



# Network Innovation Advisory Committee Meeting #12

15 March 2022

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# Agenda

#	SESSION	FACILITATOR	TIMING
1	Introductions and updates from Committee	Junayd Hollis	2:00 – 2:05
2	Review of actions	Junayd Hollis	2:05 – 2:10
3	Network Innovation Program Dashboard and Highlights	Alex Watters	2:10 – 2:30
4	Microgrids and River Communities Updates	Matthew Webb	2:30 – 2:50
5	Alignment of Innovation Program to support DER and Resilience Strategies	Junayd Hollis	2:50 – 3:35
<b>BREAK</b>			
6	Smart Meter Data trial update	Alex Watters	3:50 – 4:00
7	Development of 2024-29 Innovation Program	Junayd Hollis and Alex Watters	4:00 – 4:45
8	Recap and next steps	Junayd Hollis	4:45 – 5:00

<b>For Information Attachments</b>		<b>Slide No.</b>
A	International Community for Local Smart Grids Update	38
B	Lessons Learnt Register	40



# Review of Actions

# Open Actions

	Action Items	Date Raised	Status	Comments
16	Consideration of IEEE2030.5 and/or CSIP-Aus in connection policy and DSO services review	Sept 2021	<span style="color: yellow;">●</span> In Progress	This will be considered as part of a review of Ausgrid's connection agreements (and network standards) during Project Edith
18	Provide update on SSEN / International Community for Local Smart Grids (ICLSG) program of works next session	Nov 2021	<span style="color: green;">●</span> Complete	Refer attachment A
19	Update on DER Integration Strategy and interaction with NIAC and Ausgrid views on AER value of curtailment?	Nov 2021	<span style="color: green;">●</span> Complete	Refer agenda item 5
20	Provide update to NIAC on our resilience strategy and interaction between innovation capex and resilience capex proposals	Nov 2021	<span style="color: green;">●</span> Complete	Refer agenda item 5
21	Explore reallocation of Network innovation funds to resilience initiatives in the 2019-24 period	Nov 2021	<span style="color: green;">●</span> Complete	Refer agenda item 5
22	Ausgrid to provide initial view of innovation program structure, governance and scale for the next regulatory period for discussion	Nov 2021	<span style="color: green;">●</span> Complete	Refer agenda item 7



# Network Innovation Program Dashboard

# Innovation Program Highlights since last meeting

## Advanced Voltage Regulation

- Purchase of 15 additional STATCOMS and 3 pole-mounted BESS for to trial benefit for local area constraints.
- Commencing trial of new zone substation voltage setpoints informed by smart meter data to support DER.

## Community Batteries

- Made first payments to customers in Beacon Hill for Q4 2021 participation. Total of 59 customers now active in trial.
- CILC continues to be a key hurdle, but path forward now agreed to energise Tesla batteries.

## Edith DSO Trial

- Project team fully stood up and initial testing with 3 Reposit customers commenced.
- Significant interest from Retailers and Aggregators, with representatives from ~20 organisations attending first Aggregator Round Table meeting.

## Standalone Power Systems

- Final supplier selected and contracts signed for supply of standardised SAPS units, with supplier site visits for final sizing, design and layout plans for 5-7 Phase 1 trial sites to occur in March.

## Stray voltage detection trial

- Ausgrid is partnering with a company to trial detection of safety or asset condition issues related to underground cables by detecting stray electric fields in the public domain. This technology has the potential to reduce electric shock risk to the public, reduce energy losses and allow proactive response to cable faults.

# Network Innovation Program Dashboard (1 of 2)

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	\$3.58	\$0.78	\$2.37	●	STATCOM Phase 2 trial and Pole BESS trials commenced. Purchase of units has been completed with delivery expected later in the year.	Stage 1	Stage 2 - LV STATCOMS & AVR Trial	Stage 3 - Smart Transformers & CVR		
Network Insight Program	3.82	\$12.26	\$4.28	\$7.27	●	DM&C Integration and refurbishment underway. Project Edith commenced. Additional pole tx sensor lab evaluation complete and business case in development.	Distribution Monitoring & Control Strategic Deployment	Evolve Project	Future DSO /isibility Trials (Project Edith)		
Fringe of Grid Optimisation	3.71	\$4.97	\$0.86	\$2.38	●	Supply contract let, site specific designs commencing March for Phase 1 trial.	Stage 1 - Develop and trial		Stage 2 - Pilot deployment		
HV Microgrid Trial	3.44	\$5.30	\$0.06	\$0.35	👤 ●	Microgrid trial sites shortlisted and feasibility study underway by GHD. River communities project plan under review. Refer detailed update.	Stage 1 - Feasibility	Trial program to be developed			
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.	To be developed				
Grid Battery Trials	3.81	\$6.86	\$5.18	\$5.04	●	Customer payments commenced with 59 customers now active in trial. CILC continues to present challenges for BESS operation.	Stage 1 - Develop and trial	Stage 2 - Pilot Deployment	Evaluation		

**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 28/82/2022

# Network Innovation Program Dashboard (2 of 2)

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		Desktop evaluation and supplier engagement commenced on potential units for trial.	Market Review	Device trials			
Self-Healing Networks	3.58	\$0.33	\$0.17	\$0.35		Equipment solution failed testing, project terminated. Lessons Learnt report to be developed.	Castle Cove trial	Evaluation		Future automation trials	
Dynamic Load Control	2.83	\$0.49	\$0.00	\$0.04		Developing strategy for broader roll-out of more flexible controlled load products following successful solar soak trials.	Engage market	Tech trials			
Asset Condition Monitoring	3.17	\$4.29	\$1.02	\$2.79		Additional meter points brought online and FutureGrid software commissioned with results flowing. Refer smart meter update. Travelling Wave relay trial to be commissioned in March.	Scoping Study	Fault Location Trials	Neutral Integrity Trials		
Line Fault Indicators	2.75	\$0.70	\$0.14	\$0.34		Some delays to deployment due to on-going live work training and task review requirements.	Development options	Device trials			

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

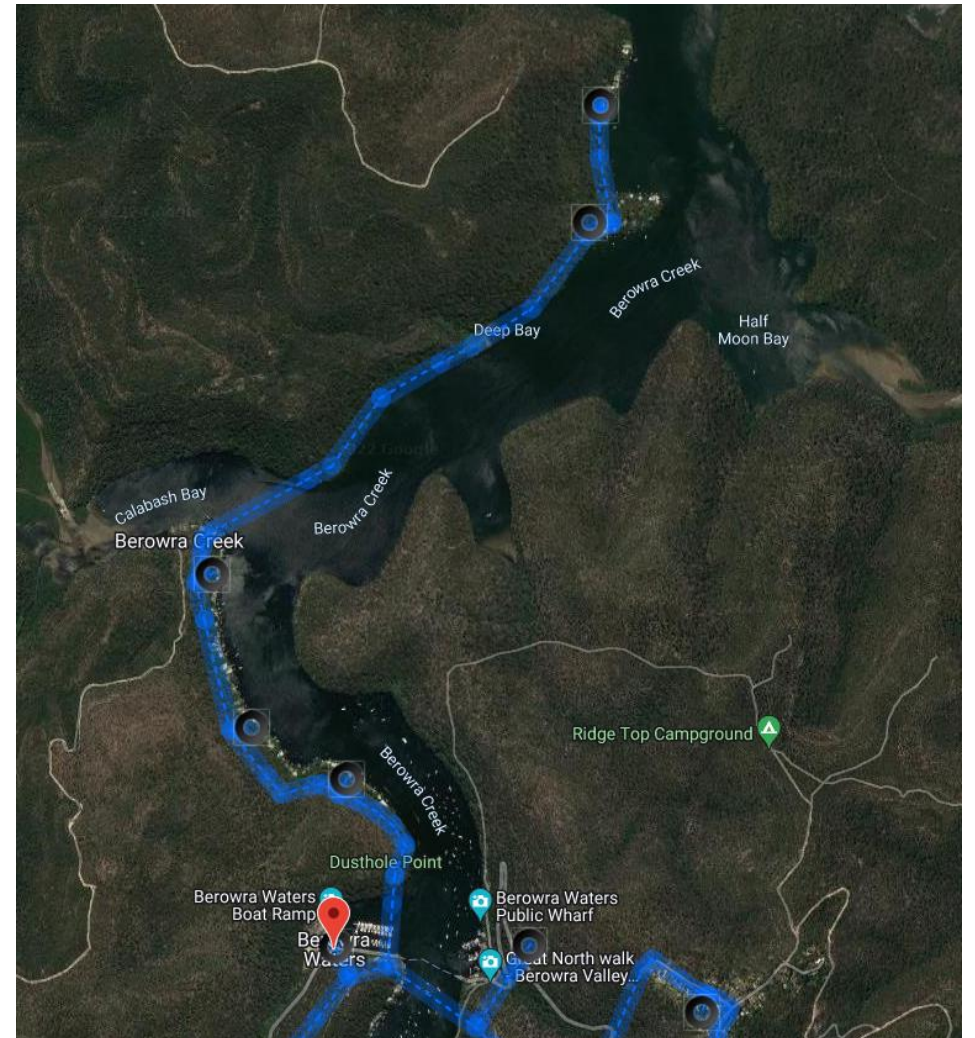
Note: Expenditure as at 28/82/2022





# River Communities

# Berowra Waters River Community



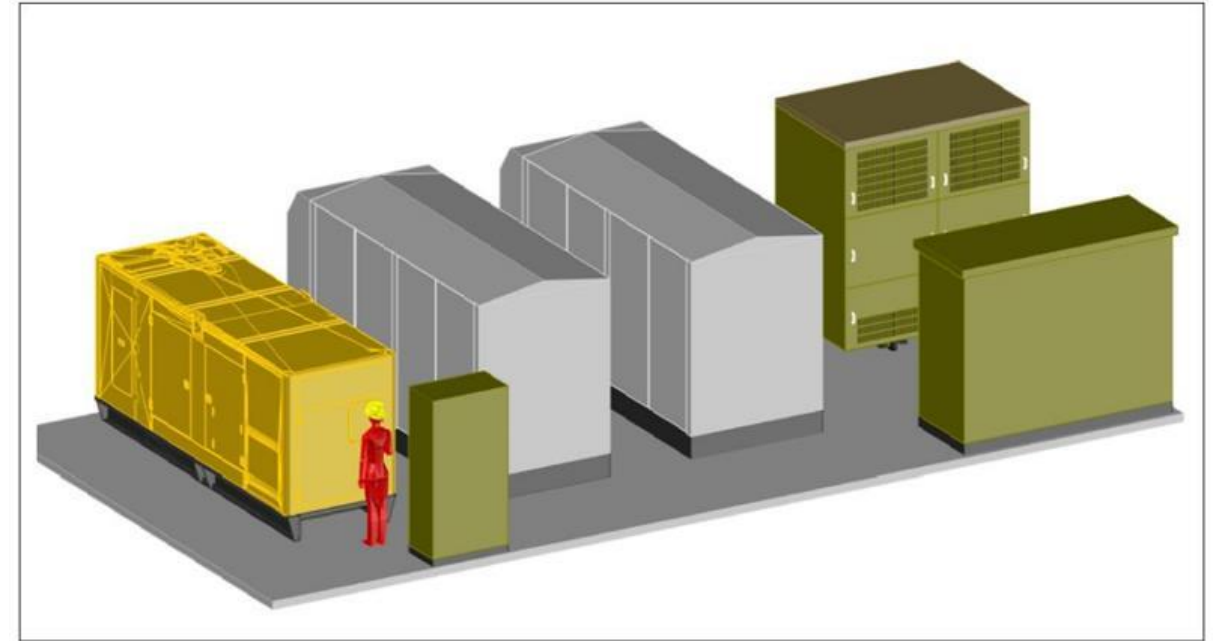
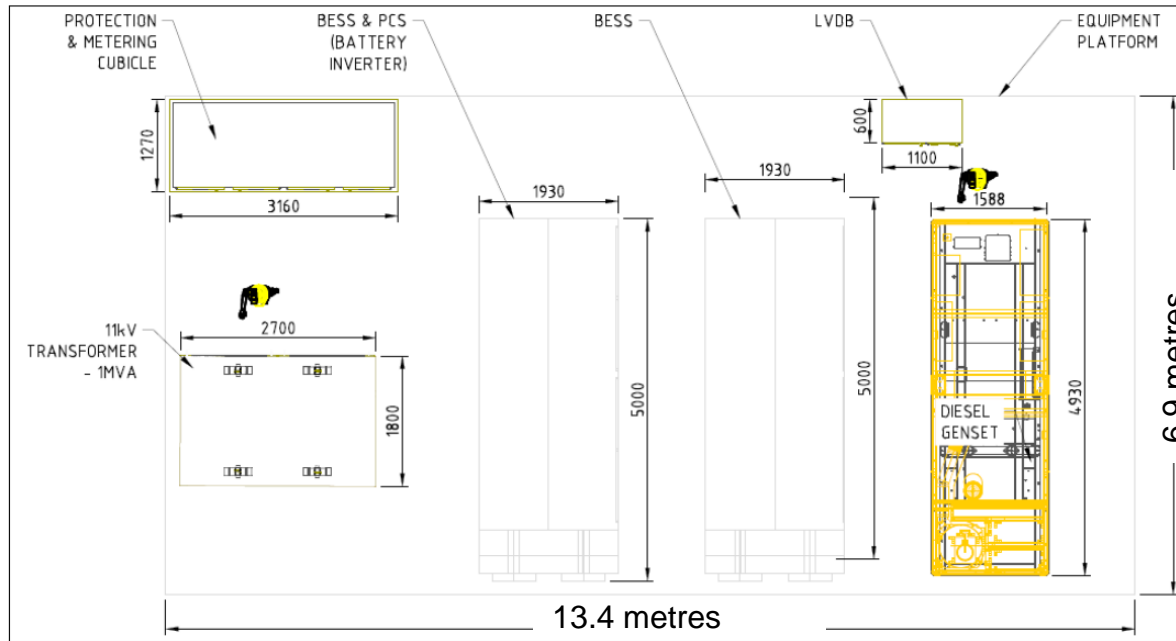
# Collingridge Point



- 20 customers off one pole substation
- Some have solar (limited)
- River access only
- Outage frequency is not the worst but restoration times can be extended due to access
- Thick trees and steep terrain



# Space needed for a microgrid



About the same area again would be needed for solar panels – in direct sunlight so they could generate

# Berowra Waters Challenges & Alternatives

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## Microgrid Challenges

- Trees very thick so:
  - Limited clear space for SAPS
  - Limited space for solar panels
  - Solar panels overshadowed and difficult orientation
- Diesel would need to be delivered by water then taken up to generator location
- Diesel “goes off” if not used
- Still depends on existing low voltage overhead lines between the houses which may be affected by the same weather
- Cost of acquiring a site (if possible)

## Potential Alternatives

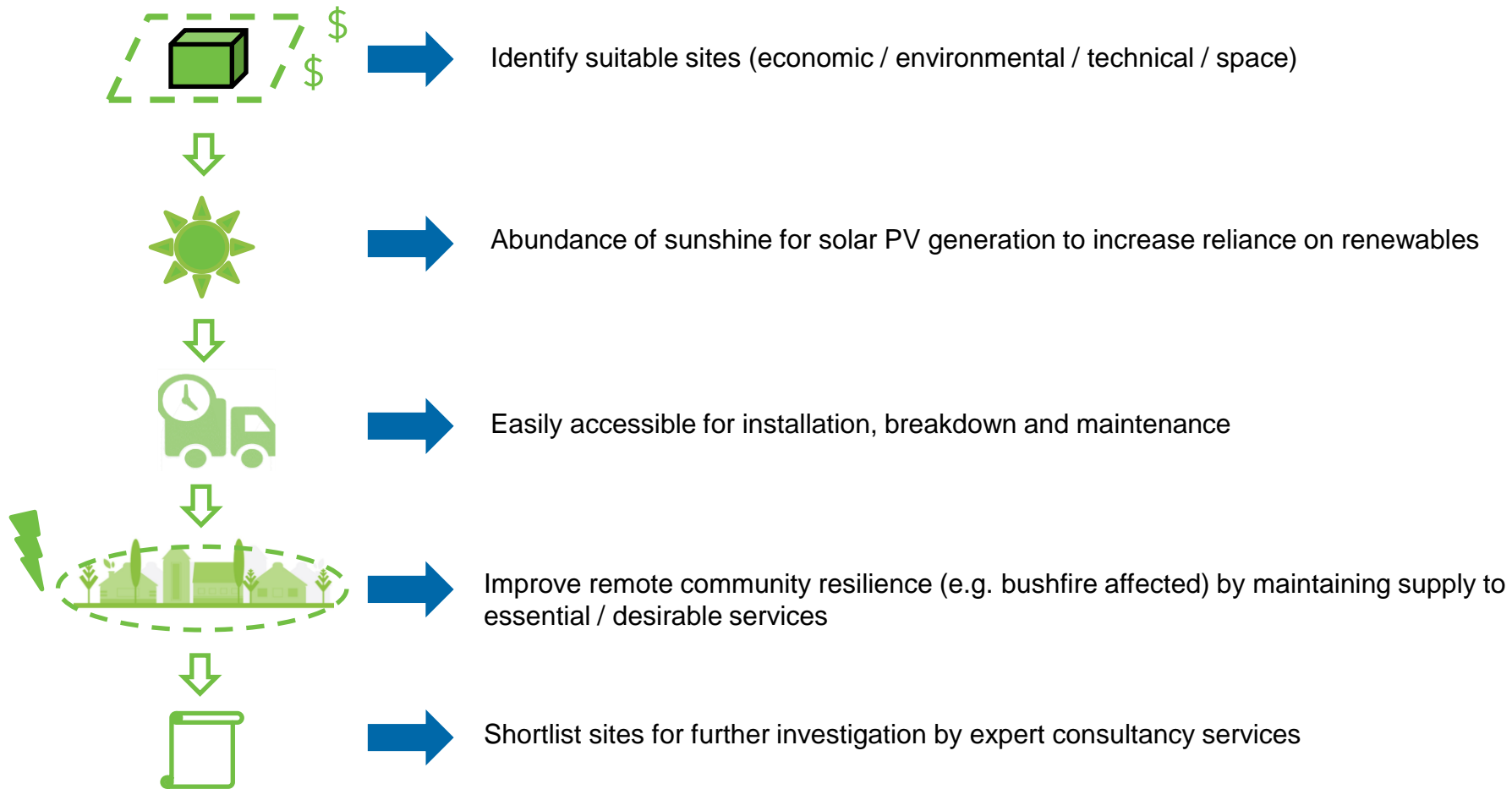
No “silver bullet” but may be benefits from:

- Greater concentration of sensing devices with communications to locate faults faster
- Remote control switches to isolate faults
- Orchestration of behind the meter solar and batteries as a community energy source for limited supply during outages
- Focussed asset strengthening at most vulnerable points



# Microgrids

# Key Principles for Microgrid Deployment



## Trial Objectives

- Understand customer needs and interaction with microgrids
- Increased resilience and reliability
- Safe and technically suitable
- Effective operating model

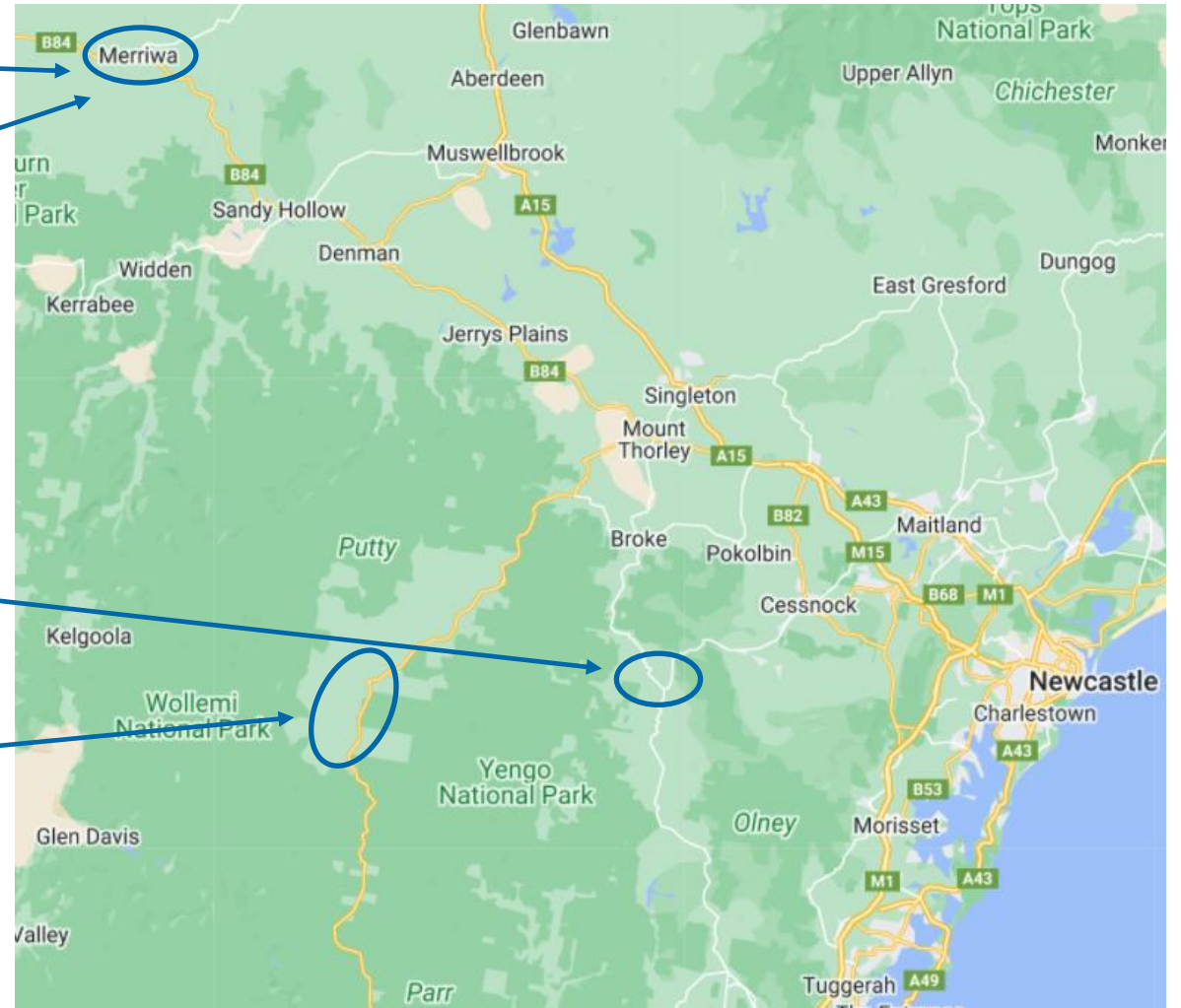
# Shortlisted Sites

1. Merriwa Town Centre (LV)

2. Merriwa Zone Substation (11kV)

3. Wollombi Village Centre (LV)

4. Putty area (22kV)





# Project Timeline

**Present status**

Consultant commencing Feasibility Study



2022 - 2023

2024 - 2025

2025+

**Phase 1**

**Phase 2**

**Phase 3**

Deploy Trial Microgrid (standalone)

Explore Customer BTM Integration  
Explore deployment of further Microgrids (various voltages)

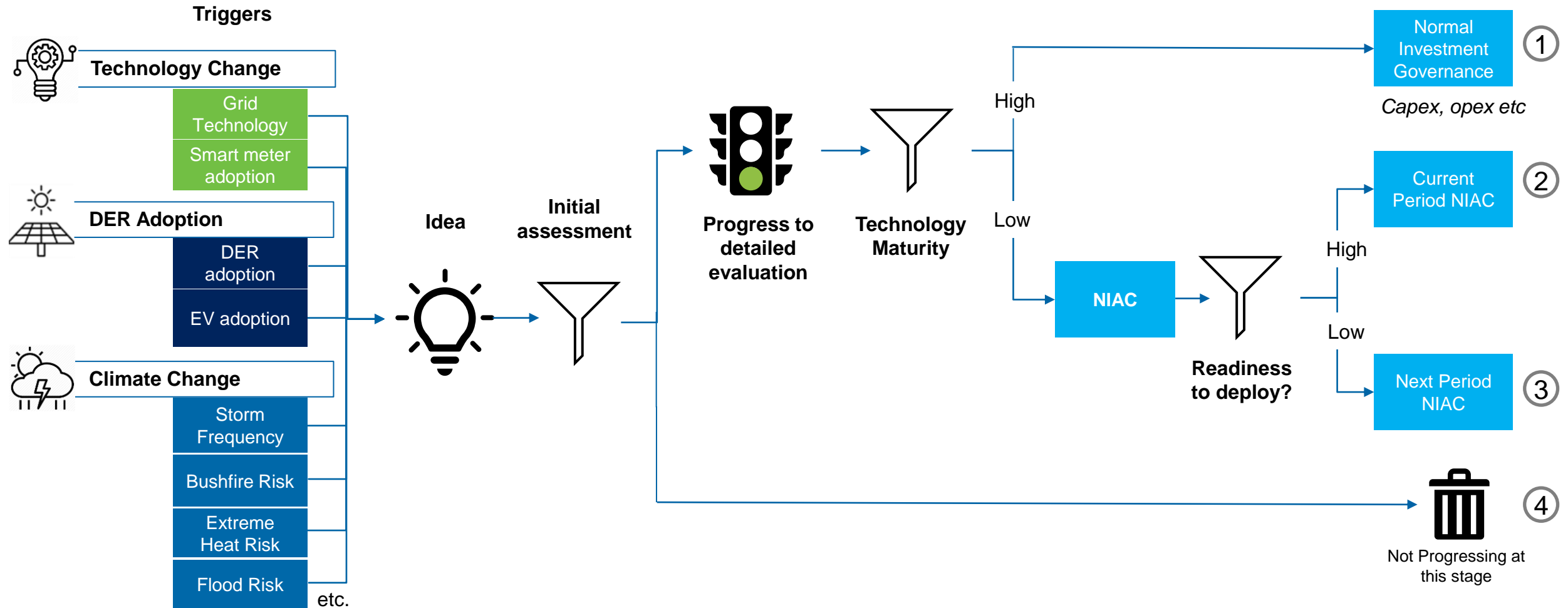
Optimisation & value added MG services  
Incorporate strategic approach for MG's at remote Zone Substations





# Alignment of Innovation program to support DER and resilience strategies

# Consideration of DER & Resilience initiatives for feed into Innovation Program



Follows Ausgrid's standard innovation framework approach

Readiness and deliverability assessment

# Initial (indicative) resilience project prioritisation outcomes



①

## Normal Investment Governance

*Capex, opex etc.*

- Community Resilience Education Campaigns
- Targeted Hazard Tree Removal
- Streamlined Co-funding Arrangements (Councils, Emergency Services, etc)
- Engineering review of feeders for resilience
- Increased Fleet Capability to Support Emergency Response (drones, boats, etc.)
- Undergrounding of HV during ASP brownfield development
- Riverine Flood Resilience
- Covered Conductor Conversion
- Conductor / Asset ratings review
- Sub-transmission topology resilience
- Extreme Heat Working Protocols / PPE
- Heat Proofing Protection Relays
- HV Feeder Sectionalising Program
- Reclosing in High Lightning Risk Zones
- Selective Undergrounding of HV OH
- Storm Resilience - Community Liaison Model
- Network Security Upgrades for Critical Community Infrastructure (telco towers, etc)

②

## Current Period NIAC

*Additional initiatives*

- Broken Conductor detection trials
- Review of business case for SAPS Phase 2 with revised climate variables
- Local weather stations
- Improved fault location technology
- Fire start monitoring
- Network digital twin uplift (NEARA enhancements)
- Rapid Plug & Plug generator deployment facilities

③

## Next Period NIAC

*Potential inclusions*

- Mobile Hydrogen Response Units
- Hydrogen turbine microgrids
- HV Microgrid
- Hydrogen based SAPS
- Environmental Monitoring sensors
- Local Autonomous Networks
- Feeder level load shedding
- Fault and incident prediction and location
- Defect Detection Sensors
- Phasor Measurement Units (PMU)

④



*Not progressing at this stage*

- Veg trimming drone w/saw
- Standards update for asset protection zone increase (BF protection)
- Standards update for asset protection zone increase (vegetation)
- Storm Resilience - Operating Restrictions
- Storm Resilience - LOR Response (operational)
- Riverine Flood Resilience – Standards perspective
- Online thermal monitoring system
- Monitoring for Spans - Movement/Blow-out

# Proposed pivot to additional resilience linked innovation investments

②



Technology	Workstream	Description	Customer Outcome
Review of business case for SAPS Phase 2 with revised climate variables	Fringe of Grid Optimisation	Review cost benefit analysis methodology for Stand-alone Power Systems to incorporate revised climate futures model	More efficient, safe and reliable supply in climate change affected areas
Rapid Plug & Plug generator deployment facilities	Portable Supply Units	Develop engineering standards and physical mechanisms for rapidly connecting portable energy sources (including generators and Portable SAPS) to communities during extended outages	Faster community response in major disasters
Broken Conductor detection trials	Asset Condition Monitoring	Pilot technology (using field sensors and smart meters) to identify broken conductors on the network. (Desktop analysis underway)	Faster outage restoration and safer network
Local weather stations	Asset Condition Monitoring	Increase visibility of local weather conditions by deployment and integration of local weather station data in decision making	Improved reliability and restoration ability in adverse conditions
Improved fault location technology	Asset Condition Monitoring	Increase focus on fault locating tech pilots including at the distribution (11 / 22 kV) level	Faster outage restoration and safer network
Fire start monitoring	Asset Condition Monitoring	Identify and trial fire start monitoring technology	Reduced bushfire risk and faster response to fires
Network digital twin uplift (NEARA enhancements)	Asset Condition Monitoring	Use of digital twin software and bushfire patrol LIDAR and imagery to identify emerging risks on network assets. Additional customer benefits from providing access to the data for ASPs to streamline connection process	More efficient, safer customer connection work. Faster assessment of emerging asset risks

# Innovation principles (for reference)

Guiding Principle	Weighting
• Maintains safety for employees and the community	17%
• Improves fairness	14%
• Accelerates de-carbonisation	14%
• Lowers costs for customers	13%
• Improves resilience	12%
• Solves a specific problem	11%
• Improves the economic utility of new and existing assets	10%
• Uniqueness of problem and collaborative opportunities	9%
	<b>100%</b>

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 principle

# Miro – Potential project prioritisation

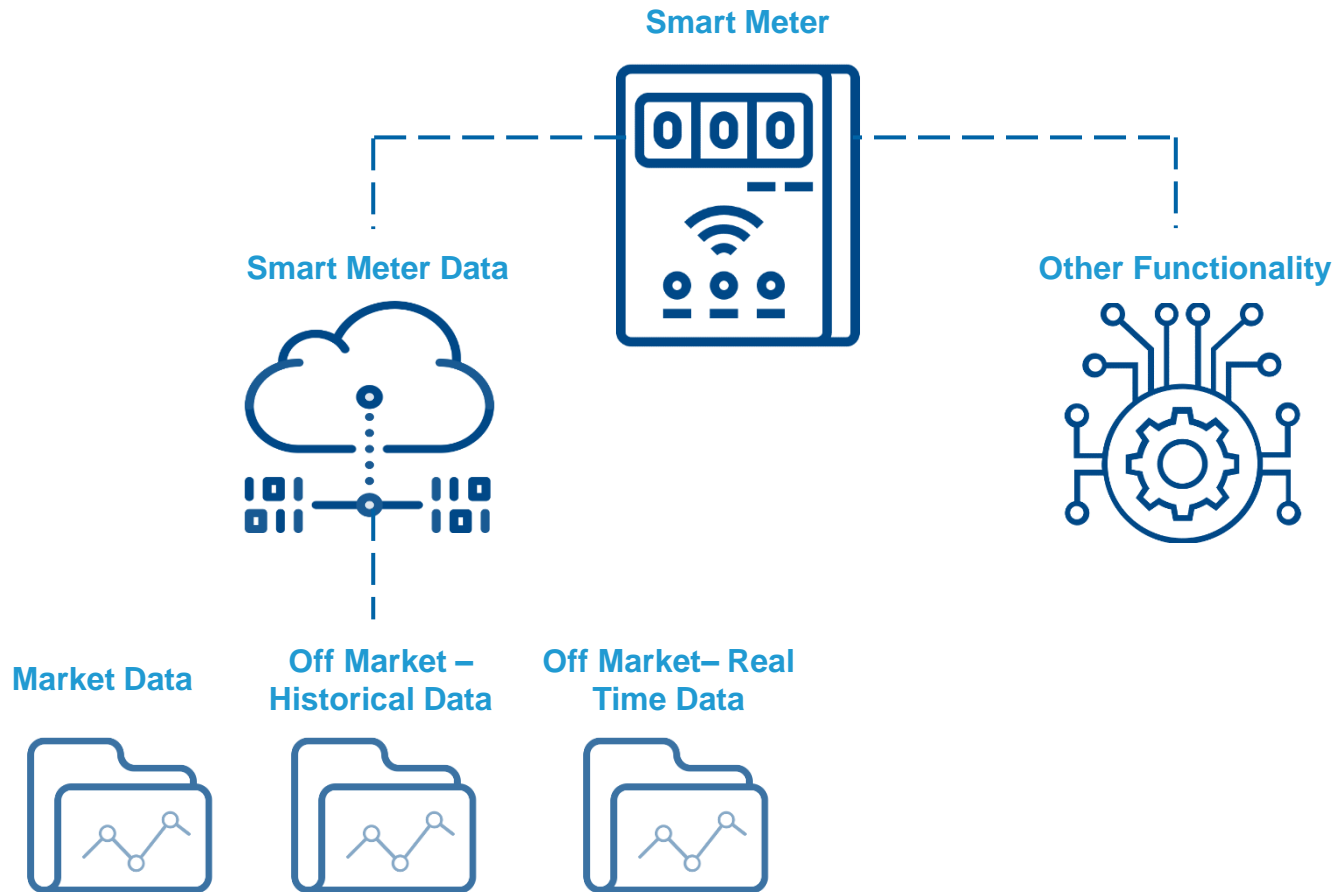
Rating Description	Rating	Principles	Weight	SAPS review - More efficient, safe and reliable supply in climate change affected areas	Rapid generator deployment facilities - Faster community response in major disasters	Broken conductor detection trials - Faster outage restoration and safer network	Local weather stations - Improved reliability and restoration ability in adverse conditions	Improved fault location technology - Faster outage restoration and safer network	Fire Start monitoring - Reduced bushfire risk and faster response to fires	Network digital twin uplift - Network digital twin uplift - More efficient, safer customer connection work. Faster assessment of emerging asset risks
Project does not impact progress on this principle	1	Maintains safety for employees and community	17%							
Project will have a minor impact on advancing this principle for Ausgrid and our customers	2	Improves Fairness	14%							
Project will have a moderate impact on advancing this principle for Ausgrid and our customers	3	Accelerates decarbonization	14%							
Project will have a significant impact in advancing this principle for Ausgrid and our customers	4	Lowers costs for customeres	13%							
Project will have a major industry wide impact on advancing this principle	5	Improves resilience	12%							
		Solves a specific problem	11%							
		Improves economic utility of new and existing assets	10%							
		uniqueness of problem and collaborative opportunities	9%							



# Smart Meter Data Strategy



# Ausgrid Smart Meter Data Trial

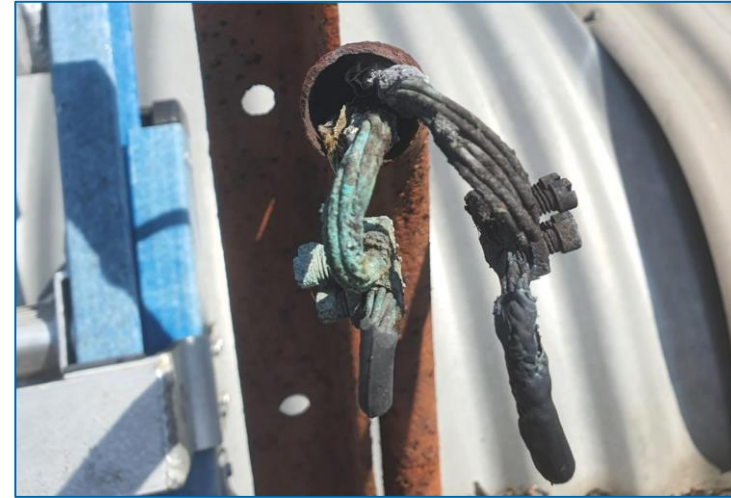


## Summary of Progress

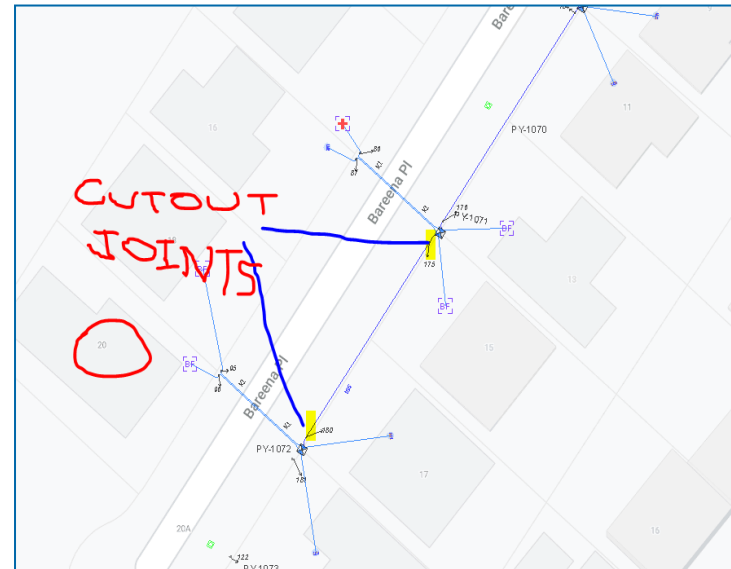
- 20,000 meters subscribed into Ausgrid data systems
- FutureGrid platform commissioned in Ausgrid's IT environment:
  - Industry-leading data ingestion and analytic platform
  - Facilitates analysis of smart meter data to detect neutral integrity issues, voltage compliance, etc
- Developing business case for expansion of trial towards BAU deployment
  - Larger volumes of “slow” power quality data – what are the IT system implications
  - Pursue proof of concepts for real time data ingestion and meter enquiry services
    - IT implications
    - Metering provider capability to offer services
  - Quantifying customer benefits of various use cases
- Engaging with AEMC and NSW Gov on Metering Services review
  - Participation in DNSP – Metering Provider working groups to support AEMC review
  - Working with NSW Government on Consumer Energy Futures consultation process

# Neutral Integrity Trial Results

- FutureGrid platform soft go-live in January
  - Immediately identified a dangerous situation in Ashfield (Inner West Sydney). Crews dispatched to attend and site rectified (vulnerable customer)
  - Additional sites investigated where high readings to detected, including detection of a defective CONSAC distributor neutral
- Validation of results
  - We are continuing to validate the raw outputs of the system to establish appropriate thresholds for alarms and field response
  - 1 in 180 sites indicated potential issue (loop impedance above network standard threshold)
  - 50% of sites visited to date had hazards identified
- Need to manage a one-off program as meters brought online vs on-going defect identification



*Corroded connection in Ashfield*



*Defects identified on LV distributor*

# Roadmap of data acquisition uplift and expected volumes



## Long term view (Subject to AEMC metering services review)

Potentially \$5-10m pa opex escalating with meter volumes, over 24-29 reg period.  
Assuming:

- Increasing volume of daily data feeds to support safety and planning efficiency improvement use cases
- Availability and increasing volume of near real time to support operational and real time network optimisation
- Availability and implementation of meter enquiry services to support operational and safety use cases

### Existing (as of January 22)

11,000 meters (focus on CONSAC neutral integrity risks)

### Extension (March 22)

9,000 additional meters added to platform – random sample across network

### Proposal

Uplift additional 50k-200k meters (subject to business case)

# Smart Meter Data Services

## Daily PQ Data

### Service Overview

- Volts and Amps (and other key PQ data) delivered daily in sync with market data
- 5 min time-synced intervals

### Key Use Cases / Benefits

- Safety
- DER Integration / improved hosting capacity
- Capex prioritisation and efficiency

### Scope and Scale (long term)

- Aim for close to 100%\* penetration (driven by safety benefits)
- CBR ratio dependent on MP costing but positive if cost-reflective services made available
- In AG network ~ 1M meters\*

## Fast PQ Data

### Service Overview

- Volts and Amps (and other PQ data) delivered within 5 - 10 min of measurement
- 5 min time-synced intervals

### Key Use Cases / Benefits

- DER Integration / improved hosting capacity
- Operational support (reduced unserved energy)

### Scope and Scale (long term)

- Likely only 20-40% penetration required for benefits
- CBR ratio dependent on MP costing
- In AG network ~ 0.25M meters

## Meter Enquiry

### Service Overview

- Meter status and latest PQ information
- Delivered on request in real-time

### Key Use Cases / Benefits

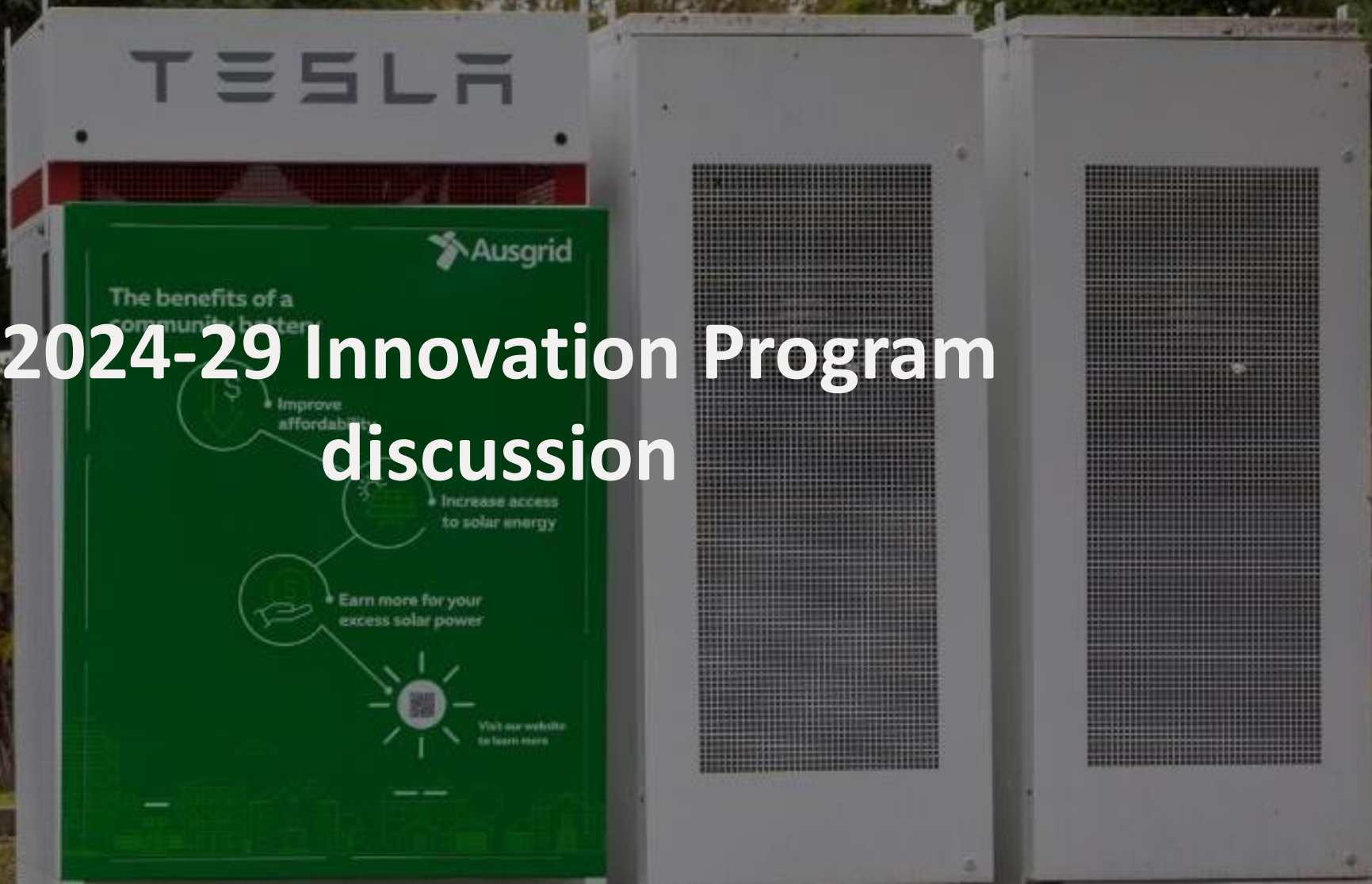
- Customer time/experience
- Operational support (reduced unserved energy)
- Opex efficiency (reduce truck-rolls)

### Scope and Scale (long term)

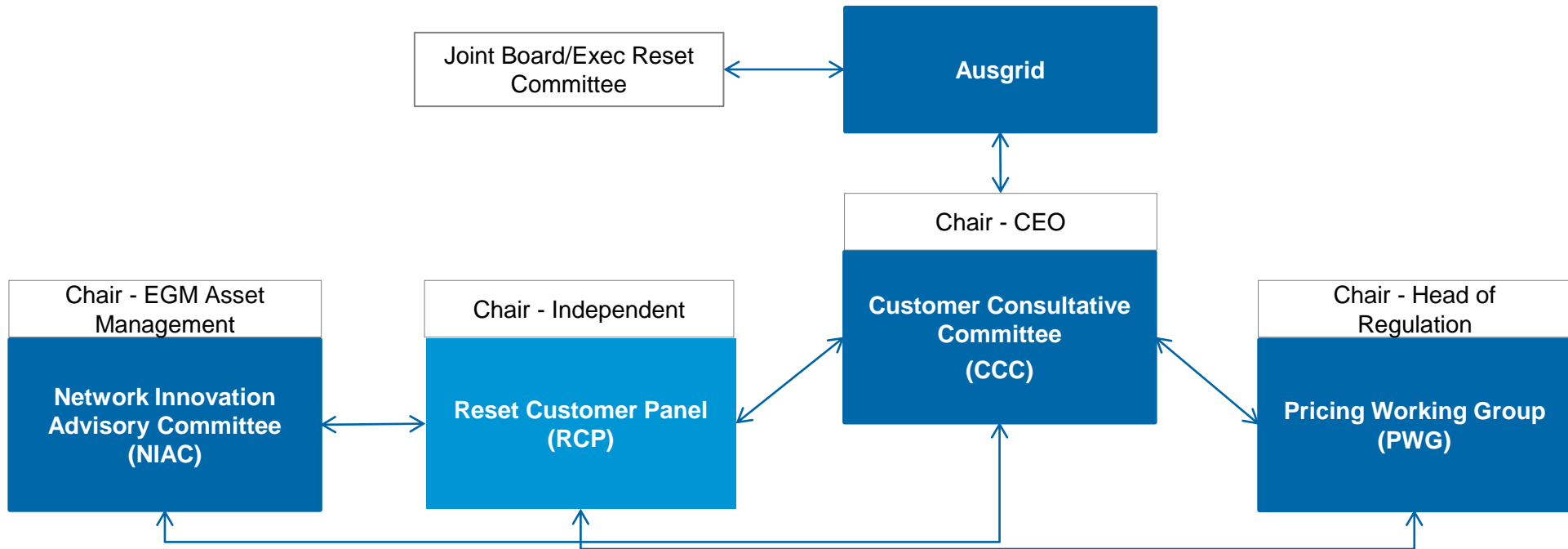
- Aim for close to 100% penetration
- CBR ratio dependent on MP costing and availability of service
- In AG network 1M meters

\*Ausgrid has approximately 900,000 unique connection points – there may be multiple meters behind each connection point (e.g apartment complex)

# 2024-29 Innovation Program discussion



# Co-designed Regulatory Reset engagement model



- **CCC** retained as peak consultative body – membership to be refreshed.
- Establishment of the **RCP** with Independent Chair to focus on 2024-29 Reset
- Ausgrid to collaborate with **RCP** and:
  - **NIAC** on current period and 2024-29 innovation program; and
  - **PWG** on 2024-29 Tariff Structures Statement
- Key 2024-29 Reset positions require **CCC** alignment.
- Ausgrid Board members engage primarily with **CCC** on business and Reset strategic issues and decisions

# Process to develop Innovation program for FY24-29

**“Business as usual” expenditure**  
*Maintaining the poles and wires*



**“Energy Transition” expenditure**  
*Deployment of proven technology to support the “energy transition”*



**Network Innovation Program**  
*Proving and implementing the next wave of technology*

## Identify Needs

- BAU Repex and Augex requirements
- DSO, DER Integration and Resilience Strategies
- Maintenance and operational elements

## Define Boundaries

- What is business as usual
- What are opportunities for innovative solutions
- What is the transition path of those solutions to BAU

## Establish scope

- Collate and refine focus areas
- Test cost-benefit and alignment to principles
- Refine and finalise program

## NIAC and RCP Guidance

- Validate principles
- Confirm NIAC priorities
- Identify gaps in AG proposal
- Review and provide feedback on scale and scope
- Endorsement of overall approach

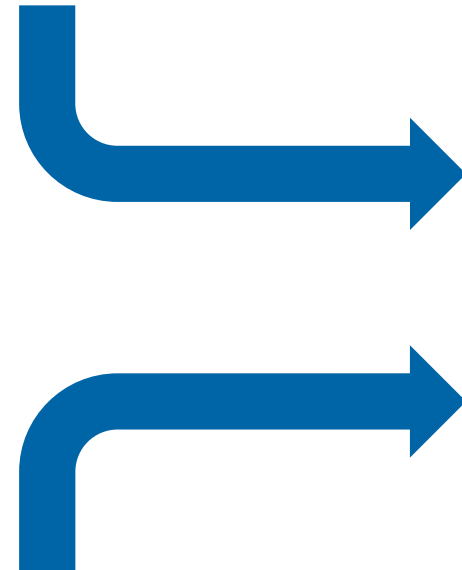
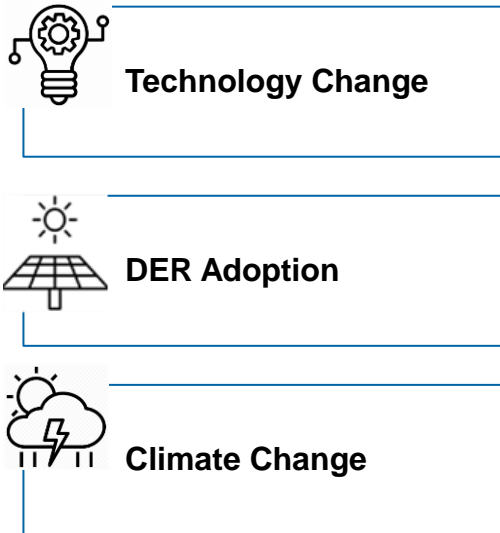
# Proposed Design of Program

## Structure of program

Portfolio approach to focus on outcomes not technology

Test *and* Implement – allow for roll-out of successful trials

Include both capex and opex components for optimum delivery



## Technology Availability and Readiness

Smart Metering

Network Devices and Equipment

OT and IT System Integration and Analytic capability



# Role of the NIAC in 2024-29 period

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## Key NIAC Questions

- Program structure
  - Portfolio approach
  - Test *and* Implement – allow for roll-out of successful trials
  - Include both capex and opex components for optimum delivery
- Priorities and Principles
  - Are the principles established this period still relevant for next period?
  - Are the ratings still right?
- Scope and Charter
  - Is the existing advisory nature the appropriate balance of oversight and involvement?
- Membership
  - Is the membership diverse enough?
  - Are we missing any key stakeholders?
- Format
  - Is the meeting frequency appropriate?
  - Are there other ways that members would like to get involved in the process?

# Miro – input on key questions

<b>Structure of Program</b>	Is a portfolio approach with a focus on benefits and outcomes rather than specific technologies better than a technology-specific program?	
	Include an allowance to both trial and implement solutions - roll-out at larger scale successful trials?	
	Include both capex and opex components for optimum delivery?	
<b>Priorities and Principles</b>	Are the innovation investment principles established this period still relevant for the next period ?	
	Is the weighting still right ?	
<b>Scope and Charter</b>	Is the existing advisory nature the appropriate balance of oversight and involvement?	
<b>Membership</b>	Is the membership diverse enough?	
	Are we missing any key stakeholders	
<b>Format</b>	Is the frequency of meetings sufficient?	
	Are there other ways that members would like to get involved in the process?	

## Innovation principles (for reference)

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	<b>100%</b>



# Closing Junayd Hollis

## Key Milestones at Next Meetings

Meeting	Content
15 March	<ul style="list-style-type: none"><li>• Refocus 2019-24 innovation programs to resilience</li><li>• Development of Innovation program for 2024-29</li></ul>
16 June	<ul style="list-style-type: none"><li>• Draft innovation program and proposed future NIAC scope / remit</li></ul>
15 September	<ul style="list-style-type: none"><li>• Review revised innovation program proposal</li></ul>
1 December	<ul style="list-style-type: none"><li>• Present final innovation program proposal</li></ul>

A hand is shown holding a black power drill, positioned over a dark, complex mechanical or electrical assembly. The background is dark and filled with various components, including what appears to be a blue circular element and some wiring. The overall scene suggests a technical or industrial setting.

# **Attachment A**

## **International Community for Local Smart Grids**

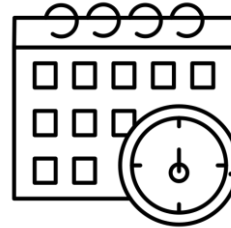
### **Status Update**

# International Community for Local Smart Grids



## What is it and why are we involved?

- ICLSG is a 5 year knowledge sharing partnership
- Ausgrid is a founding partner with Scottish & Southern Electricity Networks, Enel Foundation and Oxford University
- To work with other distributors and communities to unlock a just transition to net zero
- Inform policymaking and industry best practice by learning through doing



## Where are we at?

- Signing contract early March
- Finalise and launch [website](#)
- Oxford to recruit and engage researchers
- Recruit 10 to 12 network and associated community partners
- Researchers to conduct interviews with key personnel (May – June)
- Steerco to select the research projects to progress with



## Potential community partner

- Ausgrid is required to bring onboard a community partner
- The community partner must be a social enterprise with good governance
- That has delivered real projects and understands how to work with people
- [CORENA](#) fits the characteristics and is keen to participate
- Delivered [45 projects](#), across solar, energy efficiency, electrification and EVs

A hand is holding a black handheld device with a blue ring, positioned over a car's engine compartment. The device appears to be a diagnostic tool or a scanner. The background is a dark, close-up view of the engine bay.

# Attachment B

## Innovation Program Lessons Learned Register



# Lessons Learnt Summary

Workstream	Lessons to Date	What next?	Expectations for next regulatory cycle
Advanced Voltage Regulation	<ul style="list-style-type: none"> <li>• Cost-benefit of LV STATCOMS for resolving network constraints on LV distributors,</li> <li>• Development of safe live work design and installation procedures to reduce installation costs</li> <li>• Development of control methods conforming to licence conditions which is suitable for integration into control room or monitoring systems</li> <li>• Identification of capability required to uplift hosting capacity and resolve legacy voltage management issues</li> </ul>	<ul style="list-style-type: none"> <li>• Develop understanding of broader STATCOM capabilities under different use cases, and package learnings and materials for BAU deployment</li> <li>• Work with Home Affairs Department to promote a risk based approach to managing cyber security.</li> <li>• Explore on-load Dist. TX tap changer applications, and develop capability for broad based flexible network voltage control.</li> <li>• Pilot adaptive voltage control technology to ready for BAU deployment in zone substations</li> </ul>	Likely to largely progress into BAU investment portfolio. Potential additional need to examine greater integration of customer side equipment (including 3 <sup>rd</sup> party grid-connected batteries or microgrids) into a holistic voltage management strategy

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Network Insights	<ul style="list-style-type: none"> <li>• Developed granular model to identify cost-benefit of monitoring and control at each location on the network</li> <li>• Established standards and drawings for retrofit of DM&amp;C devices in older style kiosks</li> <li>• Developed process efficiencies for installation and commissioning</li> <li>• Streamlined comms security processes including use of 3<sup>rd</sup> party networks i.e telecom carriers.</li> <li>• Challenges with proprietary equipment and protocols.</li> <li>• Challenges in developing trust in remote indication of faults on the HV network – criticality of reliable information and operator trust in emergency situations</li> </ul>	<ul style="list-style-type: none"> <li>• Continue targeted deployment at key sites identified by modelling</li> <li>• Further progress greenfield standards and brownfield retrofit designs for additional monitoring and develop options for pole-mounted sites</li> <li>• Work with Home Affairs Department to promote a risk based approach to managing cyber security, differentiating monitoring and control risks</li> <li>• Improve asset management practices around monitoring devices and develop strategies to increase confidence in reliability of information.</li> </ul>	<ul style="list-style-type: none"> <li>• Likely to continue roll-out of distribution monitoring &amp; control devices where cost effective for increased LV visibility.</li> <li>• Cyber security investment likely to ensure data systems support the range of data sources likely, with appropriate cyber security provisions</li> </ul>

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Grid Fringe Optimisation	<ul style="list-style-type: none"> <li>Identifying areas in Ausgrid network where SAPS may be cost-benefit positive</li> <li>Realising customers' expectations and behaviours towards SAPS through a survey and meetings with some of them</li> <li>Identifying opportunities to integrate customer side optimisation to reduce costs for SAPS</li> <li>Regulatory limitations and challenges (including planning processes) for deployment of SAPS under current legislation</li> <li>Understanding technical requirements and development of technical specification for SAPS</li> <li>Supplier capability and maturity for supply, installation and maintenance and emergency response scenarios</li> <li>Customer installation safety and compliance to code</li> </ul>	<ul style="list-style-type: none"> <li>Improve holistic modelling for optimising the fringe of the grid.</li> <li>Continue to explore demand side management opportunities at trial sites</li> <li>Work with supplier on a solution for integrating customer existing DER</li> <li>Work with councils and state government on the development approval process and requirements</li> <li>Supplier chosen</li> <li>Engaging on capabilities for on-going maintenance and emergency response in line with customer expectations for reliable energy.</li> <li>Work with customers to ensure installations are fit for purpose</li> <li>4 customers agreed to sign an agreement.</li> </ul>	Likely to progress into BAU investment portfolio – some scope to continue innovation trials on emerging technologies such as Hydrogen

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<p>HV Microgrid Trial</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Engage a microgrid engineering consultant that can provide specialist advice and a market specification</li> <li>• Engage with internal stakeholders that will be directly involved with the project delivery and integration with existing systems</li> <li>• Investigate customer "behind-the-meter" integration into the microgrid to improve operational performance and extend islanded run-time capability</li> <li>• Engage the communities that have been shortlisted as feasible options from a desktop assessment</li> <li>• Investigate optimisation of all microgrid sources and potentially operating as an 'island' during normal operation with a grid backup</li> </ul>	<p>Innovation funding requirements likely to extend into next regulatory period</p>

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Advanced EV Charging Platform	<ul style="list-style-type: none"> <li>Significant industry movement, including new direction from ESB</li> </ul>	<ul style="list-style-type: none"> <li>Continuing our re-assessment of knowledge gaps and areas for investment to maximise value.</li> </ul>	<p>Likely investment required to support integration of EV and other DER into the grid</p>
Grid Batteries Trial	<ul style="list-style-type: none"> <li>NSW Distribution Critical Infrastructure Licence Conditions and federal cyber security requirements can complicate integration with overseas suppliers.</li> <li>Different in-field control designs required for each vendor. Two suppliers were selected to reduce vendor risks, but this added design time.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Establish relationships with local suppliers and update specification document with clear requirements identified during trial.</li> <li>Incorporate lessons learned into specification document to provide clear guidance to supplier and support a future scale up.</li> <li>Continue to engage with customers, communities and local councils.</li> </ul>	<ul style="list-style-type: none"> <li>Leasing Community Battery capacity included in request to AER to replace Framework and Approach – this would enable customer and market use cases.</li> <li>Incorporating Community Batteries into DER Integration Strategy.</li> </ul>

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Dynamic Load Control	<ul style="list-style-type: none"> <li>• Maturity and limitations of contestable metering market</li> <li>• Significant energy volume shifts to daytime (solar soak) using hot water</li> <li>• Potential scope for EV charging</li> </ul>	<ul style="list-style-type: none"> <li>• Assist retailers and metering providers develop capability which support customers and networks</li> <li>• Explore broader shifts of hot water energy to daytime to offset solar generation impacts</li> <li>• Further explore EV tariff options and capability to support</li> </ul>	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	<ul style="list-style-type: none"> <li>• Smart meter data acquisition challenges – commercial, technical and supplier limitations</li> <li>• Developed understanding of key use cases and data requirements for use cases</li> <li>• HALIM – prototyped ability to detect minute changes in neutral integrity successful</li> </ul>	<ul style="list-style-type: none"> <li>• Expand current program of smart meter data acquisition and commence detailed analysis of data streams in analysis systems</li> <li>• Integration of data and analytics into BAU systems and processes</li> <li>• Continue regulatory engagement around access to and quality of smart meter data</li> <li>• Expand HALIM to field trials to assess outcome in the field on high risk feeders and to validate smart meter analytic results</li> </ul>	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).

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Portable All-in-one off-grid supply units	<ul style="list-style-type: none"> <li>The market has advanced significantly in last 2 years but still maturing.</li> <li>The cost differential with diesel generation is still prohibitive in many use cases.</li> <li>There is a niche role but applications may be less broad than initially envisaged until costs decline further.</li> </ul>	<ul style="list-style-type: none"> <li>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</li> </ul>	Likely to roll into BAU investment for network resilience and emergency response. Potential scope for new technology (e.g. Hydrogen based)
Self Healing Networks	<ul style="list-style-type: none"> <li>Challenge and cost associated with establishment of localised control systems – preference a centralised scheme</li> <li>Proprietary equipment risk – difficulty integrating devices into system</li> <li>Supply chain risks for complex engineering solutions where expertise is not local</li> <li>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)</li> </ul>	<ul style="list-style-type: none"> <li>Establish roadmap and capabilities required for centralised scheme, including prioritising standardised protocols in equipment and compatibility with ADMS and local support.</li> <li>Explore potential to test operational processes using existing equipment and pre-production ADMS.</li> </ul>	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	<ul style="list-style-type: none"> <li>Cost benefit and safety implications of hot-stick deployable LFIs</li> <li>Process management for operators</li> </ul>	<ul style="list-style-type: none"> <li>Continue to roll out phase 1 of the trial to establish learnings</li> </ul>	Likely to be rolled into BAU investment