Network Innovation Advisory Committee

30 November 2021

Ausgrid

Agenda

#	SESSION	FACILITATOR	TIMING
1	Introductions & updates from Committee	Junayd Hollis	13.00 – 13.10
2	Industry Announcements	Junayd Hollis & Selina O'Connor	13.10 – 13.30
3	Review of actions	Junayd Hollis	13.30 – 13.40
4	Network Innovation Program Dashboard	Alex Watters	13.40 – 14.00
5	Community Battery Update	Alida Jansen Van Vuuren	14.00 – 14.20
	BREAK		**14.20 – 14.40**
6	Innovation Program – Lessons Learnt	Alex Watters & Junayd Hollis	14.40 – 15.10
7	Recap & Next Steps	Junayd Hollis	15.10 – 15.30

	For Information Attachments	Slide No.
A	EV Charging Platform	24
B	Project Edith Update	30
C	Microgrid Program Update	35
D	Dynamic Load Control Update	37
E	LV Visibility Update	39
F	Lessons Learnt Detailed attachments	41

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Industry Announcements

Industry Announcements / Partnerships

- **NIAC / Community Battery program recognised by IAP2**

- Community Battery and JOLT key component of **Northern Beaches Council City Power Partnership Renewable Energy Achievement Award win**.

- **International Community for Local Smart Grids**

  Key program themes are:
  - *A fair transition to net zero* **–** ensuring that as we take action to decarbonise people and communities are not left behind, and the policy environment supports a fair transition.
  - *A smart and local transition* – exploring innovative ways to support communities to decarbonise and solve sector challenges locally.

- **Science Based Target initiative (SBTi), Business for 1.5C, Race to Zero**

- **Committee for Sydney partnership – Decarbonising Sydney**

Review of Actions

Review of Actions

	Action Items	Date Raised	Status	Comments
5	To provide more information on what the customer's lived experience is with DSO trial - how might this be different from direct load control	March 2021	Complete	Out of session update provided at first Edith Project Reference Group meeting – extract in Attachment B.
7	Apply future looking forecast to River Communities benefits analysis	March 2021	Transferred	To be picked up in Ausgrid's Climate Change Risk Assessment.
13	Provide update on service control paper in context of community batteries	Sept 2021	Complete	Agenda Item 5 - Community Battery Update
14	Provide update on de-risking microgrid project	Sept 2021	Complete	Attachment C – Microgrid Program Update
15	Identify Lessons Learnt from program to date	Sept 2021	Complete	Agenda Item 6 and Attachment F - Innovation Program Lessons Learnt
16	Consideration of IEEE2030.5 and/or CSIP-Aus in connection policy & DSO services review	Sept 2021	In Progress	This will be considered as part of a review of Ausgrid's connection agreements (and network standards) during Project Edith.
17	Establish benefits case for LV visibility	Sept 2021	Complete	Attachment E – LV Visibility Benefits

Network Innovation Program Dashboard

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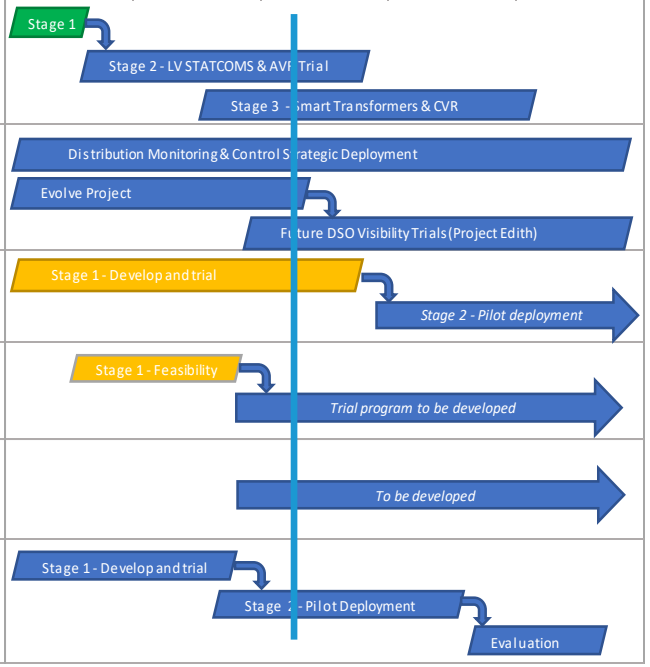
Network Innovation Program Dashboard

Workstream	Project Score	Estimated Budget $m	Actual Spend $m	Committed Spend $m	Status	Update/Comments/Feedback	High Level Project Timeframes
Advanced Voltage Regulation	3.45	$3.50	$0.43	$0.50		Business cases for Pole BESS and LV STATCOMS Phase 2 trial underway. Scoping commenced on remaining items in workstream	
Network Insight Program	3.82	$12.46	$3.34	$7.27		DM&C Integration and refurbishment underway. Project Edith commenced. Pole Sensors evaluations underway	
Fringe of Grid Optimisation	3.71	$4.97	$0.70	$2.38		Customer sites selected, preferred supplier identified. Final supplier and site confirmation to occur in December.	
HV Microgrid Trial	3.44	$14.40	$0.00	$0.05		Broader microgrid program development commenced with AI support.	
Advanced EV Charging Platform Trial	3.53	$1.05	$0.00	$0.00		Scoping of program has begun with development of potential trial focus areas.	
Grid Battery Trials	3.81	$6.86	$4.16	$5.04		Third community battery installed at Cameron Park. Customer sign-up continues well at all sites, and droplet installations are underway.	



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 31/10/2021

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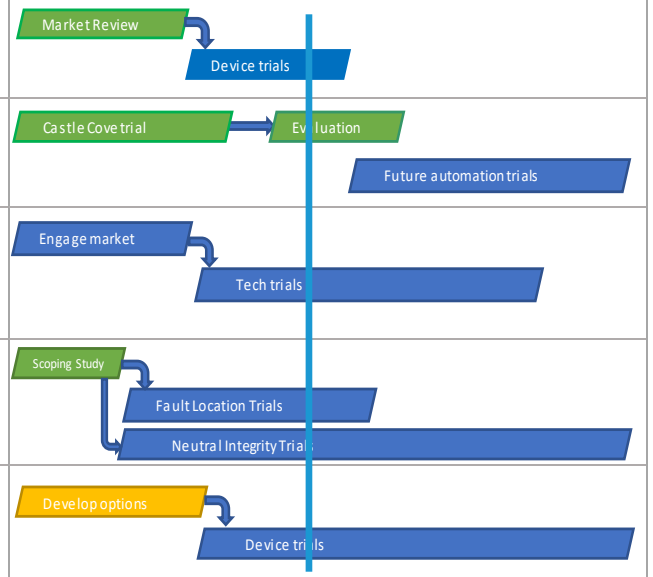
Network Innovation Program Dashboard

Workstream	Project Score	Estimated Budget $m	Actual Spend $m	Committed Spend $m	Status	Update/Comments/Feedback	High Level Project Timeframes
Portable All-in-One Off-Grid Supply Units	2.51	$0.50	$0.00	$0.03	●	Desktop evaluation and supplier engagement commenced on potential units for trial.	
Self-Healing Networks	3.58	$0.33	$0.17	$0.20	STOP	Equipment solution failed testing, project terminated. Lessons Learnt report to be developed.	
Dynamic Load Control	2.83	$0.49	$0.00	$0.04	●	Small scale solar soak trials being developed with controlled load system through smart meters. Broader strategic direction required, broader scoping of workstream overdue due to resource limitations.	
Asset Condition Monitoring	3.17	$4.29	$0.67	$2.79	●	FutureGrid software procured and is being configured with Ausgrid IT systems. Scoping for future phases has commenced.	
Line Fault Indicators	2.75	$0.70	$0.11	$0.34	●	Communicating LFI unit evaluation commenced after cyber approvals gained. Site selection complete and procurement of non-communicating devices underway.	



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Community Battery Project Update

How the NIAC can assist

We are looking for your views on our community battery program:

- Does the NIAC have any views on the KPMG recommendations?
- Would NIAC be open to providing a letter of support for the waiver to provide to the AER if it requests more evidence of stakeholder support?

Customer recruitment update

Cameron Park Community Battery successfully installed at start of November

Current status of customer enrolment

Beacon Hill

- 39 customers have registered their interest.
- 21 of 22 customers who have been sent an offer have signed trial agreement.
- Solar assessments have recommenced (after being on hold due to Covid).
- 10 droplet have been installations as at 17 November 2021.

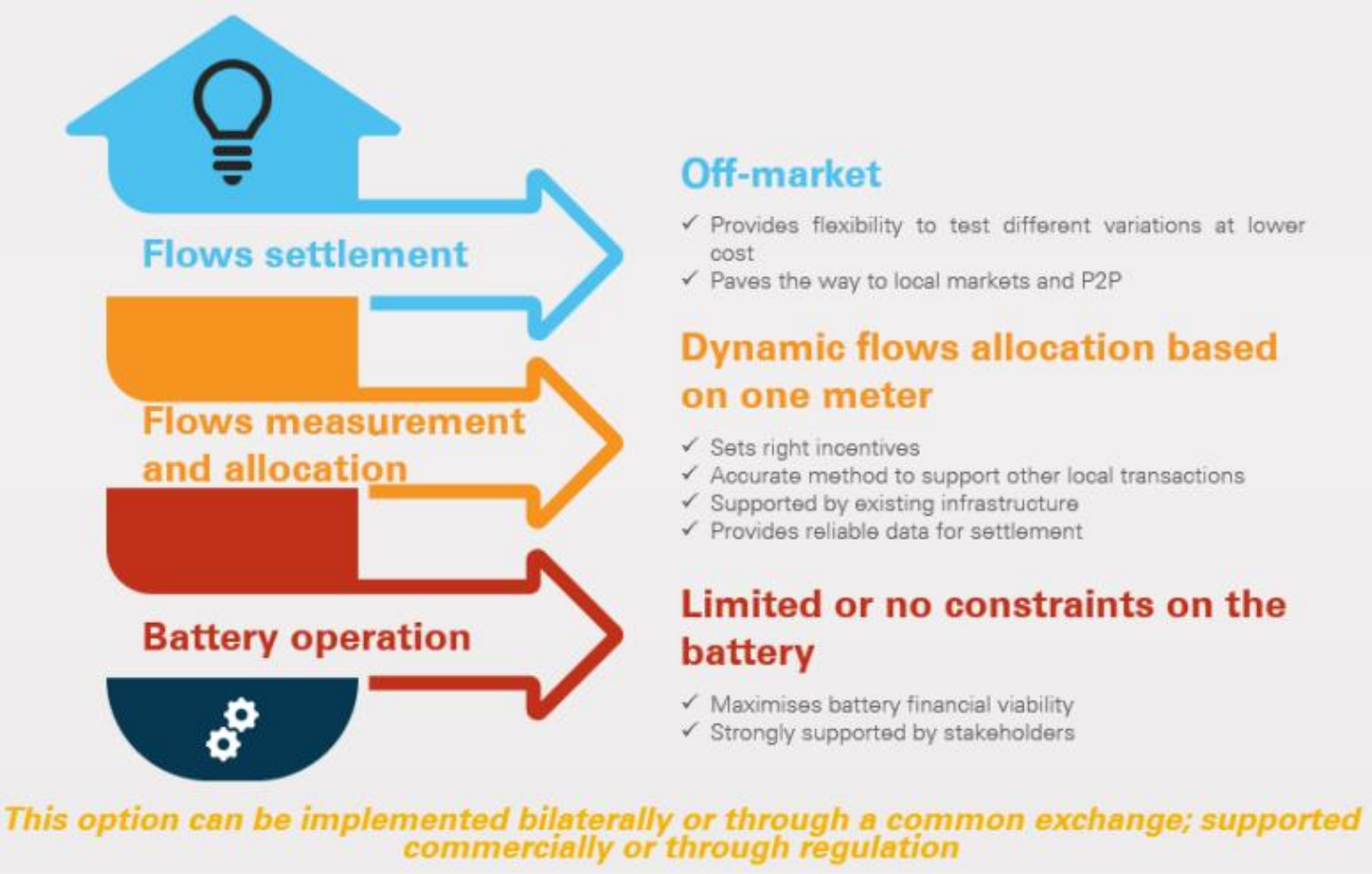
Bankstown

- 21 customers have registered their interest.
- 7 of 7 customers who have been sent an offer have signed the trial agreement.
- Solar assessment have recommenced and a further 9 offers have been sent out.
- Droplet installations to commence shortly.

Cameron Park

- 16 customers have registered interest, with 11 of these having shared their retail bill for initial assessment of likely benefits.
- Solar assessment to commence shortly.
- The launch of the third battery in the program will be scheduled for the new year ideally with a customer to share their perspective.

Sharing Community Batteries with Customers – KPMG Report



Summary of recommendations for KPMG Report

Customer Storage Service

- We've engaged KPMG to do follow up piece on potential models for the customer storage service, looking at how to meter and settle this and the implications for battery operation.
- KPMG slides and summary report on "Sharing Community Batteries with Customers" will be published on Project Research page[1] 1 December 2021.
- We are also plan on hosting a public webinar with KPMG early next year to share insights from this work.

NIAC Feedback: Does the NIAC have any feedback on the KPMG report?

1. https://www.ausgrid.com.au/In-your-community/Community-Batteries/Project-research

Break – 2:30pm

Innovation Program - Lessons Learnt

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How the NIAC can assist

We want to share some of the key learnings from the innovation program to date, and are looking for guidance on goal-setting for the broader program for remainder of the regulatory period and positioning for the next regulatory period

- Where should Ausgrid focus in a constrained environment?
- What do you see as important lessons from us to inform your assessment of our upcoming regulatory proposal?
- Are there gaps in the industry knowledge base that we could help to fill in this funding cycle or the next?

Key Lessons Learned

We are half-way through our regulatory period and innovation program for FY19-24. At a high level, key lessons include:

Integrating innovation into BAU	• Utilise existing governance and delivery processes where possible • Early staff and stakeholder engagement key to delivering trials effectively • Consider broader delivery bottlenecks and target trials or identify alternatives to navigate around
Early community engagement	• Up-front surveys and engagement to understand community views • Engage community and other stakeholders in design and scoping of trials and pilots • Continue to keep customers informed as trials progress
Working with maturing supplier markets	• Not all equipment and services are mature (eg smart meter data providers) • Suppliers need guidance as to DNSP and customer expectations (eg SAPS O&M service models) • We need to identify 'Plan Bs' where market capability is missing (e.g developing HALIM device)
Cyber security	• Evolution of the NSW Distribution Critical Infrastructure Licence Conditions and federal cyber security requirements • Assess capability of suppliers to provide secure infrastructure and services conforming to local regulations • Minimise integration to core control systems where possible to avoid risk and added complexity – particularly at a trial and pilot stages
Standardisation & modularity	• Deploying equipment which contains bespoke and proprietary protocols and systems adds risk and limits future choice – seek equipment which utilises open or established industry standards as a priority • Modularity allows for adaptability and reduces risk if requirements change and evolve during the course of the trial

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More details in Attachment F

Evolving the NIAC model for the next regulatory period

How do we evolve the NIAC model for the next regulatory period?

At 31 December 2021 we will be half way through the current regulatory period.

As we commence the development of our next regulatory proposal, it is timely to start a conversation about how we evolve the NIAC model for the next regulatory period.

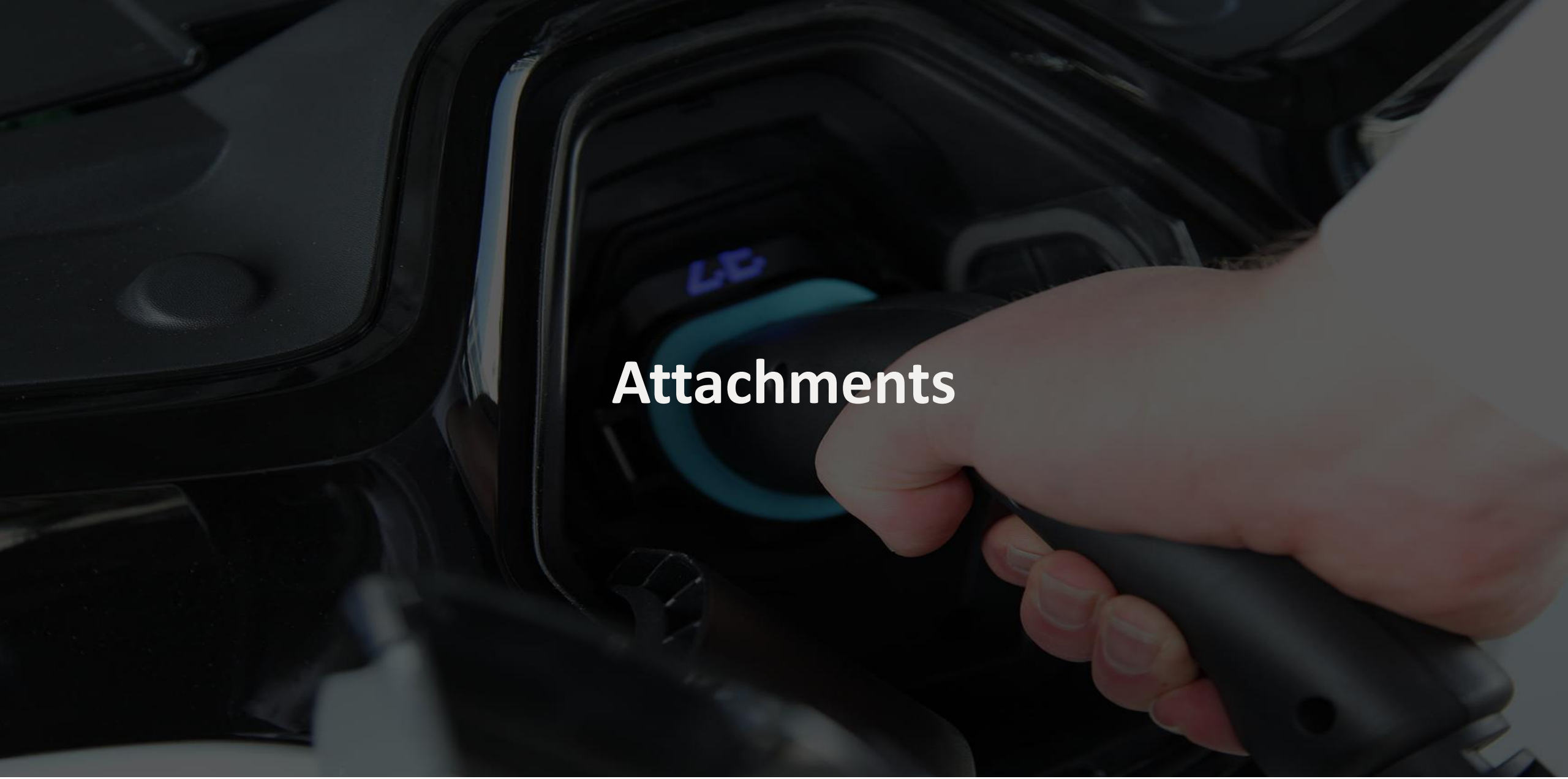
A few conversation starters, to challenge, build on and add to…

? Our current period innovation envelope is $42M of capex framed around a set of initiatives as envisioned in 2019:

- What should we propose for 2024-29?
- Should it be a mixture of capex and opex?
- How should we make these decisions?

How best might we engage with our customers on the above questions? What specific insights would you like to see?

Discussion – Gaps, Emerging Areas, Structure of an Innovation Program and the NIAC into the next regulatory period



Attachments

Attachment A:
EV Charging Update

Why would Ausgrid invest in managing electric vehicles?

Optimise network design and configuration to avoid excess capital investment to accommodate EV load

Engage with the market to improve utilisation of existing assets through information sharing and dynamic connection agreements

Support de-carbonisation of the economy by supporting the accelerated uptake of electric vehicles

Help improve customer ability and choice to charge EVs at home, work and in public locations

NIAC Feedback: In what areas do you see Ausgrid play a more active part in relation to EV growth and delivering ongoing benefit to customers?

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What customers have told us - key results of Ausgrid EV owner survey

Respondent Demographics

- Couples (without children) households (33%) or Couples with children (50%) made up the majority
- Full-time workers or part-time workers (72%)
- 78% live in detached house and 88% owned their home
- Tertiary educated – Bachelor degree or higher (78%)
- Higher than average household income bracket (75%)
- Around a third of respondents were from the Northern Sydney suburbs

Vehicle Ownership

- Less than 12 months old (68%)
- 1 other car in household (53%), 2 or more other cars (32%)
- Tesla most popular brand (78%)

Vehicle Usage

- 10,000-20,000 km/year (56%)
- Many regular trips start between 7 to 10 am (55%)
- The main purposes for regular trips were work, recreation and regular shopping (69%)
- The main purposes for occasional trips were recreation, holiday or visiting family/ friends (75%)
- 58% of regular trip distances were less than 20km compared to 19% for occasional trips

Home Charging

- Vast majority charge at home (83%)
- 10pm-7am was the most popular time for home charging (65%)
- Majority already do (18%) or would consider (58%) using a solar power system to charge their EV
- Decision on when to charge is based on 'when most convenient' irrespective of state of battery charge (37%)

Public Charging

- When using public EV chargers most do so for free (72%)
- The most used public charger locations were shopping centres
- Fast chargers were nearly always used for less than 60 mins

Electricity Pricing

- Above average awareness and knowledge about pricing options
- Around half were on an off-peak tariff for charging their EV, costing them around half as much as a single rate tariff on average
- 56% indicated they used timer setting controls to charge their EV

Demand Management

- 78% would consider participating in demand management (DM) programs for their EV charging
- 51% considered up to $10 per event to participate in a DM program would be worthwhile
- Above average awareness of energy saving actions

Total of 129 owners of NSW registered electric vehicles responded to the survey

Our EV Charging Platform Regulatory proposal

- This initiative examines **the ability** for Ausgrid's network **to interact** with multiple electric vehicles (EVs) **at a single location.**

- In **collaboration with** suitable **industry partners**, this initiative will evaluate the technical parameters and market mechanisms **for a suite of EV chargers** that can sense the level of charge in vehicle batteries, manage their charge rate and optimise the concurrent charging of individual vehicles **to best utilise** the **available network capacity**.

Target Customer Benefit

Better service experience for EV owners and reduced network costs to facilitate EV charging stations

Success Criteria

Development of effective model for deployment of EV charging stations

Indicative Cost: ***$1,000,000***

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Existing ARENA funded trials in the market

Trial	Focus	Cost
AGL EV Orchestration Trial (ARENA)	The project will also provide detailed insights into customer behaviour to inform how best to maximise customer participation and customer value, and will materially advance the preparedness of the energy industry to be able to integrate large numbers of EVs in the future. It involves orchestration trial of 200 customers: • 50 participants on V2G chargers • 50 participants on Vehicle API control • 100 participant control group on ToU only	$8.25m
Origin Energy Smart Charging Trial	The Origin Energy Electric Vehicles Smart Charging Trial seeks to understand the benefits of and barriers to controlled smart charging, including improving our understanding of EV driver behaviour, willingness to accept third party control and what incentives are needed to encourage future participation in charge management programs.	$2.92m
Jemena Dynamic Electric Vehicle Charging Trial	Objectives Monitoring network capacity in real time and providing technologies that can automatically control charging including time delay and throttling. i.e. initiating, delaying and/or varying EV charging rates. • Understanding customer behaviours during the recruitment process and through customer surveys during and after demand response events. • Building capabilities to forecast the real household EV charging load associated with managed charging.	$3.38m
REVS Report	The Realising Electric Vehicle-to-Grid Services project will install 51 bi-directional chargers and deploy a fleet of 51 V2G capable vehicles in the ACT. A system will monitor charger and vehicle availability, as well as a range of electrical parameters, which will enable the delivery of market contingency Frequency Control Ancillary Services (FCAS) at a fleet scale.	$6.59m

Trial focus areas

Areas we see opportunity and benefit in developing are:

- Testing the integration of operating envelopes into EV charging infrastructure
- Developing innovative tariffs to manage consumption (with or without controlled load)
- Establishing a framework to support Dynamic Connection Agreements for EVs
- Exploring V2G trials including for Ausgrid work vehicles
- Improve data visibility of EV location and demand
- Support the development of standards and common interfaces with key OT and IT infrastructure for future large scale integration where beneficial (eg Schneider chargers & ADMS / Ausgrid battery control system tech)
- Improve our demand forecasting and prediction of EV load patterns to enable optimum network configuration and minimise augmentation expenditure

NIAC Feedback: Are there other focus areas we should consider?

Potential options to explore

What is the trial?	What might it look like?
Integrate one of the existing retailer trials (eg AGL or Origin) Ausgrid is supporting into our systems for visibility, operating envelopes (OE) or dynamic connection agreements (DCA).	A standardised tool to gain visibility of EV charging impacts and potentially publish OE or facilitate dynamic connection agreements for EV chargers at a broad scale across the network, where existing trial customers are located.
Extend current bus electrification collaboration to integrate our IT/OT systems for visibility/OE/DCA.	A standardised tool to publish OE or inform DCA requirements for EV chargers at two bus depots Ausgrid is working with Transport for NSW on.
Collaborate with property developer(s), councils, TfNSW and/or charge point provider(s) to develop managed charging infrastructure at a single site.	Direct engagement with one or two parties to develop the equipment, infrastructure and standards for optimised charging at an apartment, rail station or shopping centre carpark.
Spatial demand forecasting tool for EVs	Develop modelling & forecasting capability to understand EV impacts on load at a granular (down to low voltage) level
Develop an A/G fleet trial (with V2G focus)	Deploy a range of electric utility and other vehicles which could potentially provide V2G support in some work tasks.

Attachment B:
Project Edith Update

Customer Offer - No Bill

Extract from first Edith Project Reference Group meeting in October 2021

REPOSIT NO BILL™

Guaranteed no electricity bill for five years.

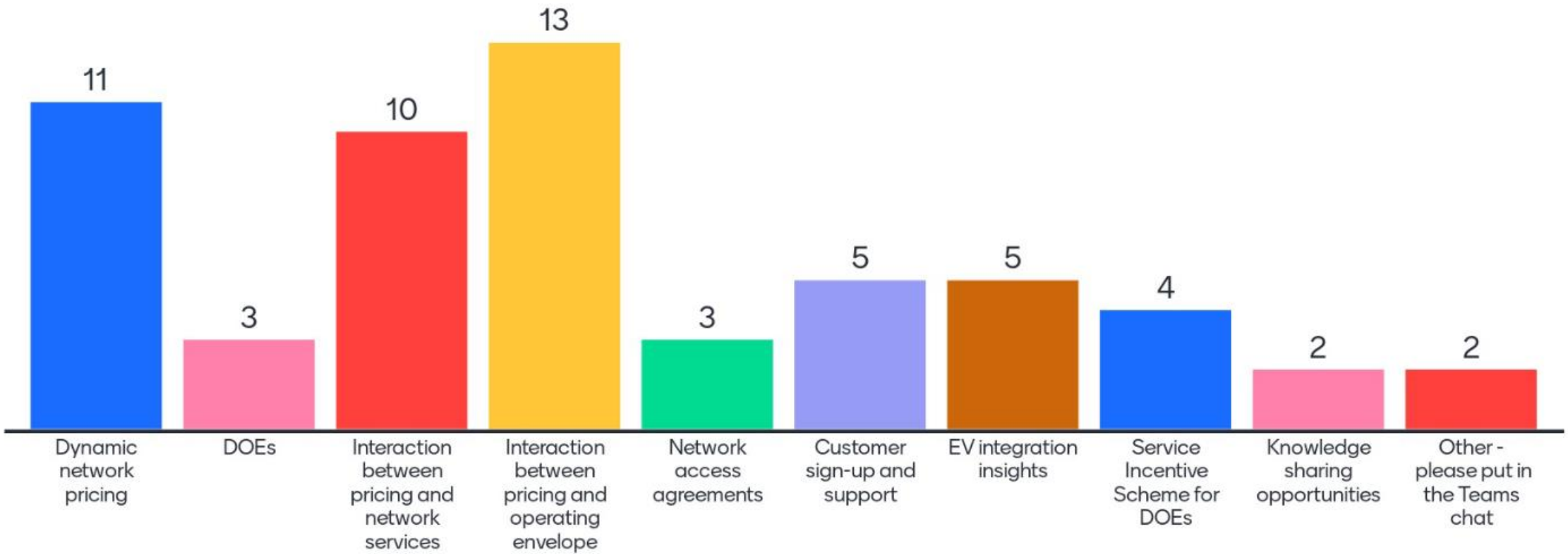
Reposit will ***design***, ***supply***, and ***install*** a Reposit-controlled solar and battery package for customers (>6.6kW solar, >11.8kWh battery).

Reposit takes responsibility for the electricity bill – incl. all fees, charges and taxes.

Customer pays for and owns solar and battery system and can change agent at any time.

Feedback from Project Reference Group will be used to inform Deep Dive topics

Which topics are the participants the most interested in and want to engage on in future workshops (top 3)?



Feedback received at October 2021 Project Reference Group meeting

Attachment C:
Microgrids Update

De-risking Microgrid program delivery – separate into sub-components

River Communities Resilience

- Follow a community driven co-design process:
  - Identify potential options for innovative solutions (including BTM orchestration, smart fault indication & switching to improve restoration, community batteries and potential microgrids post the Upper Hunter trial)
  - Identify traditional network solution options (including replace bare mains with CCT, new interconnections, reinforce procedure for using Sydney Trains backup supply)
- Build on previous orchestration trials and/or join current feasibility studies (Eg SuRF project, Bruny Island, Mooroolbark, Yakandandah)
- Utilisation of community battery learnings & technology
- Identify BTM funding approach:
  - ARENA
  - RRAMP
  - DMIA

Microgrid Technology Trial

- Target potentially bushfire affected Upper Hunter villages to provide a resilient supply to the village central area
- Focus on basics first, optimise second
  - Using lessons learnt from other DNSPs – determine Ausgrid approach to deploy
  - Separate phases for front of meter capital tech deployment, BTM optimisation and orchestration, value-add services
- Phased approach
  - Phase 1 – Technology
  - Phase 2 – BTM Integration (“Net Zero” focus)
  - Phase 3 – Value added services
- Approach communities early to get buy-in for target sites
  - Starting point is existing analysis of preferred communities and sites
  - Be open to community proposals for other sites

https://www.ausnetservices.com.au/en/About/Projects-and-Innovation/New-Folder/Mooroolbark-Mini-Grid-Project
http://brunybatterytrial.org/
https://cecs.anu.edu.au/news/southcoast-microgrid-project-energised-3125m-funding
https://www.energy.gov.au/government-priorities/energy-programs/regional-and-remote-communities-reliability-fund

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Attachment D:
Dynamic Load Control Update

Dynamic Load Control Update

Recap of workstream objectives

- Pilot projects to identify potential to reduce future capital expenditure by utilising the capability of new smart meters and other mechanisms to individually address the timing of customer demand.
- Key benefits quantified for this project include avoided future capex on replacement of aged ripple control systems and deferral of future network augmentation due to dynamic demand response capabilities to better manage network voltage or other constraints under scenarios of increased DER penetration levels.

Review Existing Capability
- Testing controlled load system capability for solar soak (refer chart 1)
- Developing CL strategy

Explore new capability
- Designing Dynamic Operating Envelopes
- Engaging with Home Energy Management System providers
- Exploring more flexible tariff options

Determine next steps
- Identify cost-benefit (Ausgrid & Customer) of different solutions

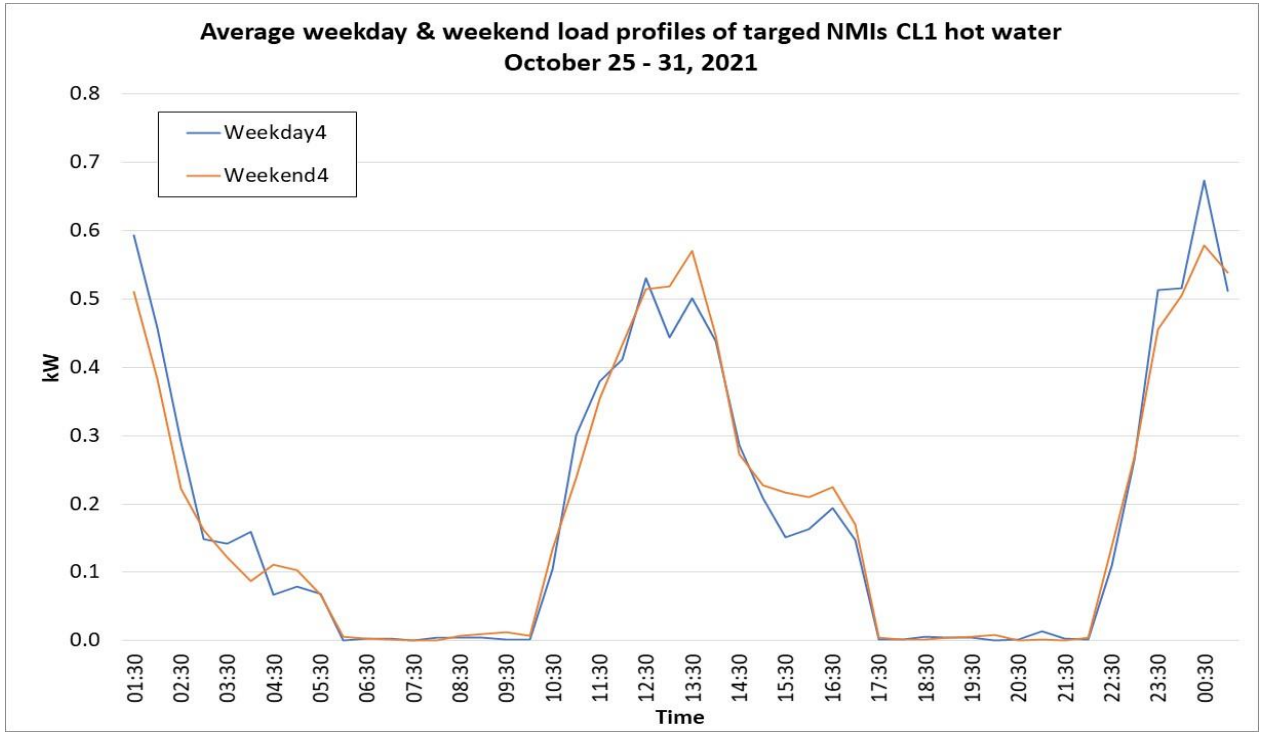

Chart 1 - Ausgrid solar-soak trial Phase 1 snapshot

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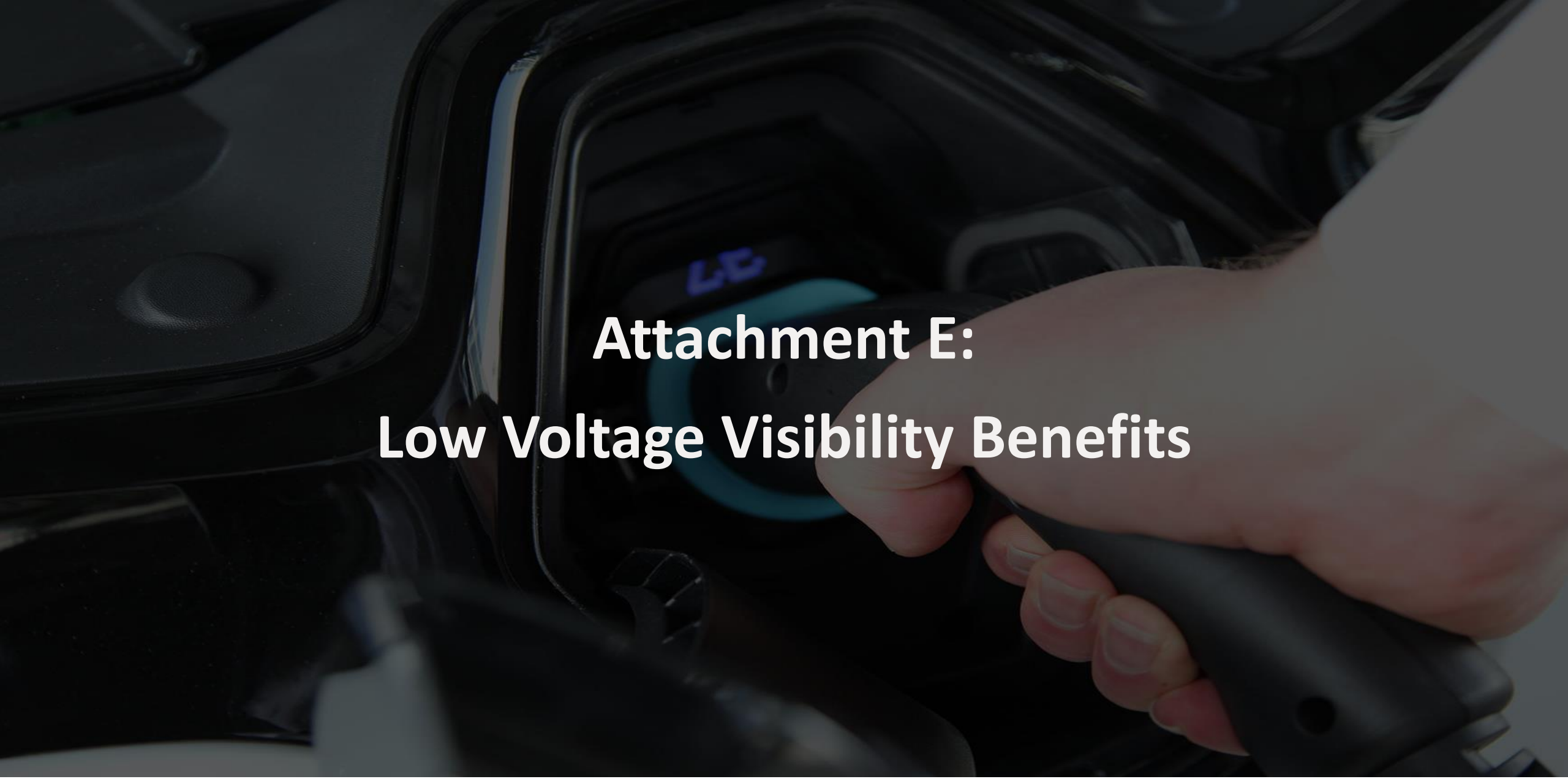

Attachment E:
Low Voltage Visibility Benefits

Low Voltage Visibility Benefits

Low voltage visibility is going to form a key pillar of Ausgrid's DER integration strategy – benefits still to be quantified

Safety	Capex Optimisation	Opex Efficiencies	Reliability & Customer Experience	DER Integration
• Identify failing neutral connections which could lead to electric shocks • Detect broken conductors which could lead to shock or fire risks • Detect dangerous over-voltages or overload conditions • Identification of un-documented network parallels which could lead to dangerous situations • Detect other issues such as reverse polarity, incorrect switch states	• Increase utilisation of assets by reducing conservative margins where status unknown • Improve quality of network model and reduce field validations of network state • Real time voltage management to avoid capex associated with correcting large voltage variation • Optimise network configuration based on detailed configuration and loading data	• Reduce ad-hoc measurements of utilisation for short and long term planning • Reduce time and cost responding to customer complaints or fault reports	• Faster detection of and response to outages • Better discrimination of where the outage has occurred • Detection of emerging issues will reduce likelihood of outages • Provide real-time and more accurate information to customers on network status and outages • Enable scope for Conservation Voltage Reduction to reduce energy consumption and losses	• Visibility of network voltages to identify hosting capacity limits • Dynamic voltage control to increase hosting capacity • Support development of dynamic operating envelopes • Aid in resolving complaints about DER operation • Provide information to the market on availability of capacity for additional DER

These benefits lead to lower cost of living, more customer choice and increased capability to support distributed energy resource exports for a lower carbon future

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Attachment F:
Innovation Program Lessons Learned

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Advanced Voltage Regulation	• Cost-benefit of LV STATCOMS for resolving network constraints on LV distributors, • Development of safe live work design and installation procedures to reduce installation costs • Identification of capability required to uplift hosting capacity and resolve legacy voltage management issues	• Develop understanding of broader STATCOM capabilities under different use cases, and package learnings and materials for BAU deployment • Explore on-load Dist. TX tap changer applications, and develop capability for broad based flexible network voltage control. • Pilot adaptive voltage control technology to ready for BAU deployment in zone substations	• Likely to largely progress into BAU investment portfolio. Potential additional need to examine greater integration of customer side equipment (including 3rd party grid-connected batteries or microgrids) into a holistic voltage management strategy

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Network Insights	• Developed granular model to identify cost-benefit of monitoring and control at each location on the network • Established standards and drawings for retrofit of DM&C devices in older style kiosks • Developed process efficiencies for installation and commissioning	• Continue targeted deployment at key sites identified by modelling • Further progress greenfield standards and brownfield retrofit designs for additional monitoring and develop options for pole-mounted sites	• Likely to continue roll-out of distribution monitoring and control devices where cost effective for increased LV visibility.
	• Streamlined comms security processes including use of 3rd party networks i.e telecom carriers. • Challenges with proprietary equipment and protocols.	• Work with Home Affairs Department to promote a risk based approach to managing cyber security, differentiating monitoring and control risks	• Cyber security investment likely to ensure data systems support the range of data sources likely, with appropriate cyber security provisions
	• Challenges in developing trust in remote indication of faults on the HV network – criticality of reliable information and operator trust in emergency situations	• Improve asset management practices around monitoring devices and develop strategies to increase confidence in reliability of information.	

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Grid Fringe Optimisation	• Identifying areas in Ausgrid network where SAPS may be cost-benefit positive • Realising customers' expectations and behaviours towards SAPS through a survey and meetings with some of them • Identifying opportunities to integrate customer side optimisation to reduce costs for SAPS • Regulatory limitations and challenges (including planning processes) for deployment of SAPS under current legislation • Understanding technical requirements and development of technical specification for SAPS • Supplier capability and maturity for supply, installation and maintenance and emergency response scenarios • Customer installation safety and compliance to code	• Improve holistic modelling for optimising the fringe of the grid. • Continue to explore demand side management opportunities at trial sites • Work with supplier on a solution for integrating customer existing DER • Work with councils and state government on the development approval process and requirements • Finalising supplier selection and awarding supply contract(s). • Engaging on capabilities for on-going maintenance and emergency response in line with customer expectations for reliable energy. • Work with customers to ensure installations are fit for purpose	Likely to progress into BAU investment portfolio – some scope to continue innovation trials on emerging technologies such as Hydrogen

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
HV Microgrid Trial	• Microgrids that are dependent on renewables (solar/batteries) are better suited to areas exposed to frequent shorter duration outages. For longer outages the battery will typically run out of storage and be dependent on diesel generation. • Solar and physical access are critical to viability of microgrids, and current cost-benefit equation means generally limited to very remote communities with little/no network redundancy and poor reliability. • Often community focus on microgrids more often seen for environmental benefits and being less reliant on the 'grid' rather than explicitly being driven by poor reliability.	• Engage a microgrid engineering consultant that can provide specialist advice and a market specification • Engage with internal stakeholders that will be directly involved with the project delivery and integration with existing systems • Investigate customer "behind-the-meter" integration into the microgrid to improve operational performance and extend islanded run-time capability • Engage the communities that have been shortlisted as feasible options from a desktop assessment • Investigate optimisation of all microgrid sources and potentially operating as an 'island' during normal operation with a grid backup	Innovation funding requirements likely to extend into next regulatory period

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Advanced EV Charging Platform	• Significant industry movement, including new direction from ESB	• Continuing our re-assessment of knowledge gaps and areas for investment to maximise value.	• Likely investment required to support integration of EV and other DER into the grid
Grid Batteries Trial	• NSW Distribution Critical Infrastructure Licence Conditions and federal cyber security requirements can complicate integration with overseas suppliers. • Different in-field control designs required for each vendor. Two suppliers were selected to reduce vendor risks, but this added design time. • Up-front surveys and engagement required to understand community views. Customers are understanding of changes and local councils remain highly supportive if they are kept informed as trials progress.	• Establish relationships with local suppliers and update specification document with clear requirements identified during trial. • Incorporate lessons learned into specification document to provide clear guidance to supplier and support a future scale up. • Continue to engage with customers, communities and local councils.	• Leasing Community Battery capacity included in request to AER to replace Framework and Approach – this would enable customer and market use cases. • Incorporating Community Batteries into DER Integration Strategy.

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Dynamic Load Control	• Maturity and limitations of contestable metering market • Significant energy volume shifts to daytime (solar soak) using hot water • Potential scope for EV charging	• Assist retailers and metering providers develop capability which support customers and networks • Explore broader shifts of hot water energy to daytime to offset solar generation impacts • Further explore EV tariff options and capability to support	Expect an on-going need to uplift capability to respond to emerging market trends and functions (including those identified through ESB post 2025 market review), increasing capability of home energy management systems and other flexible loads
Asset Condition Monitoring	• Smart meter data acquisition challenges – commercial, technical and supplier limitations • Developed understanding of key use cases and data requirements for use cases • HALIM – prototyped ability to detect minute changes in neutral integrity successful	• Expand current program of smart meter data acquisition and commence detailed analysis of data streams in analysis systems • Integration of data and analytics into BAU systems and processes • Continue regulatory engagement around access to and quality of smart meter data • Expand HALIM to field trials to assess outcome in the field on high risk feeders and to validate smart meter analytic results	Expect on-going need to invest in trials and pilots in line with increasing capability and availability of market services from smart meters and other advances in monitoring technology and analytics (including AI).

Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Portable All-in-one off-grid supply units	• The market has advanced significantly in last 2 years but still maturing. • The cost differential with diesel generation is still prohibitive in many use cases. • There is a niche role but applications may be less broad than initially envisaged until costs decline further.	• Trials over remaining period will determine the extent to which this equipment can compliment the existing fleet of mobile generators and substations as that fleet evolves	Likely to roll into BAU investment for network resilience and emergency response. Potential scope for new technology (eg Hydrogen based)
Self Healing Networks	• Challenge and cost associated with establishment of localised control systems – preference a centralised scheme • Proprietary equipment risk – difficulty integrating devices into system • Supply chain risks for complex engineering solutions where expertise is not local • Operational process control – need to consider operational state, data management and field communications to ensure system can operate safely (e.g certainty around LV parallels)	• Establish roadmap and capabilities required for centralised scheme, including prioritising standardised protocols in equipment and compatibility with ADMS and local support. • Explore potential to test operational processes using existing equipment and pre-production ADMS.	Likely to require additional pilots and trials in the next regulatory period to investigate advances in control technology and systems for optimisation of network configuration.
Line Fault Indicators	• Cost benefit and safety implications of hot-stick deployable LFIs • Process management for operators	• Continue to roll out phase 1 of the trial to establish learnings	Likely to be rolled into BAU investment

Thank you

Ausgrid