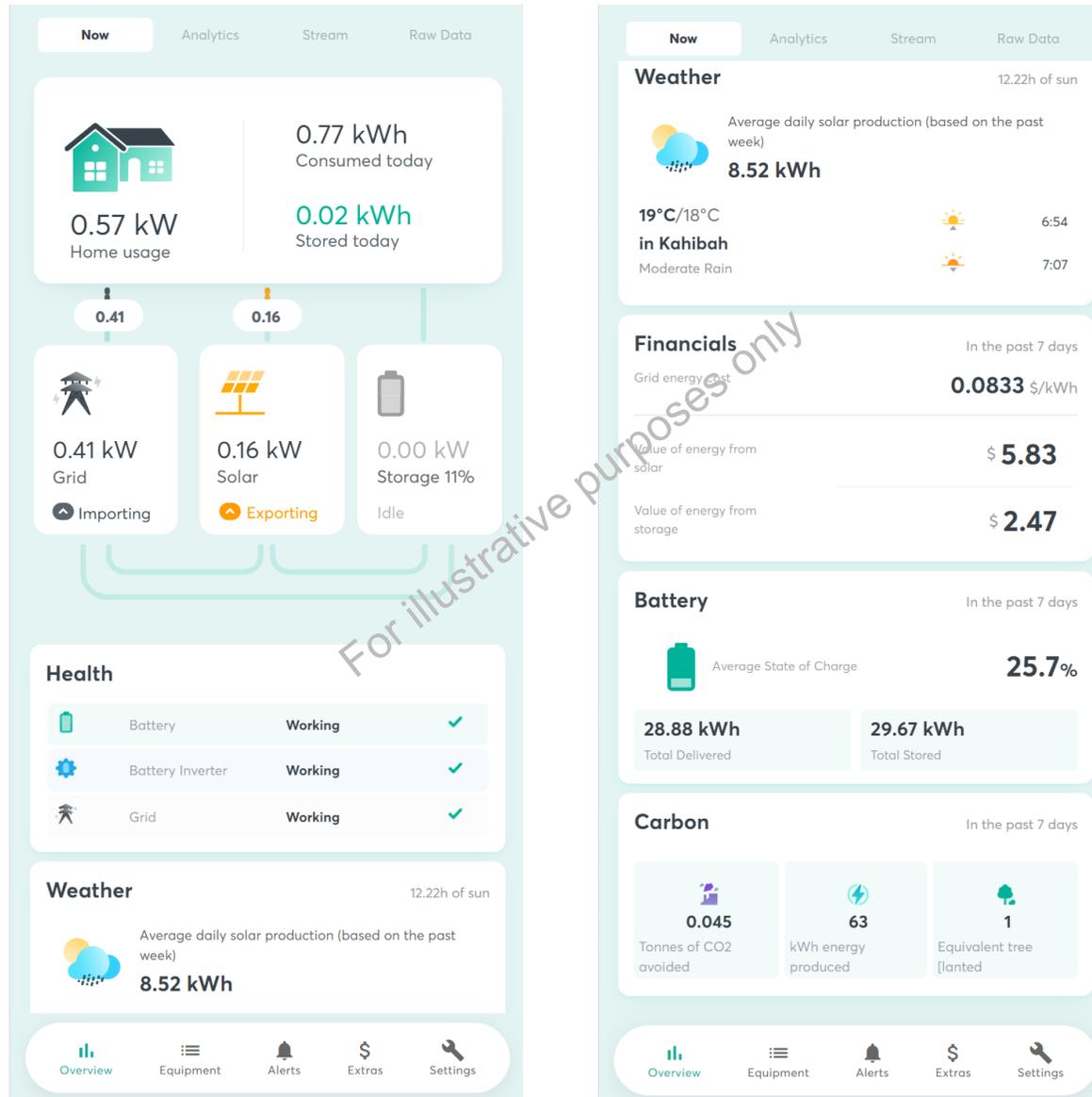
After 1st and 2nd waves of Entice activities

- 59% of solar customers (26 of 44) in trial area
- 5% of non-solar customers (7 of 148) in trial area

Action 4 – Sign up journey for customers in a trial area



Action 4 – Customer App – shown below without customisations



- These images are of the app as presented in 'white label' format, that is without any branding or customisation
- What this does show is a 'look and feel'
- The top left widget is animated and shows near real-time values
- The battery representation as shown is for a behind-the-meter setup, and will be adjusted to show the virtual storage setup
- The second image shows what is displayed when you scroll down on a phone

Action 5 – Project update – Customer Partner Selection and Customer Engagement Framework

Customer Research and Trial Offer Development

- Qualitative customer research complete and results being used to inform engagement plan and activities
- Customer trial offer legal terms and conditions for virtual storage phase 1 trial offer almost complete

Customer Technology and Installation Partner

- Customer Technology Partner: Vendor selection completed and detailed commercials and Scope of Works in progress for customized app development for virtual storage phase 1 trial offer
- Installation Partner(s): Vendor selection almost complete. Detailed procurement and safety review in progress

Customer Engagement Partner and Framework Development (RPS Group)

- Vendor selection completed, initial workshops conducted for 5E framework, development of early promotional materials complete and Entice phase has commenced for Beacon Hill trial area (see next slide)
- Development of customer monitoring and evaluation framework has commenced

NIAC Feedback Sought

1. What does success look like for the customer engagement component of the project?

(eg. high customer satisfaction with participation, high number of customers interested and participating)

2. What metrics are needed to measure this success?

(eg. Net Promoter Score (NPS) is planned to be used as one of these metrics during the project)

3. What metrics or results from trial participants might help inform regulatory change around shared batteries?

4. Any other feedback on customer engagement monitoring and evaluation?



A close-up photograph of a person's hand holding a black handheld device, possibly a scanner or diagnostic tool, over the engine compartment of a car. The engine bay is dark, and a blue glow is visible from the device. The text 'Potential DSO Demonstration Project' is overlaid in white on the image.

Potential DSO Demonstration Project

Network businesses have been contemplating what our future role is as distribution system operators (DSOs)

A DSO is expected to dynamically manage *network capacity* and operate the distribution network to:

- maintain an efficient, safe and reliable service, while
- optimise value to customers and the energy system, and
- support the renewable energy transition.



This was presented at Ausgrid's Pricing Working Group in Feb 2021. The feedback received at this session:

- Enduring relationship between the DSO, the market and customers' traders are crucial – framework should support this (see next slide).
- Pricing is not the full answer – the industry / government need to engage with consumers on what the energy transition means (i.e. sometimes an abundance of energy).
- Not clear how this supports Community Energy Schemes.
- Would help if it was translated into “a day in the life of” examples for customers.

NIAC Feedback: Do you have any additional feedback?

Dynamic System Operation – continuing to provide a safe and reliable service in a dynamic system

- Maintaining a safe and reliable service whilst optimising the network for supply and use of electricity as it changes throughout the day.

Flexible Access Services – giving customers options in how they connect to and use the network

- As more and more customers seek to export energy back into the system, connect their electric vehicles or participate in community energy schemes, it's apparent that a one-size network access service will no longer be fit for purpose.

Dynamic Network Pricing – using pricing as a tool to get more from the existing network

- Pricing the use of the network is complex and requires careful consideration of equity, affordability and fairness. However, it can also be a powerful tool for getting more out the existing network by, for example, dynamically signalling to EVs when there is spare capacity in the network for them to charge from.

System Support – playing a part in supporting the end-to-end energy system

- Increasingly the things that happen in the distribution network have an impact on the overall system and energy markets. By leveraging the capabilities above and collaborating with AEMO, DSOs will be able to provide much more sophisticated support to the NEM.

What a DSO doesn't do:

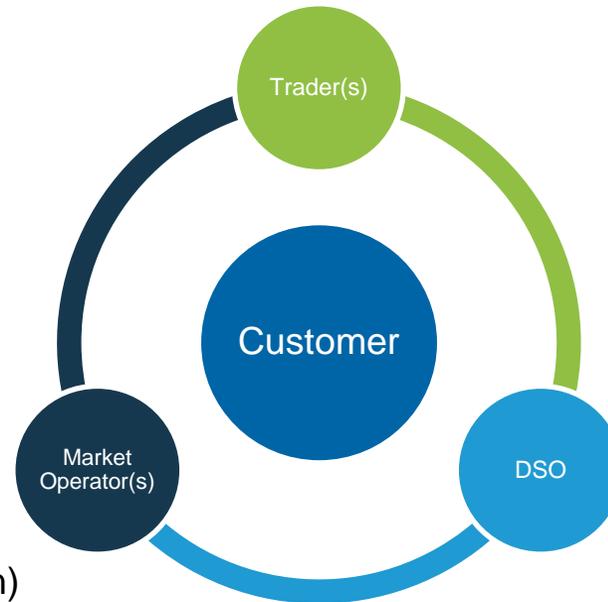
- Run energy markets. The focus is instead on supporting DER participation in local and NEM energy markets as they evolve.
- Aggregate and bid customer resources into energy markets. The focus is instead on supporting traders to do so through a flexible and trusted network service.

Traders, the DSO and Market Operators collectively enabling customers to get value from their DER investments

Objective: Consider markets, network pricing, and other incentives and use these to develop simple offerings and solutions to help customers manage cost / get value from their investments.



NIAC Feedback: Do you think this is in line with customer expectations?



Objective: Ensure overall supply and demand balance (i.e. is there enough generation to meet peak load and enough load to absorb peak generation) in each market. Run efficient markets with low barriers to entry to increase competition and reduce prices.

Objective: Provide flexible, safe and reliable network services that enable DER to participate in markets. Efficiently manage network capacity and aim to increase the use of the existing network to reduce prices for all.

Day in the life of Edith



Meet Edith. She lives in Sunnyville and recently bought an EV. She signed up to the *Green Revolution* charging service with Provider X that means all the energy for her car is bought from renewables and her car is enrolled to provide support to the energy system when there are fluctuations in renewable generation. This is just one of the ways in which Edith is choosing to live a more sustainable life.

Provider X receives daily updates from the local network on the capacity available in Edith's area along with a price on different time windows for using the network. They also monitor the forecast market prices for energy and combines this information with Edith's usage preferences for her EV to charge when there is spare capacity in the network and an abundance of cheap renewable energy being produced.

It is a sunny day in Sunnyville, as is often the case, and Edith decided to have lunch in the garden. In her driveway Edith's EV is soaking up the solar energy produced by the array of solar farms on the outskirts of town. However, a cloud is pulling in from the coast and is covering several solar farms. This has caused a sudden shortage of energy in the region...

Day in the life of Edith (continued)

Luckily the energy system is set up to balance out the supply and demand. The Market Operator signals for a large-scale battery in the area to discharge, but soon it is clear more help is needed.

The local DSO lowers the voltage across the region to reduce how much energy is being consumed. This drop in voltage is made possible by Edith's EV that, together with other EVs and the DSO's community battery, are propping up the voltages in the nooks and crannies of the distribution network that are now running at too low a voltage due to the regional change. This is enabled by network support agreements that the local DSO has with Provider X and others like it in the area.

After a while the cloud moves on and by the time Edith goes back inside to wash up her plate the system has reverted to normal. She notices a message on her phone, thanking her for supporting the system during the recent event. If it wasn't for that, and the credit on her bill at the end of the month, Edith really wouldn't even have known anything happened.



Ausgrid is considering running a demonstration of how DER can be integrated without a central DER Market Place that attempts to co-optimize.

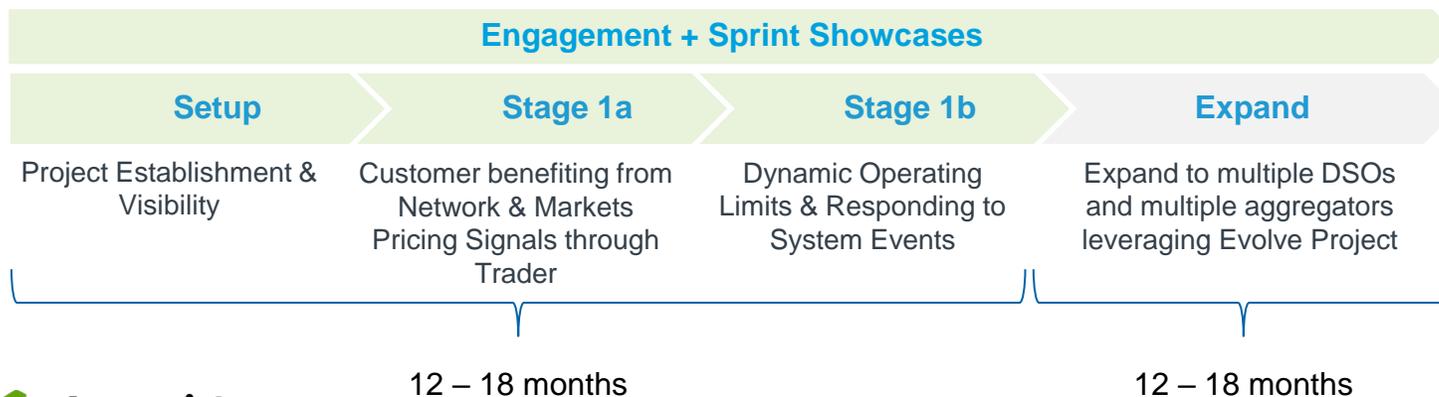
Purpose of project

- Demonstrate a faster and cheaper solution for integrating DER, where:
 - DSO responsible for managing network capacity.
 - AEMO responsible for markets (for this project – noting the DSO would also support local energy markets).
 - Trader responsible for integrating this into a simple product for customers.
 - AEMO & DSOs work together to optimise network capacity and market outcomes at a strategic level without a central platform trying dispatch for both.
- Demonstrate an incremental approach that is flexible and can scale as customers take up new offerings.
- Co-design a model with customer, traders, networks and AEMO that can expand to other states.

Key risks and issues

- **Issue: Ausgrid ability to support trial with significant resources committed to Community Battery and other innovation trials.**
- *Risk:* Time delay in obtaining ARENA funding.
 - *Mitigation:* Staging project to commence work while awaiting ARENA funding
- *Risk:* Demonstration project could struggle gaining sufficient visibility.
 - *Mitigation:* Marketing and engagement to form key part of delivery.
- *Risk:* Cost of billing system changes.
 - *Mitigation:* No changes to billing system – settlement between Reposit and Ausgrid outside of production systems, however using project to establish tariff development process.

Project staging



 Ausgrid is contemplating a demonstration project of this model to feed into the current debate on future market designs and associated roles and responsibilities. Pricing Working Group members expressed their support for such an initiative.

NIAC Feedback: Would you be supportive *in principle* with funding the Ausgrid part of this through Network Innovation?

How would this project compare to other initiatives in the portfolio?

Prioritisation Principles	Weight	Edith (DSO Demo)	Rating of existing initiatives in proposal for reference										
			Advanced Voltage Regulation	Network Insights	Optimise Fringe of Grid	HV Microgrid	EV Charging Platform	Community Batteries	Portable Supply Units	Self Healing Networks	Dynamic Load Control	Asset Condition Monitoring	Line Fault Indicators
Maintains safety for employees & the community	17%	2	3	4	4	4	2	3	2	3	2	4	3
Improves fairness	14%	3	3	3	5	4	5	5	3	4	3	2	4
Accelerates de-carbonisation	14%	4	4	4	3	3	4	4	3	2	3	1	1
Lowers costs for customers	13%	5	3	5	4	3	3	3	2	5	4	3	2
Improves resilience	12%	2	3	5	4	4	2	2	4	4	2	4	3
Solves a specific problem	11%	5	5	3	3	3	4	5	1	3	2	4	4
Improves the economic utility of new and existing assets	10%	5	3	4	4	4	5	5	3	5	4	4	3
Uniqueness of problem and collaborative opportunities	9%	5	4	2	2	2	4	4	2	3	3	4	2
	100%	3.71	3.45	3.82	3.71	3.44	3.53	3.81	2.51	3.58	2.83	3.17	2.75

Rating	Rating description
1	Project does not impact progress on this principle
2	Project will have a minor impact on advancing this principle for Ausgrid and our customers
3	Project will have a moderate impact on advancing this principle for Ausgrid and our customers
4	Project will have a significant impact in advancing this principle for Ausgrid and our customers
5	Project will have a major industry wide impact on advancing this principles

 **NIAC Feedback:** Do committee members have any feedback on the preliminary assessment of how this would compare?

A hand is shown holding a black power tool handle, likely a torque wrench, against a dark background of electrical equipment. The equipment has some blue markings, including the letters 'LB'. The overall scene is dimly lit, focusing on the hand and the tool.

HV Microgrid Trial – River Communities

Ausgrid's River Communities

Ausgrid's river communities experience poor reliability supply. This was highlighted in storm events such as the February 2020 and July 2020 storms, during which communities in the Hawkesbury experienced significant outages.

Background:

- Poor reliability has historically been driven by:



Geography

challenging characteristics such as dense vegetation and proximity to cliffs and waterways (in many instances communities can only be accessed via ferry) leading to poor access and high outage durations



Weather

exposure to destructive weather events such as storms and bushfires leading to high outage frequencies



Legacy

extended network distances between customers and their closest zone substation given these regions exist between the fringes of Ausgrid's discrete southern and northern network areas

- Prevailing conditions drive an imperative for Ausgrid to act. Recent developments which are supportive of a timely strategy for enhanced reliability for river communities are as follows:



Word of Mouth

recent upgrades in West Pittwater have been noticed by other river communities. Word of mouth is driving an increase in enquiries regarding potential reliability upgrades



Economics

decreasing technology costs mean that Stand Alone Power Systems (SAPS) are now a viable option in some situations and these communities could be perfect candidates



Discourse

COVID-19 and the Victorian Bushfires Royal Commission (2009) have driven the availability of incremental funding for supporting vulnerable communities and vegetation management respectively

- Blended arrangements of network options as well as Microgrids and SAPS to address reliability were investigated.
- Given the large number of potential arrangements, a programmatic method was deployed to identify the arrangement which would yield the best NPV outcome.



River Communities have distinct characteristics

2,797 Ausgrid customers living across 25 river communities experience poor reliability driven by poor access and destructive weather. Outage duration performance across these communities underperforms against reasonable standards by a magnitude of up to 7x.

Characterisation of the Problem:

- River communities spanning the Hawkesbury and West Pittwater regions of the Ausgrid network (highlighted red in Figure 2) experience poor reliability of supply driven by challenging geography, destructive weather and the legacy of a merging of 2 discrete networks.
- Highlight statistics relating to the river community region are as follows:
 - **Customers:** 2,797 Ausgrid customers across 25 river communities¹ (and 4 sites with no mains supply);
 - **Topology:** customers are supplied by 9 feeders out of 7 zone substations²;
 - **Outages:** Hawkesbury River Community customers experience poor outage performance, with the majority of distribution substations in these areas underperforming against reasonable short rural SAIDI standards by a magnitude of up to 7x. It's important to note that distribution substation level performance in this subset of the network appears poor however compliance against license condition targets is performed at the feeder level and also considers higher performing distribution substations on feeders shared with the poorer performing subset being investigated.

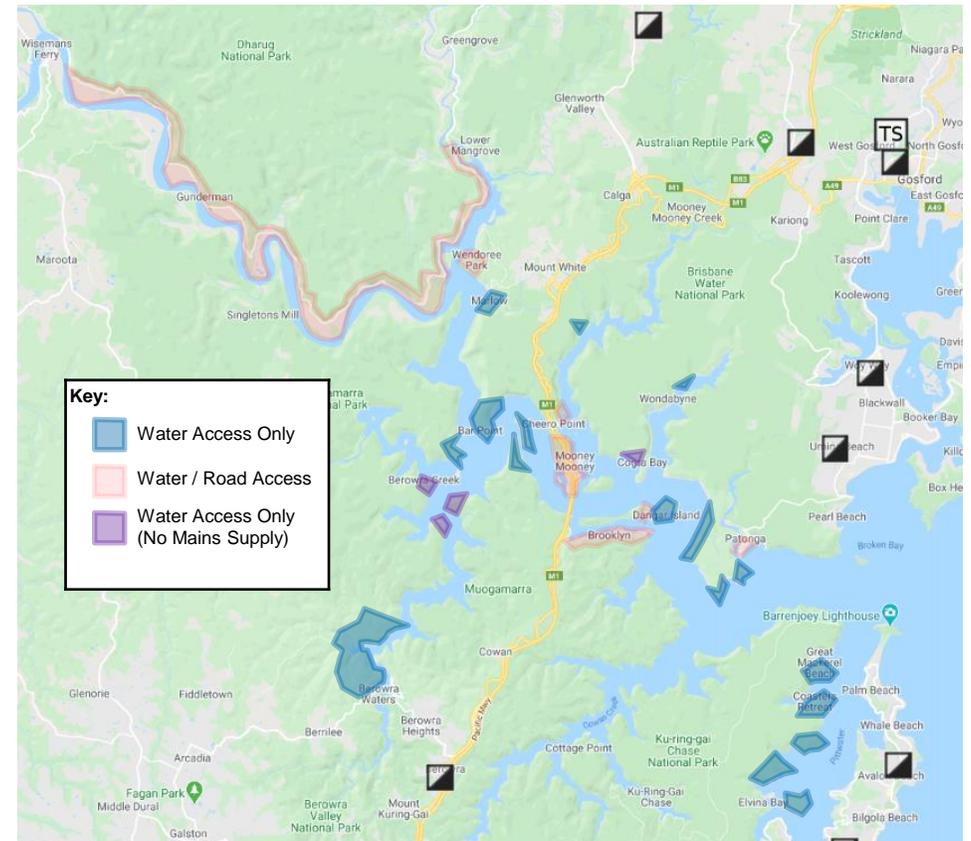
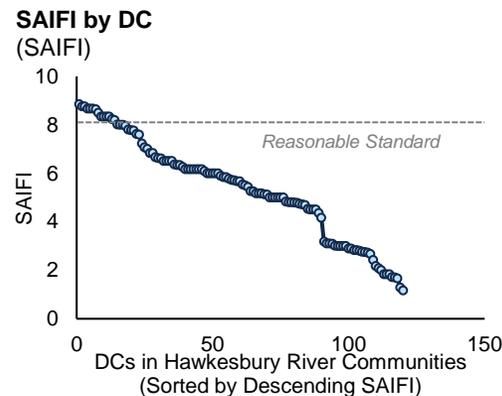
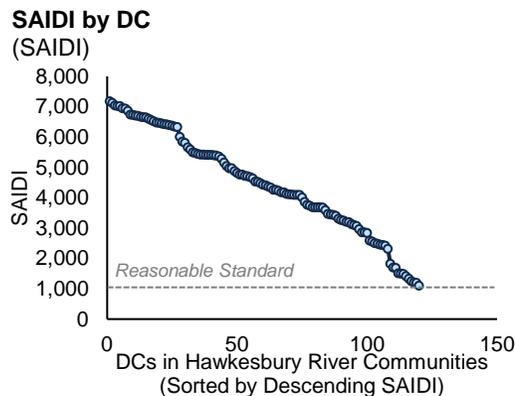


Figure 2. Highlighted vulnerable river communities analysed as part of this investigation.



1. Which sit within 11 network topology groupings
 2. Berowra Pa11, Berowra Pa18, Berowra Pa21, Careel Bay Pa28, Mona Vale Pa10, Peats Ridge Pa1, Somersby Pa17, Umina Pa13L and Woy Woy Pa14

A Different Approach to Optimal Investment Investigation

46,734 potential arrangements of network solution, microgrid and SAPS investments were tested to identify the optimal investment arrangement from an NPV perspective.

Approach to Identifying Optimal Investment Decisions:

An investigation indicated that reliability could be addressed by a blend of:

- 21 discrete network solutions²;
- The potential deployment of a Microgrid in Mooney Mooney, Bar Point and Berowra Waters / Calabash Bay respectively; and
- Several degrees of potential SAPS deployment based on economic feasibility³.

46,734 discrete solution arrangements made up of the above were tested programmatically to identify the optimal arrangement of investments from a portfolio of network and non-network investment options (refer to Appendix A – Potential Technologies for further detail on the technologies which would make up a potential holistic approach).

3 outcomes have been proposed for further investigation:

- The optimal investment arrangement for the best NPV outcome⁴;
- The optimal investment arrangement for the best NPV outcome if a Microgrid were to be deployed in Mooney Mooney; and
- The optimal investment arrangement for the best NPV outcome with Microgrids deployed in Mooney Mooney, Bar Point and Berowra Waters / Calabash Bay.

Given the innovative nature of the proposed approach and the focus on improving the quality of life for remote communities, this project aligns with the timing and objectives of government stimulus and ARENA funding. We would pursue a blend of funding to support the development and implementation of a strategy for the reliability of supply for our river communities.

20 Year NPV Outcome of Investment Permutations
(Real FY20 \$m)

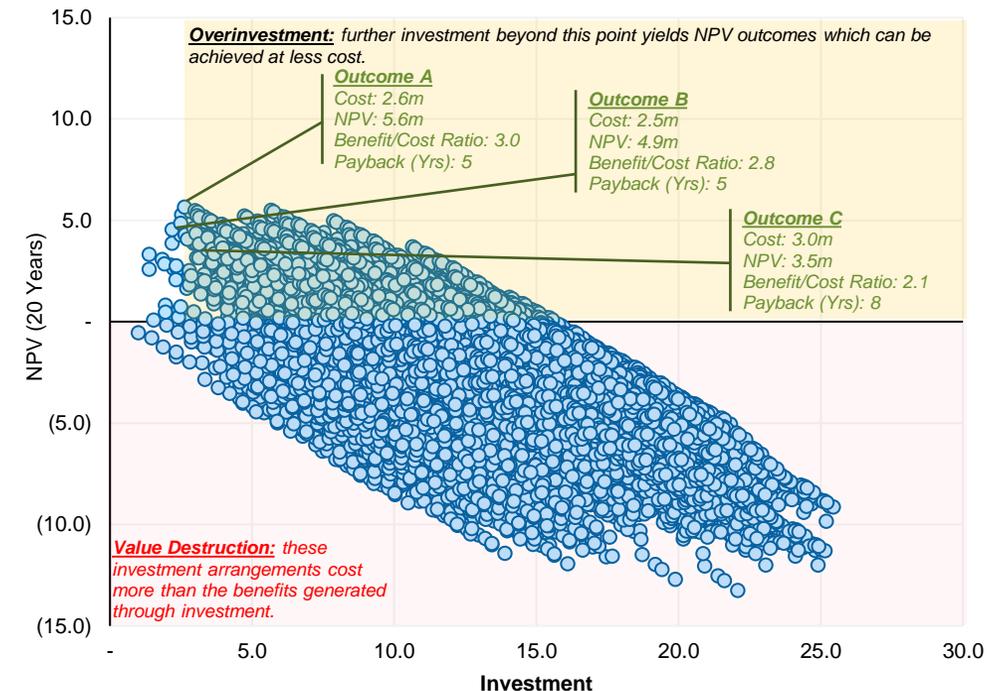


Figure 3. Outcomes from investment arrangement testing.

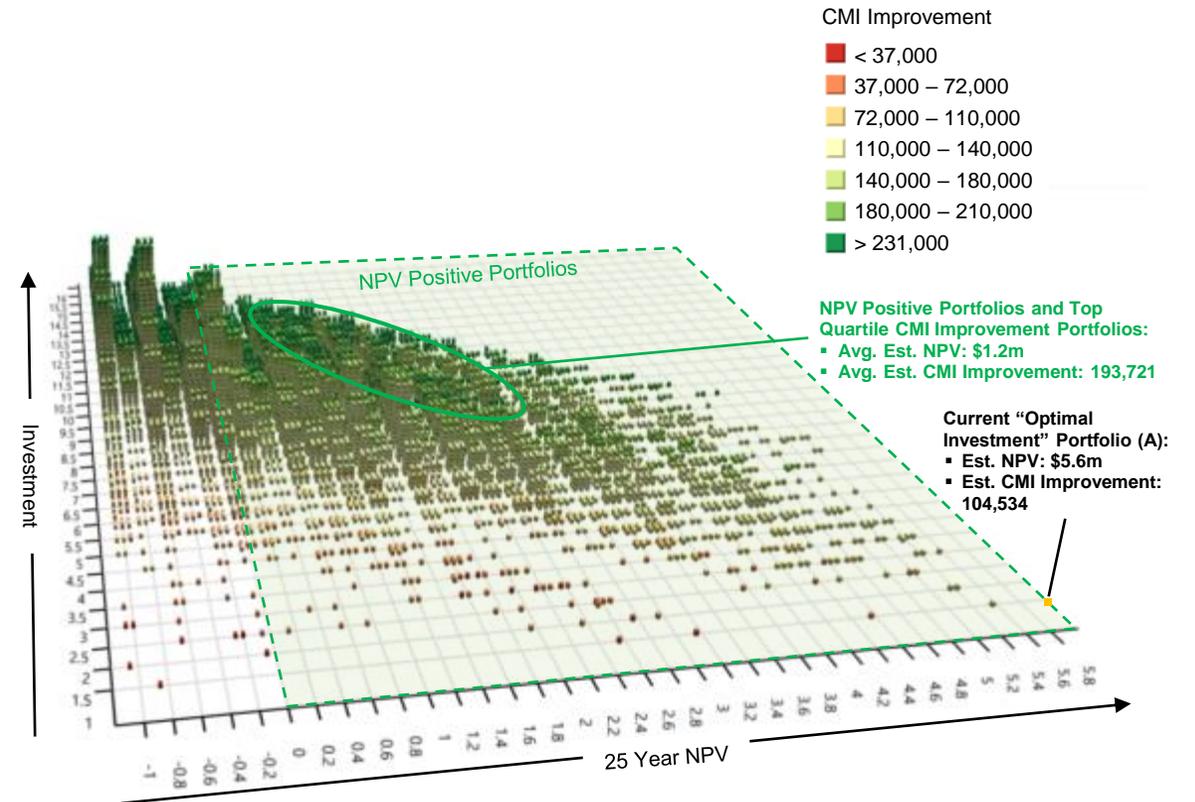
Alternative Portfolios

Several portfolios deliver an improvement to estimated Customer Minutes Interrupted (CMI) (and SAIDI outcomes) relative to the “Optimal Investment” scenario while remaining NPV positive.

Alternative Scenarios:

- The “Optimal Investment” scenario delivers strong financial outcomes, however delivers limited benefit in reliability terms (refer to Appendix B – Impact by Community for Proposal A).
- It was hypothesised that of the 46,734 scenarios tested, a subset of alternative portfolios would exist which provide a stronger reliability benefit while remaining NPV positive. Several steps were undertaken to select alternative scenarios for further investigation.
 - Additional analysis was undertaken into alternatives to the “Optimal Investment” scenario. 3 axis analysis was undertaken to understand estimated improvement to CMI relative to level of investment and estimated NPV for each potential investment arrangement.
 - CMI improvement outcomes (for all scenarios) were divided into quartiles so that top quartile outcomes which were NPV positive could be identified.
- It was found that 7,243 “feasible” portfolio options were NPV positive while being able to deliver top quartile levels of CMI improvement.
 - An additional metric was formed to demonstrate CMI improvement per investment. This metric was used to identify the optimal portfolio option from within the 7,243 “feasible” portfolio options. A fourth proposal (Proposal D) using this basis follows.

CMI Improvement by Level of Investment and 25 Year NPV



CMI Improvement Focused Investment

This arrangement costs \$4.8m, has a 25 year NPV of \$5.1m and a payback period of 9 years. This option drives an estimated CMI improvement of approximately 180,000 minutes.

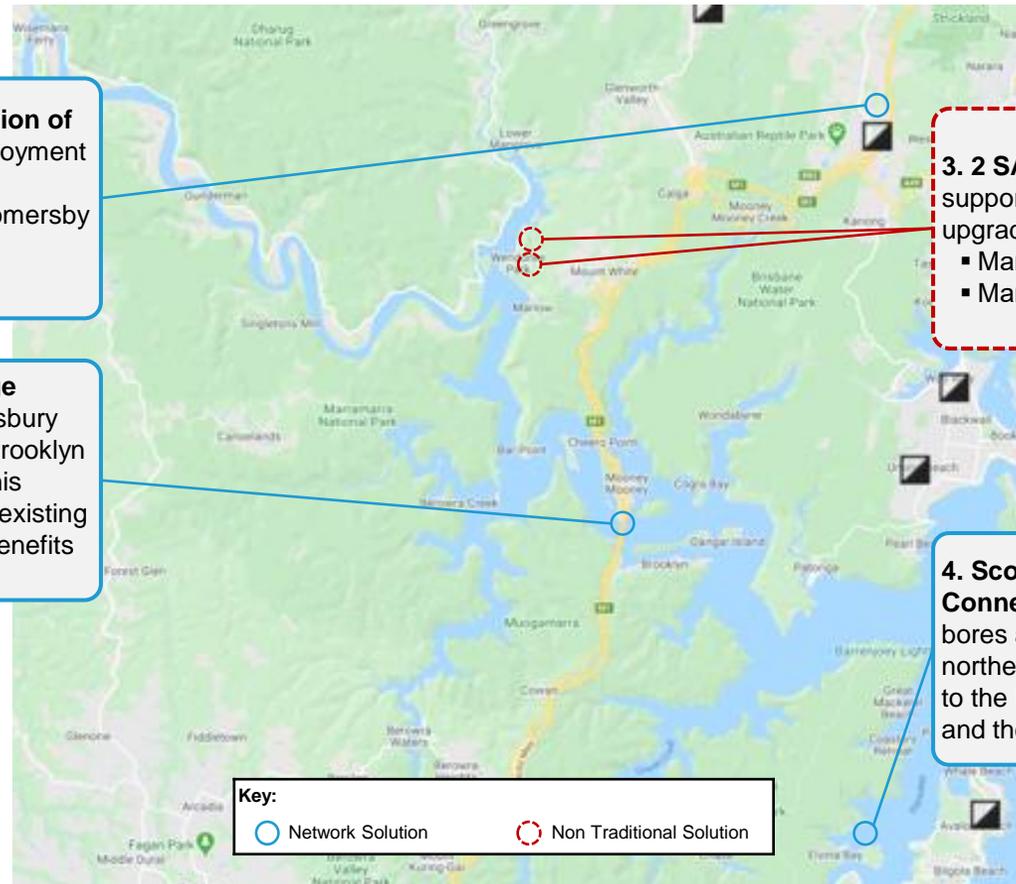
1. Open Point Changes to Redirect a Small Section of Somersby Pa17 to Peats Ridge Pa13L \$0.0: deployment of changes to open points to reduce the number of downstream customers impacted by outages on Somersby Pa17 which occur closer to the zone (reduction in customers impacted in a subset of outages).

2. Brooklyn Bridge Connection Over RMS Bridge \$2.3m: an 11kV interconnection across the Hawkesbury river by means of a cable attached to the existing Brooklyn Bridge (supported by negotiation with the RMS). This option will require sections of OH to connect to the existing network and OH uprating at either end to support benefits to both sides of the river.

3. 2 SAPS deployments \$0.3m²: deployment of SAPS to support 2 sites which are not served by a network upgrade. These sites are as follows:

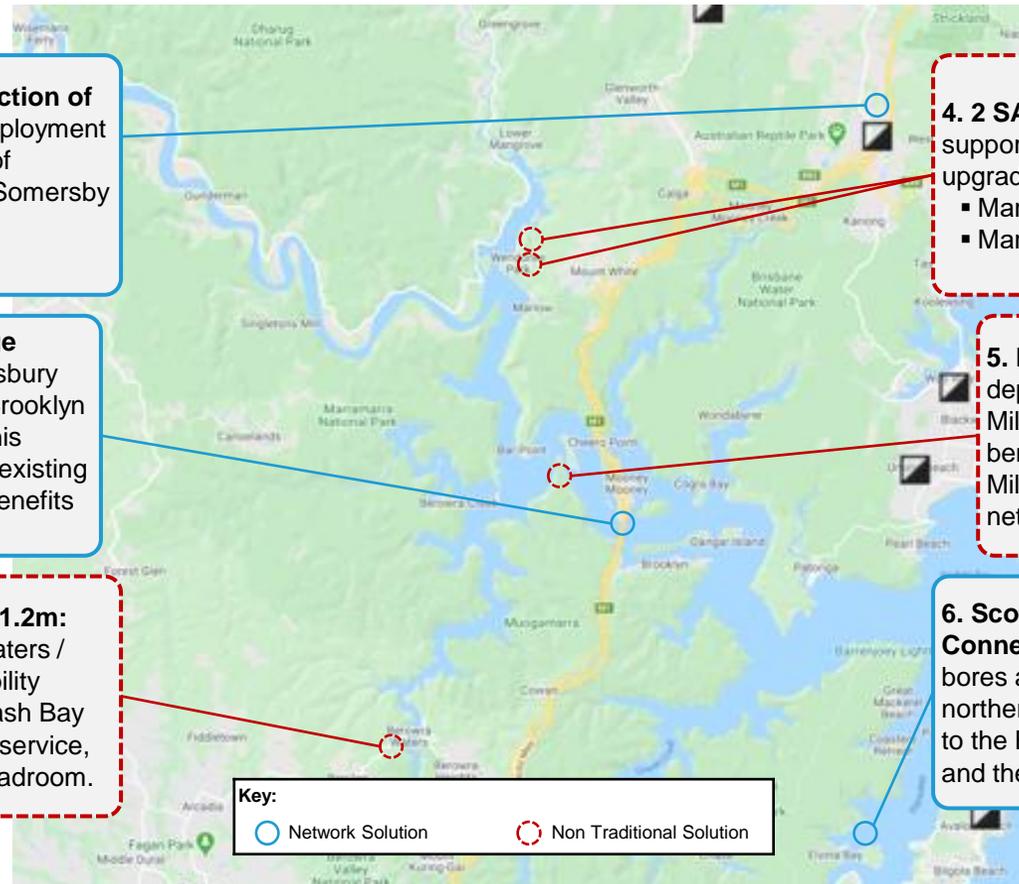
- Marlow's Gully: PT14482 on Somersby Pa17; and
- Marlow's Gully: PT18046 on Somersby Pa17.

4. Scotland Island Submarine / Short Under-Bore Connection \$2.2m³: a submarine cable with short under-bores at either end. A smart switch is positioned on the northern side and S16272 has Supervisory control added to the RMI. This option forms a ring with Scotland Island and the Western Foreshores.



Combined CMI Improvement & Innovation Investment

Outcomes from the investigation process informed the development of a proposal balancing innovation outcomes and improvements to reliability. This proposal costs \$7.0m, has a 25 year NPV of \$3.4m and a payback period of 13 years. It has an estimated CMI benefit of approx. 190,000 minutes.



1. Open Point Changes to Redirect a Small Section of Somersby Pa17 to Peats Ridge Pa13L \$0.0: deployment of changes to open points to reduce the number of downstream customers impacted by outages on Somersby Pa17 which occur closer to the zone (reduction in customers impacted in a subset of outages).

2. Brooklyn Bridge Connection Over RMS Bridge \$2.3m: an 11kV interconnection across the Hawkesbury river by means of a cable attached to the existing Brooklyn Bridge (supported by negotiation with the RMS). This option will require sections of OH to connect to the existing network and OH uprating at either end to support benefits to both sides of the river.

3. Berowra Waters / Calabash Bay Microgrid \$1.2m: deployment of a Microgrid solution in Berowra Waters / Calabash Bay (on Berowra Pa18) to deliver reliability benefits to customers in Berowra Waters / Calabash Bay as well as further benefits including storage-as-a-service, wholesale, FCAS, customer savings and DER headroom.

4. 2 SAPS deployments \$0.3m¹: deployment of SAPS to support 2 sites which are not served by a network upgrade. These sites are as follows:

- Marlow's Gully: PT14482 on Somersby Pa17;
- Marlow's Gully: PT18046 on Somersby Pa17; and

5. Milsons Passage / Milson Island Microgrid \$0.9m: deployment of a Microgrid solution in Milsons Passage / Milson Island (on Berowra Pa11) to deliver reliability benefits to customers in the water access communities of Milsons Passage / Milson Island, as well as further network support and DER capex deferral benefits.

6. Scotland Island Submarine / Short Under-Bore Connection \$2.2m²: a submarine cable with short under-bores at either end. A smart switch is positioned on the northern side and S16272 has Supervisory control added to the RMI. This option forms a ring with Scotland Island and the Western Foreshores.

Key:
○ Network Solution ○ Non Traditional Solution

1. Sites were chosen based on desktop analysis – a detailed site selection process including physical examination of sites for suitability will be undertaken once an investment direction has been agreed.
 2. Note: the Scotland Island Submarine / Short Under-Bore project is underway.

NIAC Input Sought

- Using the modelling of multiple scenarios, we can choose from strategies which optimise for different factors:
 - Best benefit to cost ratio
 - Lowest cost per customer minute saved
 - Most customer minutes saved
 - Greatest number of customers/communities receiving an improvement

Does the NIAC have a preference on which?

- We are currently actively considering the resilience of our network and customers in the face of further climate change

Does the NIAC see value in strategies like this one for cost effectively supporting resilience?





Network Innovation Program Investment Reprioritisation

Network Innovation Program – Investment Reprioritisation

- As presented at this meeting, there is a need to reprioritise the planned Network Innovation Program funding profile. This will account for:
 - Additional funding required to successfully complete some projects (e.g. community batteries)
 - Additional funding for proposed new projects (e.g. potential DSO Demonstration project)
- There are several ways by which this reprioritisation can be achieved including:
 1. Reallocation of funding from other existing Network Innovation Programs (i.e. total value of Network Innovation Program remains the same)
 2. Increase the overall value of the Network Innovation Program (i.e. a reallocation from other network capex programs)
- Options, including advantages and disadvantages, are presented in this section

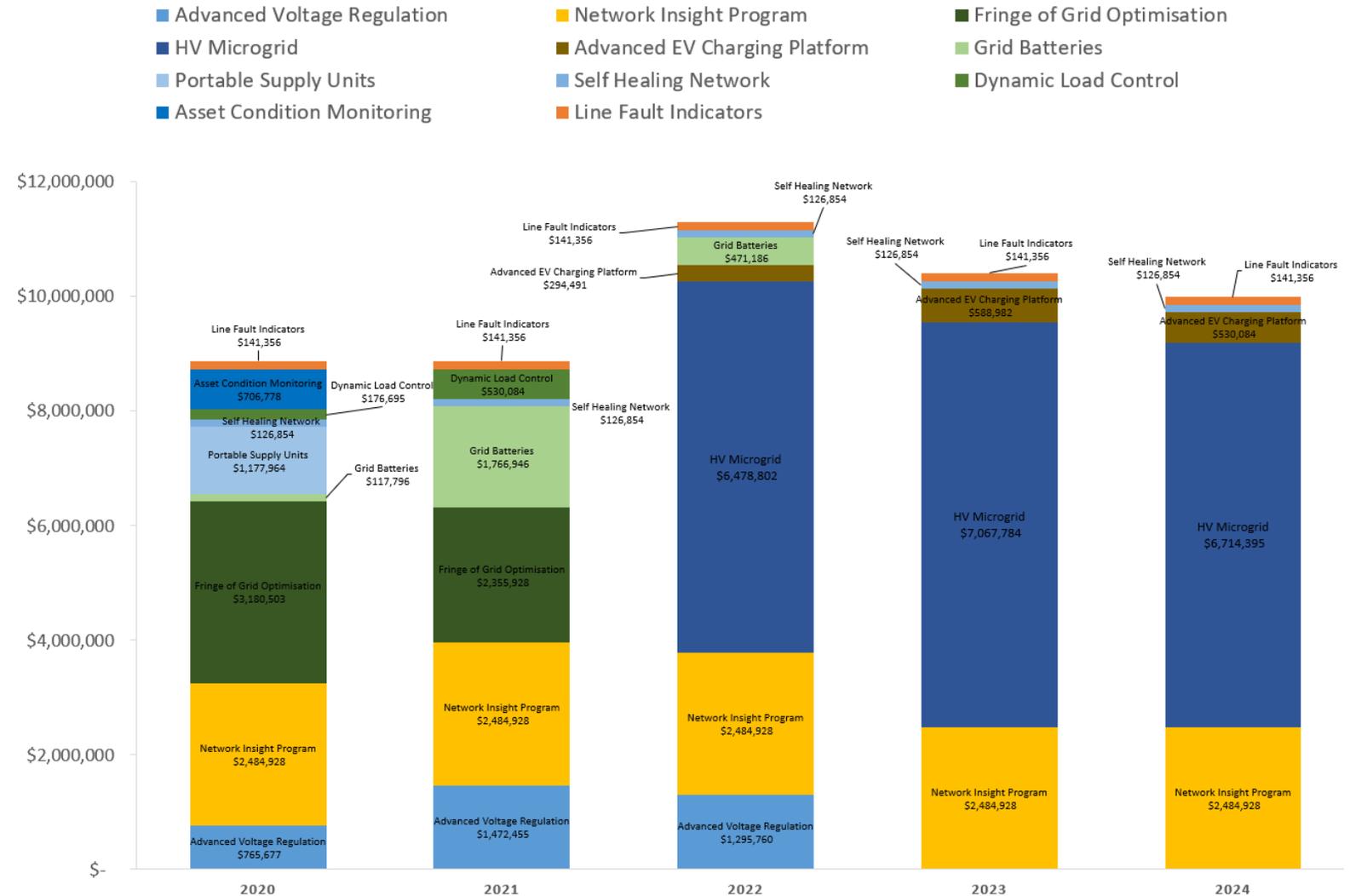


NIAC Feedback: Do committee members have a high level preference for the best way to reprioritise funding?

Network Innovation Program – Revised Regulatory Proposal Forecast

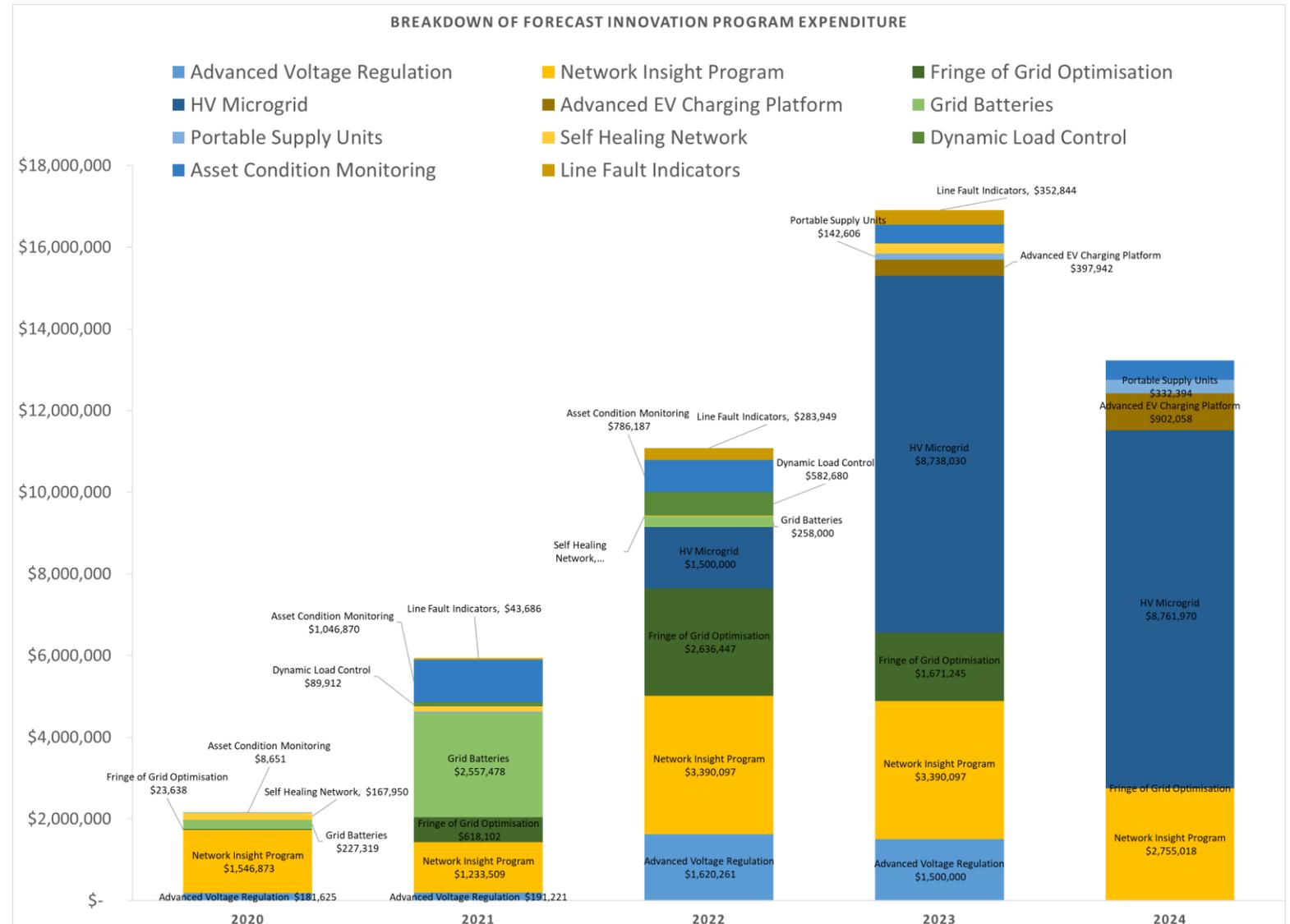
- The program was initially proposed as a fairly flat profile across the regulatory period
- Typically, programs were split over a number of years to ensure deliverability of outcomes

REGULATORY PROPOSAL FORECAST INNOVATION PROGRAM EXPENDITURE



Network Innovation Program – Current Actuals + Forecast (graphical)

- As previously reported, a number of hurdles have been encountered in the scoping and development of some programs, leading to expenditure in early years being less than forecast.
- Forecast expenditure profile has been adjusted to account for lower spend in early years
- A tabular view of this data is presented on the next slide



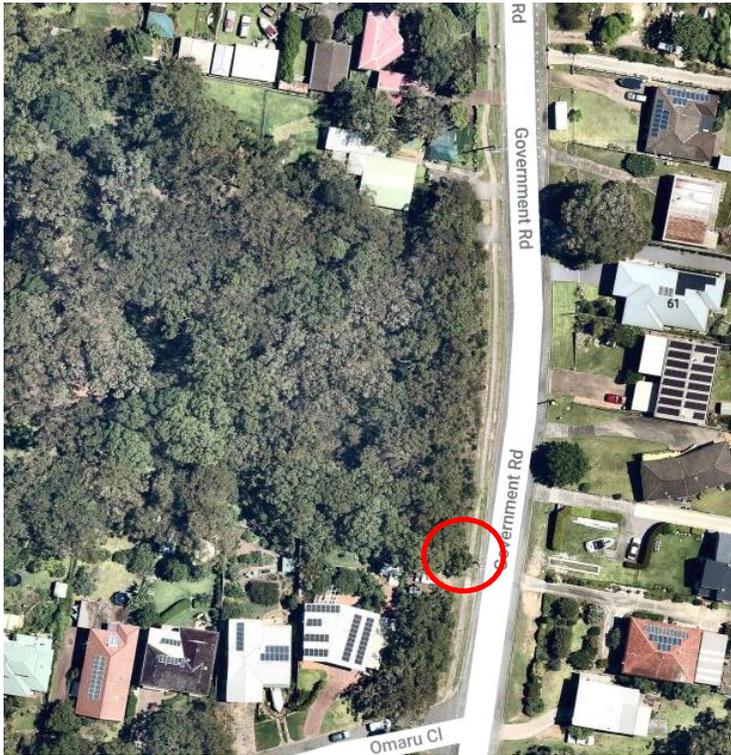
A close-up photograph of a person's hand holding a power drill, positioned over the engine compartment of a car. The engine's various components, including hoses and metal parts, are visible in the background. The lighting is somewhat dim, and the overall tone is dark, with the hand and the drill's handle being the primary focus.

For Information:

**A. Advanced Voltage Regulation
Statcom Trial Update**

First LV Statcom Commissioned – Nords Wharf, Lake Macquarie

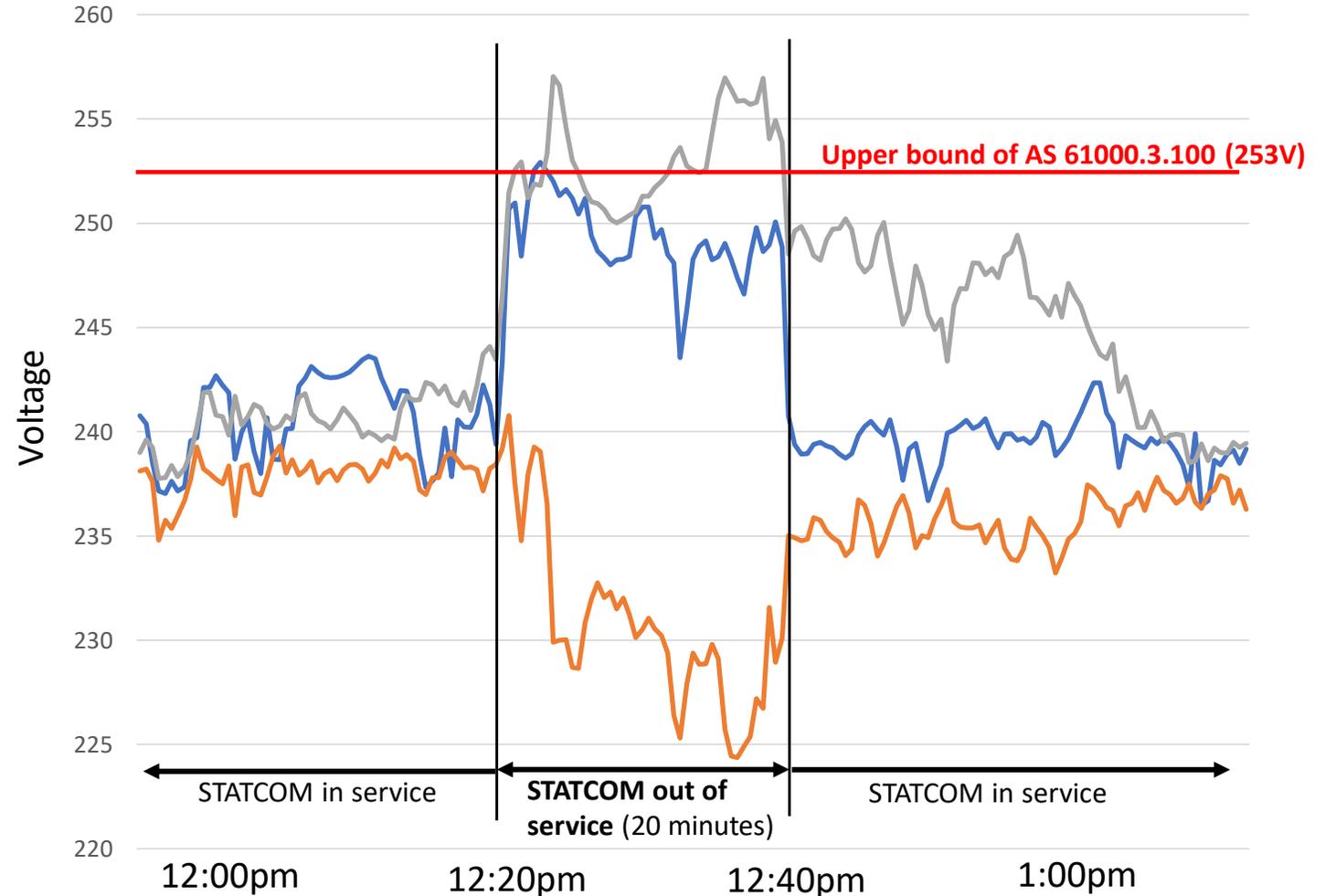
- Installed on a low voltage distributor, approx. 400m from the transformer, with 105 customers including 22 solar customers
- Commissioned on 27 February 2021



Initial Statcom Results

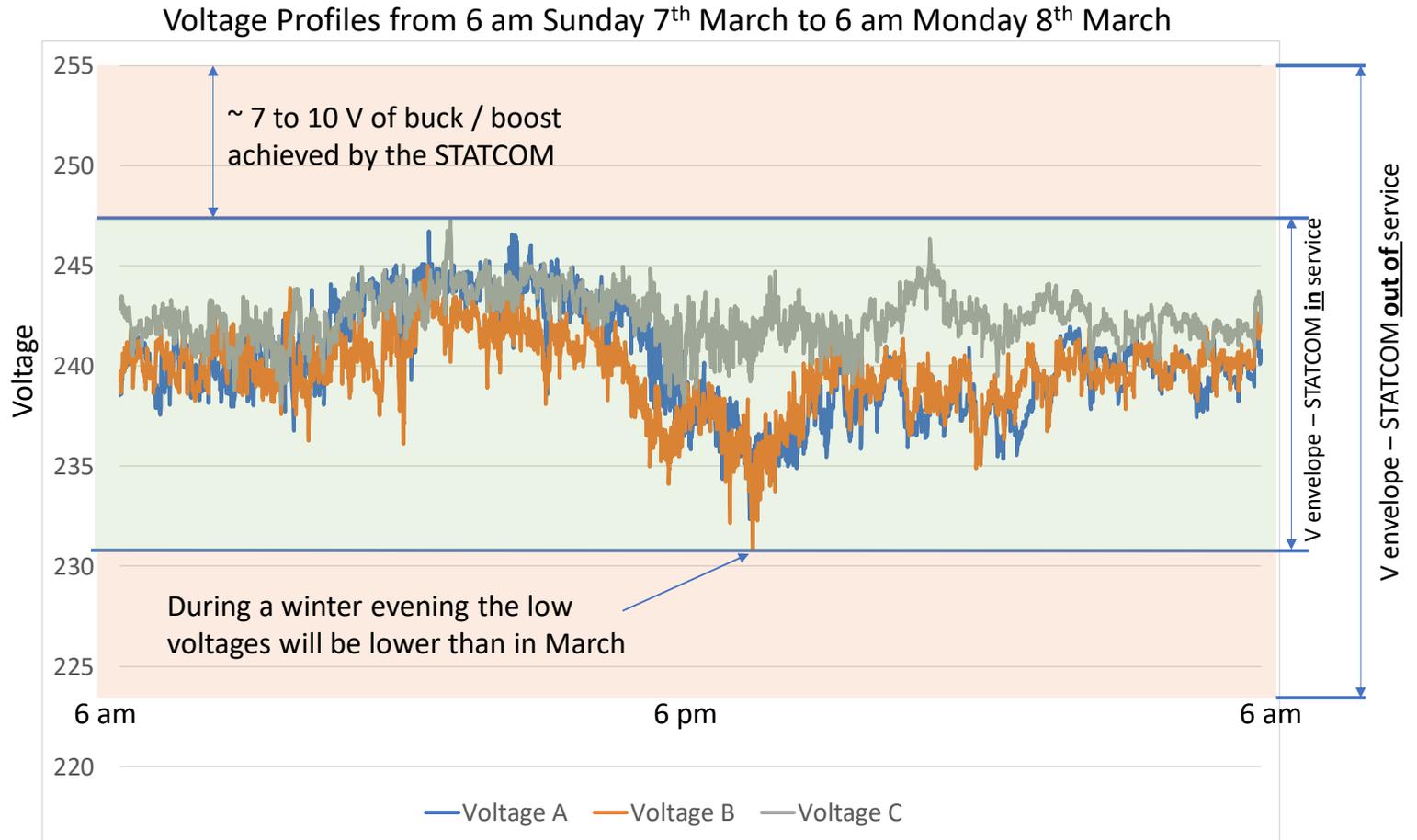
- Initial results are proving fruitful, showing that the first trial location was in need of both:
 - Balancing of voltages across the three phases
 - Management of voltages to ensure they remain within the bounds set by the Australian Standard
- These results are showing that it is highly likely that some solar PV systems connected to this distributor were being curtailed or disconnected at times of high voltage, prior to the statcom being commissioned

Trial STATCOM Nords Wharf. Three phase voltages, STATCOM taken out of service for approximately 20 minutes Sun 28 Feb at 12:20pm



Initial Statcom Results

- Results also indicate that between 7-10V of buck and/or boost are regularly being achieved by the Statcom
- This includes boosting of lower voltages experienced at times of peak domestic load (~6pm)
- This indicates that further voltage boosting will be experienced as this peak load increases, typically in Winter periods.
- The need to both boost and buck the voltage further indicates the suitability of this site for a Statcom.



A hand is shown holding a black power tool, likely a drill, against a dark, textured background. The hand is positioned on the right side of the frame, with the fingers gripping the handle. The background appears to be a close-up of a mechanical or electrical component, possibly a power outlet or a control panel, with various wires and components visible. The overall lighting is dim, creating a professional and technical atmosphere.

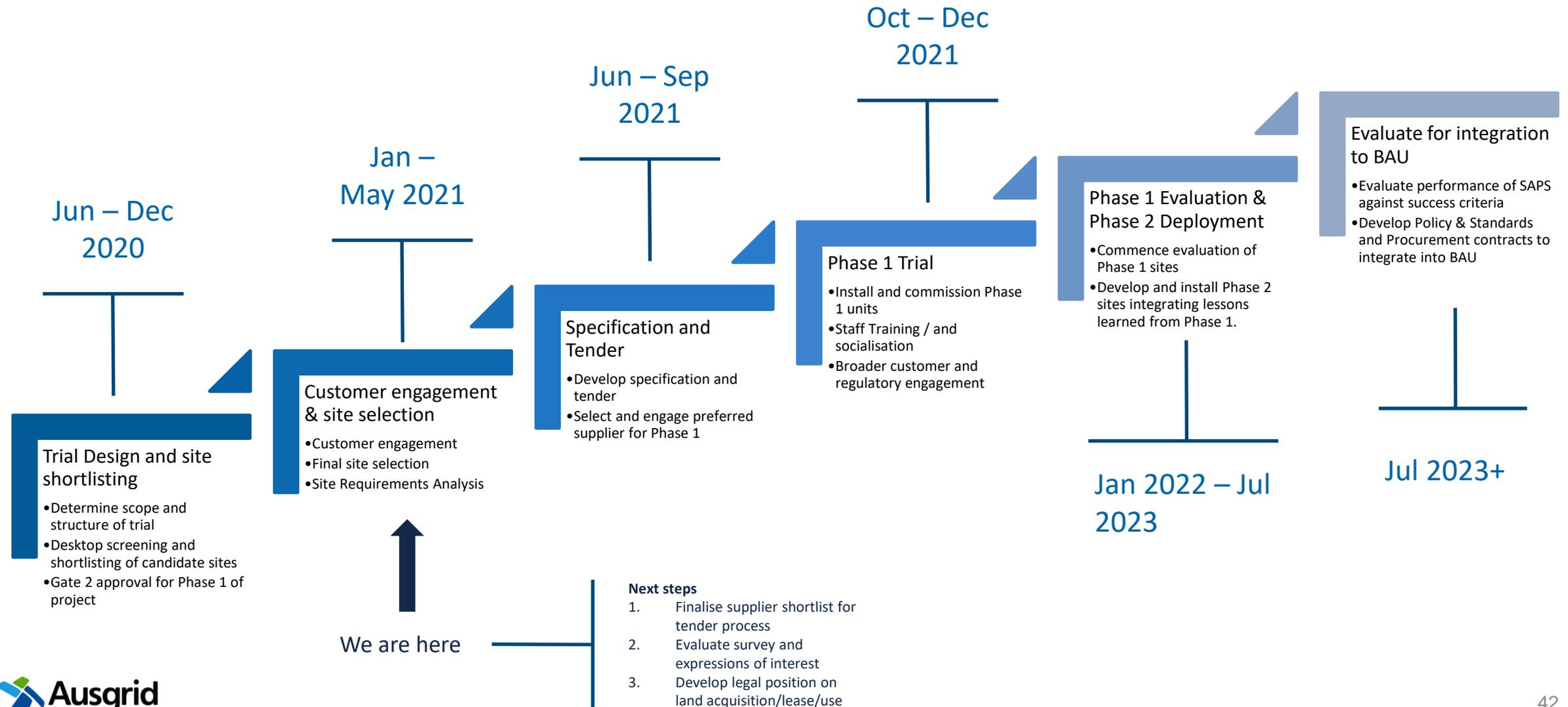
For Information:

**B. Stand Alone Power Systems
Update**

Stand Alone Power Systems Trial Update – Achievements

Community Engagement	<ul style="list-style-type: none">• We have released a survey to customers in potential SAPS areas to understand customer views on their energy supply, SAPS and to identify trial participants• Commencing briefings with key community stakeholders including councils and MPs
Equipment	<ul style="list-style-type: none">• Preliminary analysis and ranking of supplier Request for Information (RFI) submissions have been completed• Supplier Q&A have commenced to refine understanding and inform technical requirements• ENA working group commenced to improve alignment in SAPS approach
Legal	<ul style="list-style-type: none">• Obtaining legal advice on appropriate options for securing land access to facilitate SAPS deployment on private property
Regulatory	<ul style="list-style-type: none">• Commencing engagement with NSW DPIE on SAPS approach within NSW• On-going engagement with AER ring-fencing review of SAPS and batteries• Watching brief on AEMC rule change process

Stand Alone Power Systems Trial Update – Timeline



Stand Alone Power Systems Trial Update – Proposed Revised Measures of Success

Review of success measures to align to customer priorities (using ECA Consumer Expectations Research)

Existing Measures of Success:	Proposed Measures of Success:
Robust quantitative analysis tool to assess value of SAPS deployment against BAU replacement program over full asset lifecycle	Evidence that BAU deployment of SAPS will increase affordability overall through more efficient delivery of services in remote areas
Established evidence that a SAPS solution will provide at least existing reliability levels	Demonstrated and measurable customer acceptance of the solution – specifically that it is reliable, cleaner and provides choice for remote customers
Demonstrated and measurable customer acceptance of the solution	Acceptance of solution by Ausgrid management, planning and field staff to support on-going operations
Acceptance of solution by Ausgrid management, planning and field staff	Regulatory certainty that Ausgrid will be able to deploy and obtain a reasonable return on investment
Regulatory certainty that Ausgrid will be able to deploy and obtain reasonable return on investment	Regulatory certainty that Ausgrid will be able to deploy and obtain a reasonable return on investment

Thank you

