Network Innovation Advisory Committee

19 May 2020

Ausgrid

Agenda

#	SESSION	FACILITATOR	TIMING
1	Introductions & updates from Committee	Junayd Hollis	11:00 – 11:15
2	Review of actions	Junayd Hollis	11:15 – 11:30
3	Innovation Principle Sensitivity Poll results	Alex Moran	11:30 – 11:35
4	Community Battery project update	Felix Keck & Mark Appleton	11:35 – 12:25
5	Recap & next steps	Junayd Hollis	12:25 – 12:30

	To Be Reviewed Outside of Meeting	Slide No.
A	Action Updates	18
B	Network Innovation Program Dashboard	24
C	Advanced Voltage Regulation Update	26
D	Dynamic Load Control Update	28

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Introduction & Updates

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Review of Actions

	Action Items	Status	Comments
1	Can we identify how the DSO strategy aligns with the Wholesale Demand response rule change and the ESB 2025 market review	Complete	See Action Updates
2	Provide advice on the ENA's future forum - Ausgrid to provide an overview of our Network Innovation program	Complete	See Action Updates
3	Provide legend for Network Innovation Program Dashboard	Complete	See Action Updates
4	Microgrid federal funding can we use this for our microgrid project	Complete	See Action Updates
5	Resilience - look to include WALDO definition and provide advice on amending Ausgrid's definition	Complete	See Action Updates
6	Provide update on board strategy day and alignment with innovation program	Complete	See Action Updates
7	Speak with SAPN to understand the similarities between the Ausgrid Network Insights program and SAPN's	Complete	See Action Updates

Review of Actions

	Action Items	Status	Comments
8	Can we clarify who will pay for repairs to Ausgrid's network from the storm	Complete	See Action Updates
9	Draft first issue of Ausgrid innovation quarterly update, April	In Progress	Currently In Development
10	Darren Gladman to contact Ausgrid to seek input for an article he is drafting on solar inverters and voltage management	In Progress	Any further input required?
11	Peter Youll is looking to do a blog on community Batteries	In Progress	Any further input required?
12	Prepare and discuss innovation principle sensitivity weighting poll	Complete	See Agenda Item 3
13	Ausgrid to share Community Battery Feasibility Report and Community Battery customer survey with NIAC members	Complete	See Agenda Item 4

Innovation Principles

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Action 12: Innovation Principle Sensitivity Weighting Poll

- We received six responses from our Innovation Principles survey

- We are now able to use these results to determine:
  - Whether projects require changes to achieve greater alignment with guiding principles
  - Whether opportunities exist to reprioritise funding towards higher scoring projects, or
  - If projects should be replaced with a new project.

- Next steps: score all current projects

Project Prioritisation Principles	Rank/Priority	Weighting
Maintains safety for employees & the community	1	17%
Improves fairness	2	14%
Accelerates decarbonisation	3	14%
Lowers costs for customers	4	13%
Improves resilience	5	12%
Solves a specific problem	6	11%
Improves economic utility of new existing asset	7	10%
Uniqueness of problem & collaborative opportunities	8	9%

Community Battery Project Update

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Presentation to NIAC (October 2019)

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: $2 - 5.5m[1]

Discussions with ARENA have been initiated

	Stage 1 budget ($500k)	Stage 2 budget ($1.3m)	Stage 3 budget ($200k)
Key activities	**Q4 '19 – Q1 '20** • Customer testing • Implementation preparation • Contract & terms negotiation • Partnership agreements	**Q1 2020** • Contract execution • Order placement • Construction & installation	**Q2/Q3 '20 onwards** • Commercial & technical operation

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Community Battery Trial Principles and Objectives

Project specific guiding principles[1]

1. No customer to be worse off by participating in the trial
2. A positive experience for participating customers
3. Suitable sample size (number of customers)
4. Timely completion of trial and assessment of results
5. Improve the body of knowledge for shared use batteries
6. Maintain retail contestability
7. Maintain a safe and reliable network
8. Enable and assess feasibility of alternative commercial models

Trial objectives

1. Identify the costs & benefits of community storage for both solar and non-solar customers
2. Evaluate the customer experience for solar customers who participate
3. Test different operating protocols and network configurations to assess commercial models
4. Raise community and industry awareness of the potential benefits from community batteries
5. Confirm the regulatory barriers and build support for potential regulatory solutions
6. Maintain ability to access full value stack at a later date
7. Test appropriate tariff/charging arrangements
8. Test ability of battery to address network constraints

Do the outlined principles and objectives align with your expectations?

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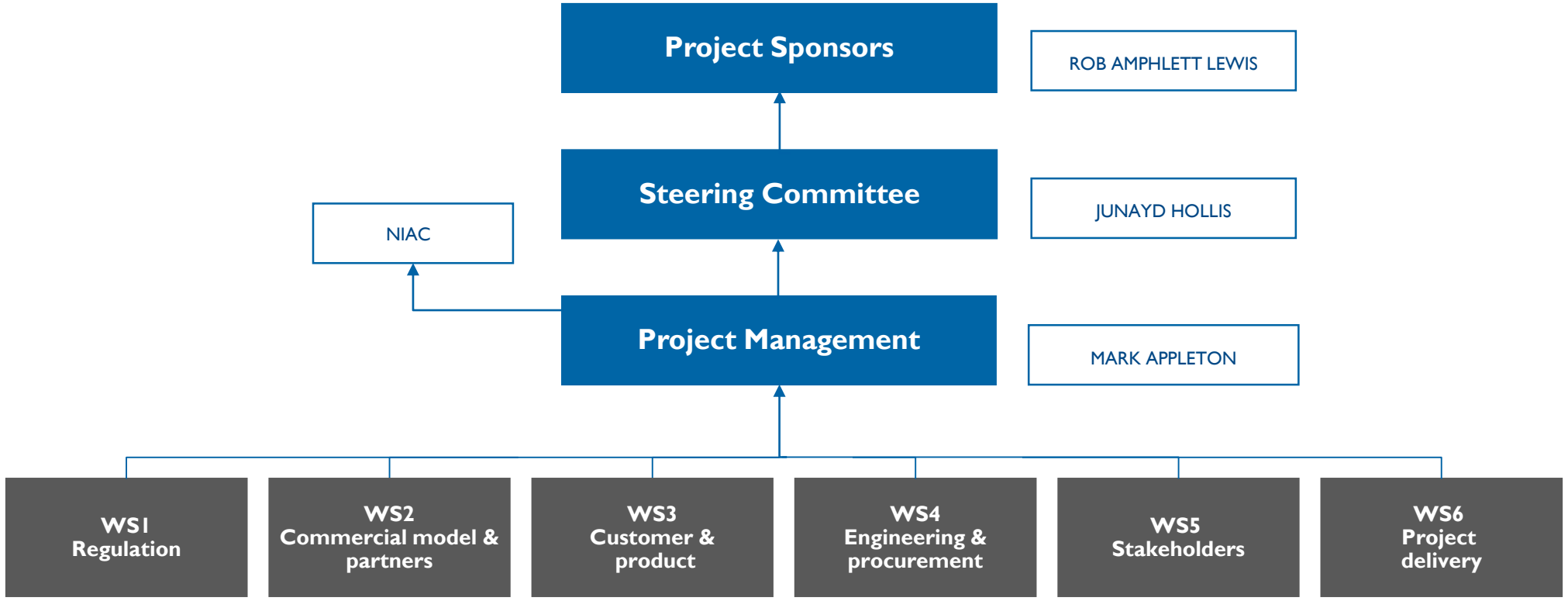
1 in addition to NIAC guiding principles for innovation / terms of references.

Project structure



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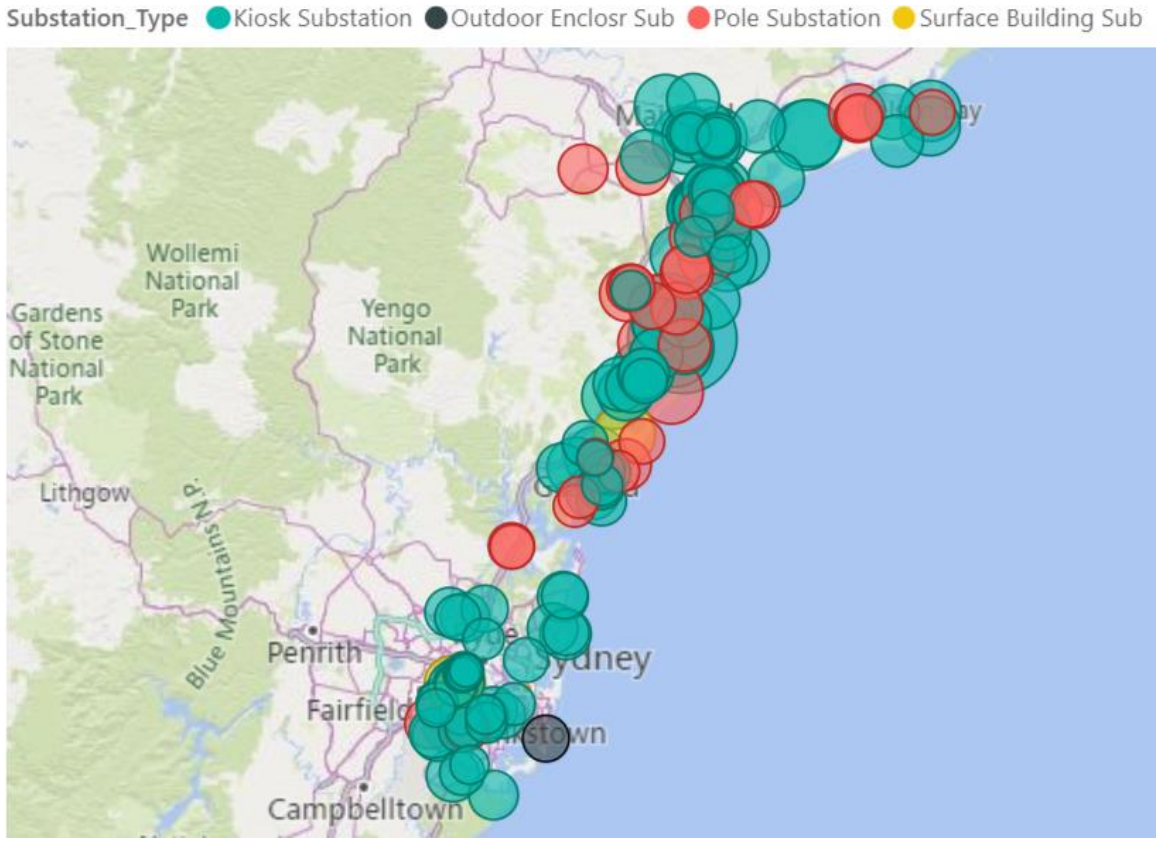
Site Selection

- Trial sites will be selected to optimise pilot outcomes:
  - represent typical network constraints
  - reflect range of customers
- Shortlist drawn from all 34,000+ distribution centres (DCs):
  - Minimum 30 solar customers (160 sites)
- Customer assessment includes:
  - Analysis of half-hourly import/export data (see next page)
  - Range of customer retail tariffs
  - Range of battery subscription costs
  - Annual fixed vs daily flexible battery size
- Network asset criteria includes:
  - DC utilisation and voltage management factor
  - Site construction suitability



- Does the NIAC have any views on whether a fixed or flexible customer battery size would be preferred?
- Are there criteria which the NIAC believe we should consider in selecting the preferred battery sites?

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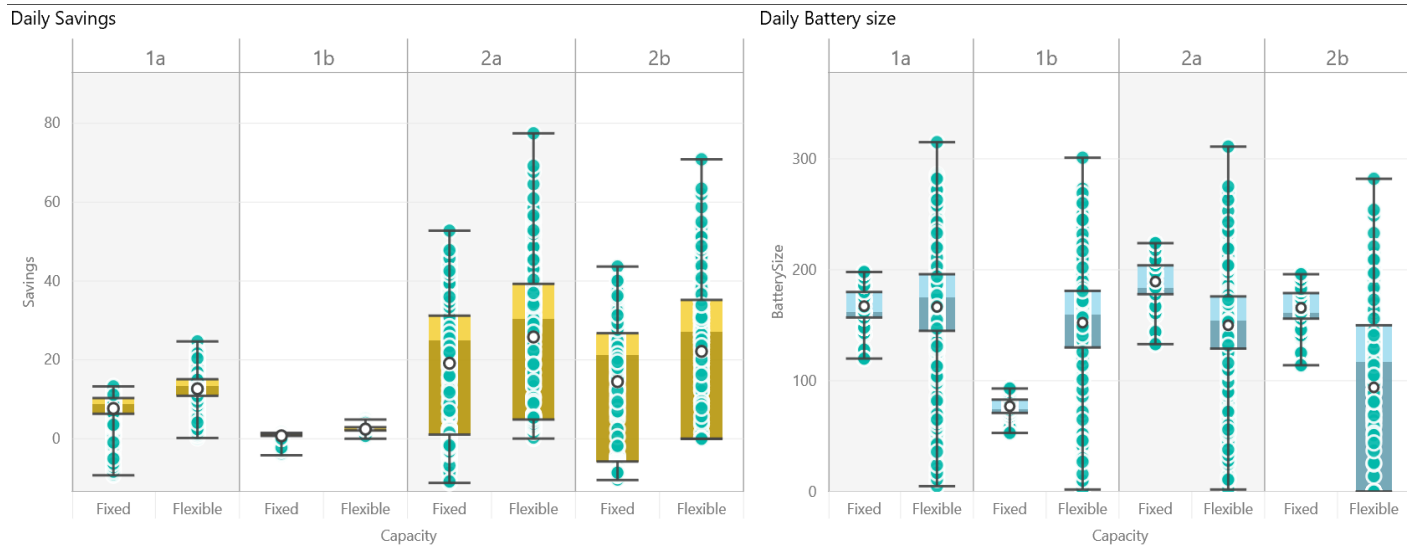
Tariff analysis

- We have assessed four different tariffs:
  - 1a Flat tariff with low feed-in tariff
  - 1b Flat tariff with high feed-in tariff
  - 2a TOU tariff with low feed-in tariff
  - 2b TOU tariff with high feed-in tariff
- We then:
  - Calculated the daily saving per site
  - Determined the optimal battery size based on maximising customer savings
- We found there were savings for all tariffs, but the greatest savings were for those customers on TOU tariff with low feed-in tariff



Customer Research

- Quantitative research underway (Phase 1)
  - targeting 700-1000 responses
- Customer segments
  - Customers in detached homes without solar
  - Solar with battery customers
  - Solar non-battery customers (<5 and >5 kWh export per day)
    - Oversample preferred community battery sites
- Question categories
  - Solar or battery purchase intentions
  - Alternative storage service consideration
  - FiT tariffs and Retailer questions
  - Solar production and system
  - Demographics
- Qualitative research to follow (Phase 2)
  - 8 x 2hr focus groups with key customer groups

Research objectives

Phase 1:

- Guide site-selection
- Align offering with customer needs
- Identify value propositions

Phase 2:

- Understand how best to communicate and engage with consumers
- Identify compelling customer proposition
- Develop communication materials and product specifics

- Does the NIAC have any views on the customer survey plans?
- Are there are specific questions or customer segments which the NIAC believe we should consider?
- Can the NIAC recommend how we might address any survey impacts due to COVID?

Commercial Model Update

Workstream scope and status

Purpose of engagement:

- developing a detailed commercial model for the community battery pilot project; and
- providing tendering support for engagement with commercial and technology partners for the project.

List of consultants engaged:

- Winner: **Frontier Economics** (*runner-up ENEA).*
- RFP sent to: Baringa Partners, CQ Energy, ENEA, Frontier Economics, KPMG, L.E.K. (no submission) and Marsden Jacob (no submission).

Timeline:

- Kick-off: 7 May 2020
- Commercial model assessment (incl. market feedback): *June/July 2020*
- Partner selection/tender: *September 2020*

Key challenges

- Commercial model important to unlock full revenue stack of shared batteries (incl. regulated and unregulated business)
- Multitude of commercial structuring options exist with different commercial and risk allocations and roles
- Successful model needs to be *fair* and attract *commercial interest* from market partners
- *Preliminary view* is that NIAC and Ausgrid need to agree on priority to test in pilot project – details to follow *next meeting*

Detailed discussion planned for next NIAC meeting

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Regulatory Update

The key regulatory barriers to the implementation of community batteries were identified by KPMG in its Feasibility Study.

How flows to and from community batteries are settled in the market

- ❑ Energy flows back to the customer from the community battery will be charged at the full retail tariff, even though the electricity was originally produced at the customer's premises through solar PV.
- ❑ Potential solutions to this problem are likely to be complex and will not be implemented in time for the trial.
- ❑ For the purposes of the trial we will reimburse participants to ensure they are not worse off from participating in the trial.
- ❑ A waiver will be needed to ensure that the energy flows do not impact the operation of the revenue cap

Ring fencing and how the community battery costs are allocated

- ❑ Community batteries have the potential to offer a number of services, not all of which can currently be provided by a network
- ❑ While a network can use a battery for network purposes, it cannot use a battery for wholesale trading, frequency control ancillary services (FCAS) or customer storage services.
- ❑ For the purposes of the trial, Ausgrid will be seeking a waiver that will allow it to offer a customer battery access service.
- ❑ There are a number of options that could be adopted for the allocation of capital and operating costs for community batteries. For the purposes of the trial we will seek a waiver from the operation of the CAM so we can use our network innovation fund to pay for the trial.

Potential restrictions on the ability to access wholesale and FCAS markets

- ❑ For community batteries to participate in wholesale and FCAS markets, the market participant must be suitably registered and able to meet AEMO's strict market requirements and procedures.
- ❑ With an initial trial of only two to three batteries, we will not be seeking a market participant to operate the community batteries in wholesale and FCAS markets.
- ❑ AEMO has already allowed different approaches and measurement requirements for Virtual Power Plant (VPP) and similar treatment could be provided for a community battery pilot.

Next steps

- Finalise community battery waiver application with NIAC feedback.
- Build support for Ausgrid's battery trial.
- Approach AER and NSW Government seeking support for trial and potential waiver.
- AEMC sandbox arrangements are not yet fully operational, however the framework is published.
- We will follow the proposed framework in our application.

- Does the NIAC have any views on our intended approach?
- How could we build support for our proposed trial?

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Community Battery – Stage 1 trial indicative timeline

April

9	Request for Proposal (RFP) sent to ten suppliers
•	Work continuing on site selection, commercial model and partners, customer user interface

May

11	Meet with AER to discuss regulatory issues
13	RFP closes
19	NIAC meeting
21	Webinar with Energy Security Board (ESB) / Australian National University (ANU) / Total Environment Centre (TEC) / Ausgrid

June

- Quantitative and Qualitative surveys underway

July

8 NIAC meeting

September

23	NIAC meeting

A. Action Updates
(to be reviewed outside of meeting)

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Action Updates

	Action Item	Status
1	Can we identify how the DSO strategy aligns with the Wholesale Demand response mechanism (WDRM) rule change & the ESB Post-2025 market review	Complete

- Ausgrid's DSO Strategy is focussed on:
  - Continuing to place customers at the centre of our decision making processes,
  - Continuing to advocate for policy and regulatory reform that meets the needs and expectations of our customers and stakeholders, and
  - Continuing 'no regrets' actions to move towards a DSO future (e.g. community battery project, VPP trials, EV charging trials).
- Ausgrid recently responded to the AEMC's 2nd draft rule, continuing to advocate for access to WDRM information. DNSP access to information was recognised as a need by the AEMC, however, they declined to include this provision in the draft rule.
- The ESB Post-2025 market review covers many areas. Ausgrid's DSO manager is on the Technical Working Group, which will ensure visibility of the direction of the program and advocacy in line with Ausgrid's strategy.

	Action Item	Status
2	Provide advice on the ENA's future forum - Ausgrid to provide an overview of our Network Innovation program	Complete

- Ausgrid provided an overview of the Network Insights program at the last Future Networks forum as the theme was network visibility
- Facilitation of the Future Networks Forum is now being assisted by the ENA, who will also send a representative
- Future topics suggested include stand alone power systems and community batteries
- The next meeting will be virtual and is currently being organised by Tas Networks and EQL

Action Updates

	Action Item	Status
3	Provide legend for Network Innovation Program Dashboard	Complete

STATUS	DESCRIPTION
○	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.

	Action Item	Status
4	Microgrid federal funding can we use this for our microgrid project	Complete

- Ausgrid has not chosen to apply for federal funding for it's Microgrid trial at this time
- Currently, this trial is forecast for later in the regulatory period, so it is still at very initial stage of planning
- This will be revisited as planning for this project progresses

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Action Updates

	Action Item	Status
5	Resilience - look to include WALDO definition and provide advice on amending Ausgrid's definition	Complete

- Noting the desire to include WALDO, instead of HILP, we propose to define 'improving resilience' as:

  "the ability to anticipate, withstand, quickly recover[1] and learn from disruptive events[2], particularly wide area, long duration outage (WALDO) events.

1 Recover in this context refers to reconnecting as many customers as quickly and safely as possible to minimise customer time without power.
2 Disruptive events refers to events such as extreme weather events, cyber attacks, or losses in power supply from fluctuations in intermittent energy sources.

	Action Item	Status
6	Provide update on board strategy day and alignment with innovation program	Complete

Key Strategic Signposts: (as presented to Board)

- Customer sentiment levels remain relatively steady across affordability, reliability and sustainability – the average customer is still more concerned with affordability and reliability than sustainability, though the severity of the recent bushfire and storm season has increased public awareness of the impacts of climate change
- There continues to be no strong indication that Australia's heating or transport energy consumption is being electrified (in contrast to growing trends overseas) - Australia remains an EV laggard with EVs making up less than a twentieth of a percent of registered vehicles
- Solar and battery uptake continue to grow, but within anticipated bands and from a low base - BTM share of total consumption on Ausgrid network expected to rise from ~1% today to 3-7% in 2040 – i.e. in spite of the rapid growth in DER, being connected, the grid is expected to remain the most economical solution for the majority of residential and commercial customers

(Continued on next slide)

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Action Updates

	Action Item	Status
6	Provide update on board strategy day and alignment with innovation program	Complete

(Continued from previous slide)

What we are solving for:

- Customers are adopting new technology for financial and environmental reasons, but the grid is here to stay as a key component of the supply mix for most customers for the foreseeable future – if Ausgrid is to thrive in the new high renewable energy ecosystem our customers must be satisfied with the energy service they can access through our network – for this to happen they must have genuine choice and control over their energy supply, and get value for money for that service.
- The reliability outcome for many customers is worsening as the effects global climate change play out in a localised fashion, increasing both the stresses on the network and the risk the network can present to its surroundings – in order to remain successful in the long term our grid must be able to keep people safe and maintain service levels commensurate with community expectations.

Key objectives for our innovation portfolio:

1. Affordability (and sustainability) - leveraging new technology and changing customer needs to sustainably grow our business within a thriving sector by:
    a. increasing economic utilisation of existing network assets (e.g. asset condition monitoring, fringe of grid optimisation)
    b. supporting innovative business models where this can lead to decreased costs in competitive sectors of the energy supply chain (e.g. advanced voltage regulation, dynamic load control)
    c. developing new technologies that will cost effectively allow faster electrification of energy (e.g. advanced EV charging platform)
    d. trialling and validating where future network deployment may represent the lowest system cost for all customers (e.g. community batteries)
2. Resilience – trial new technology that has the potential to cost effectively improve our ability to withstand and respond to increasingly severe storms, heat and bushfires (e.g. HV microgrid trial, network insights program, self-healing networks, line fault indicators)

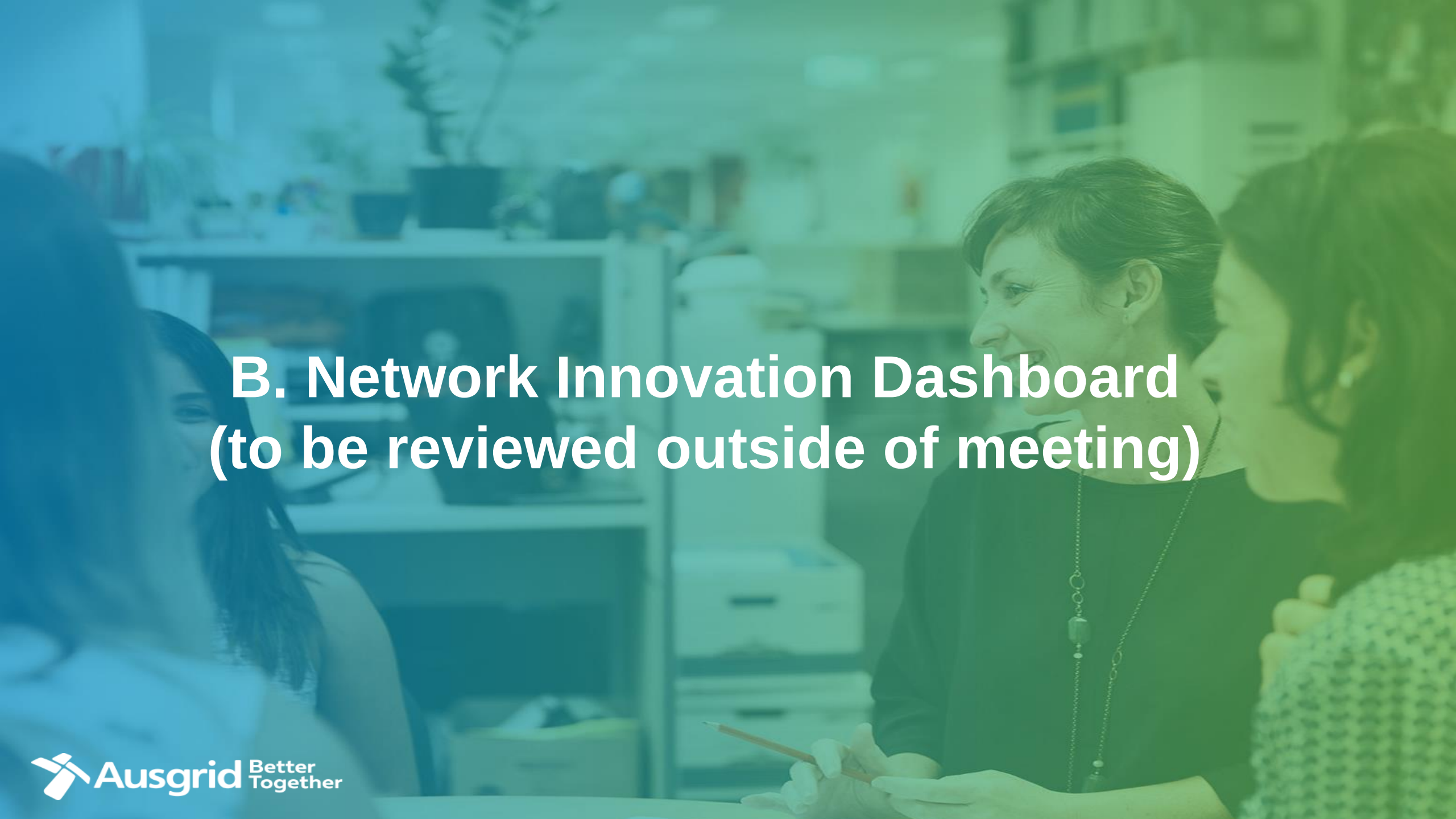
Action Updates

	Action Item	Status
7	Speak with SAPN to understand the similarities between the Ausgrid Network Insights program and SAPN's	Complete

- This action was based on Ausgrid potentially joining an ARENA funded trial looking at determining the optimal penetration of network visibility, in order to maximise DER hosting capacity for customers without overinvesting in data and/or devices. This trial will piece together disparate data sources including smart meters, monitoring devices installed on customer premises and distribution substation monitoring, in a practical way in order to create a readily accessible view of DER hosting capacity.
- In order to determine options for managing DER hosting capacity, SAPN is planning to create a representative sample set of around 10% of LV circuits that are modelled in detail and actively monitored. It appears they have chosen this option based on advice from CBA modelling that was undertaken by EA Technologies.
- Given current circumstances, Ausgrid have now chosen to not be involved in the ARENA trial as a direct participant, but will participate on a technical working group, and will continue the Network Insights program as planned. Rollout is being prioritised on those sites with the highest cost benefit first.

	Action Item	Status
8	Can we clarify who will pay for repairs to Ausgrid's network from the storm	Complete

- The November 2019 and February 2020 storms that hit our network have been declared natural disaster events by the NSW Government.
- While we are still considering the extent of a pass through application, Ausgrid will seek to pass through to consumers costs associated with the summer storms.
- The AER has granted Ausgrid an extension of time, until 1 August 2020, to lodge a pass through application.



B. Network Innovation Dashboard (to be reviewed outside of meeting)

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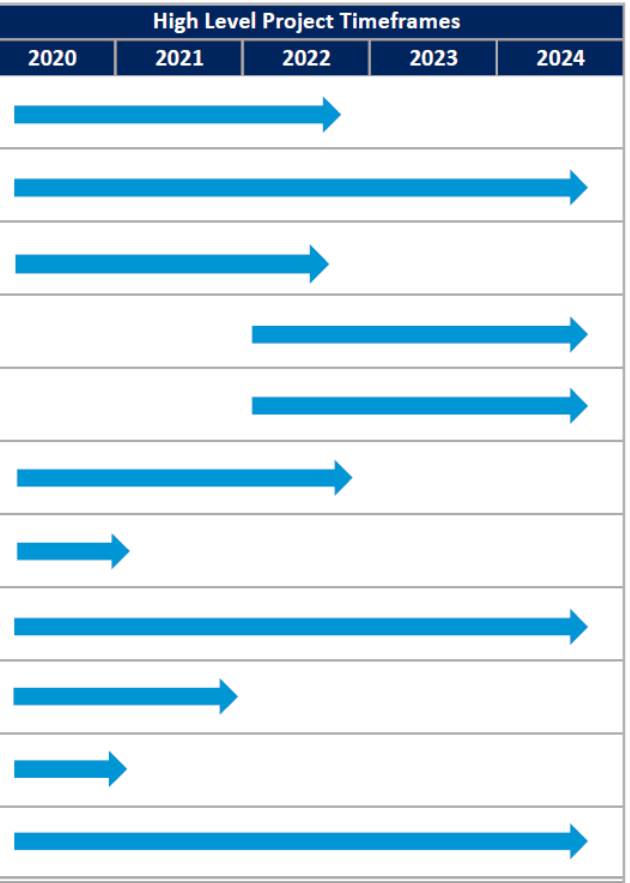
Network Innovation Program Dashboard

ID	Workstream	Project Stage	Estimated Budget $m	Actual Spend $m	Status	Update/Comments/Feedback	High Level Project Timeframes
A	Advanced Voltage Regulation	Execution	$3.50	$0.11	●	Stage 2 (field trial of 3 units) commencing May 2020	
B	Network Insight Program	Design & Execution	$12.60	$1.23	●	New device designs commenced. Strategic deployment plan complete	
C	Fringe of Grid Optimisation	Design	$5.53	$0.01	●	Trial design commenced	
D	HV Microgrid Trial	Not yet commenced	$17.20	$0.00	○	Not yet commenced	
E	Advanced EV Charging Platform Trial	Not yet commenced	$1.41	$0.00	○	Not yet commenced	
F	Grid Battery Trials	Feasibility	$2.37	$0.14	●	Community battery feasibility study completed. Trial design underway.	
G	Portable All-in-One Off-Grid Supply Units	Not yet commenced	$0.98	$0.00	●	Market product review underway	
H	Self-Healing Networks	Execution	$0.63	$0.17	●	Trial scheduled for commissioning mid 2020	
I	Dynamic Load Control	Feasibility	$0.70	$0.00	●	Discussions commenced with metering providers and retailers	
J	Asset Condition Monitoring	Feasibility	$0.70	$0.00	●	Market product review underway	
K	Line Fault Indicators	Feasibility	$0.70	$0.00	●	Market product review underway	



Note: Expenditure as at 04/05/2020

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○	Project not yet commenced. Remains within timeframes
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C. Advanced Voltage Regulation Update (to be reviewed outside of meeting)

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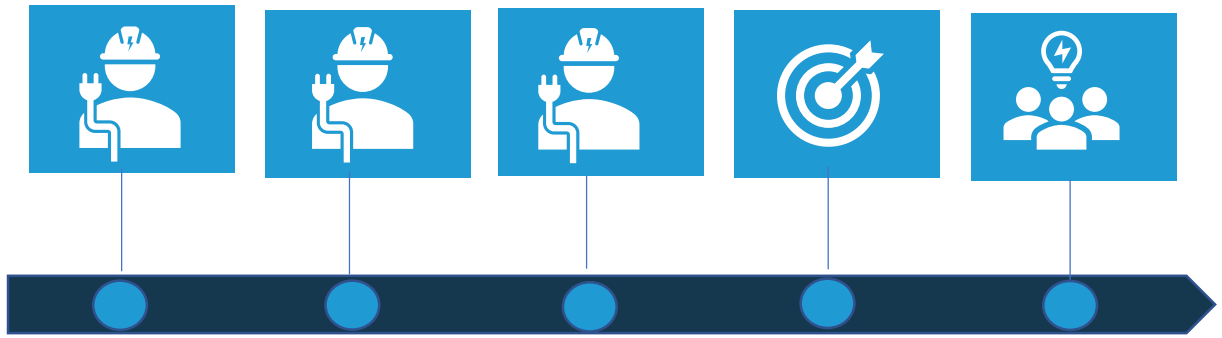
Advanced Voltage Regulation Update

Progress to Date

- Desktop review of available low voltage regulator technology
- Reached out to peers for insights
- Assessed & selected equipment to use in trial
- Briefing of relevant staff on use of STATCOMS
- Selected vendor & site for 1st trial, equipment order placed, project plan finalised
- Provisional selection of trial sites 2 and 3

Next Steps



JUL 2020
Trial site 2 commences

JUL 2020
Trial site 3 commences

AUG 2020
Trial site 1 device installation

MAR 2021
Trials completed & results analysed

MAY 2021
Share insights & learning from project

We welcome feedback from the NIAC to inform our next steps

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D. Dynamic Load Control Update (to be reviewed outside of meeting)

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Dynamic Load Control Update

- Ausgrid have commenced planning of a Dynamic Load Control trial
- We have had initial discussions with a number of Metering Providers and a Retailer
- We are keen to test the technical abilities of Metering Providers to provide a dynamic load control service including:
  - Timeliness (e.g. how much notice is required)
  - Scalability (e.g. localised set of meters or broad-based)
  - Technical integration (e.g. email, web portal, API)

Potential Use Cases Identified:

- Network voltage support
- Emergency load shedding
- Increase flexibility in scheduling outages
- EV controlled load offer with opt-out

We welcome feedback from the NIAC to inform our next steps

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Next Steps

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Thank you