Electricity Network Transformation Roadmap Unlocking the Full Value of DER

CIDER 2017

John Bradley, Chief Executive Officer

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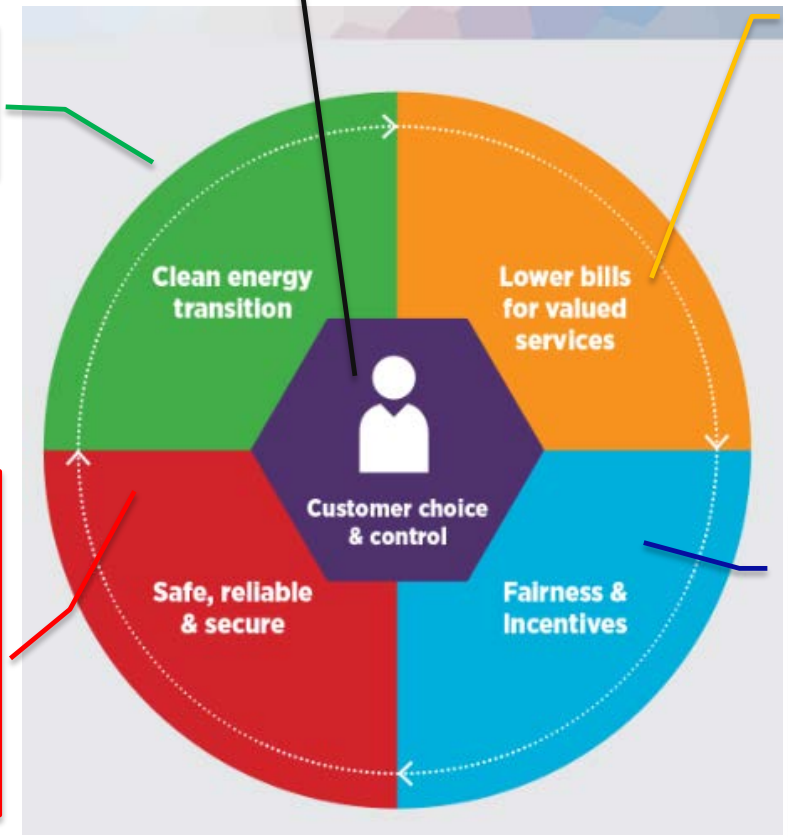
ENTR – a pathway to a better future

- Almost 2/3 of customers have DER
- 1/3 customers on 'stand alone power system' tariff
- Customer protection and concession schemes fit for purpose.

- COP 21 aspiration of Zero Net Emissions by 2050 is met



- Reduce total system spend by $101 BN by 2050
- Save Households $414 pa
- Network charges 30% lower than 2016

- Efficient solutions for new NEM services avoid security & stability risks.
- Real time balancing, reliability & quality of supply with millions of DER participants

- Avoid over $18 BN in cross subsidies
- Means $600 pa. for mid size family without DER
- Networks pay over $2.5 BN pa for DER services

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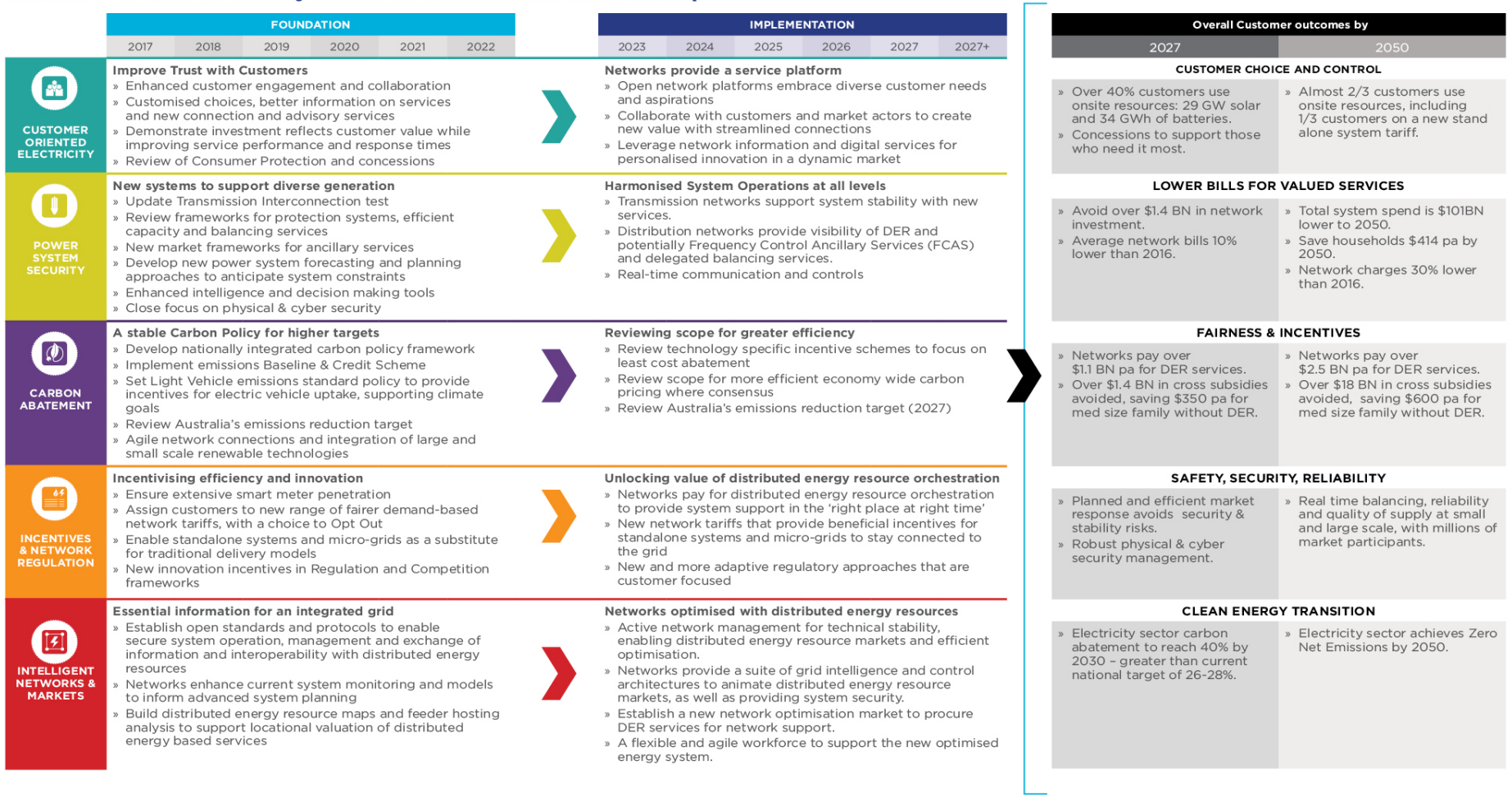
ENTR - Implementation

ENTR – 45 Milestones/158 Actions

Overview of the Electricity Network Transformation Roadmap



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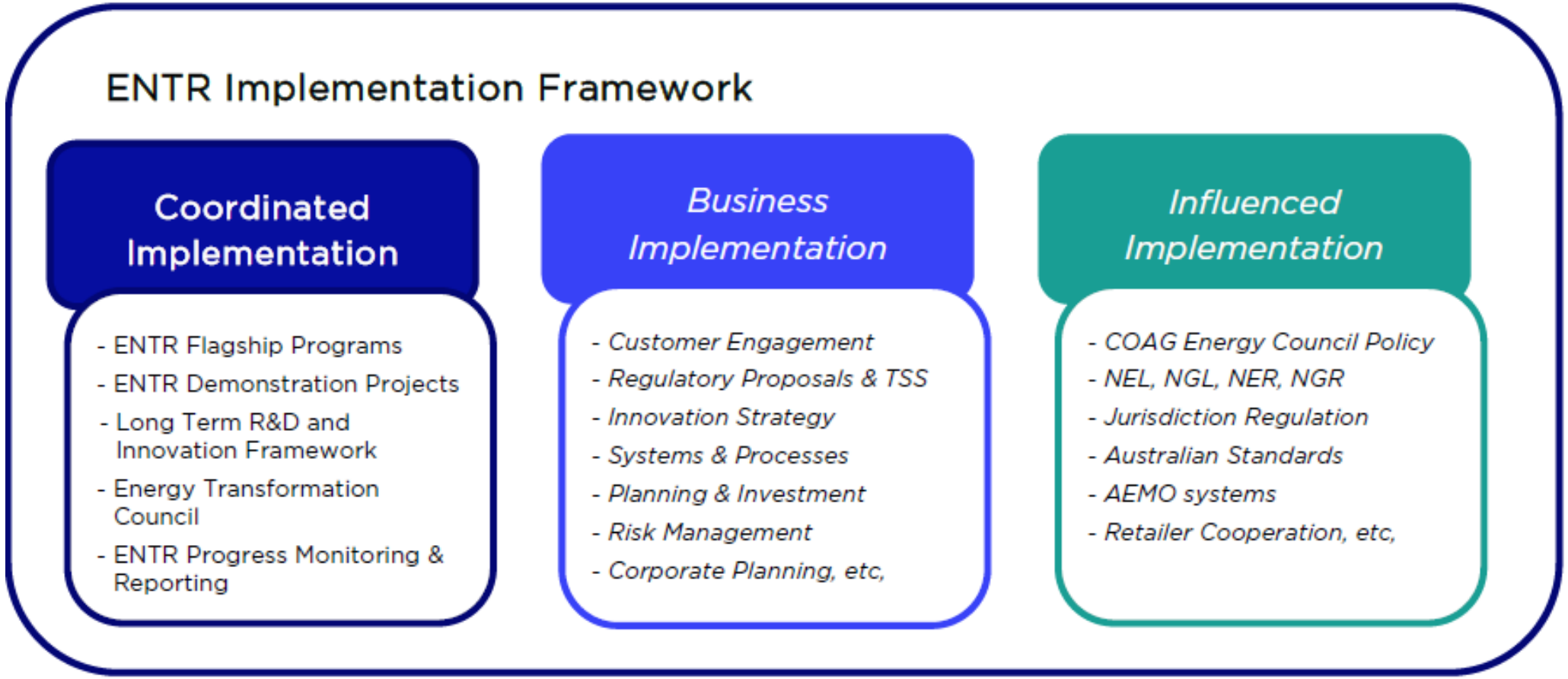

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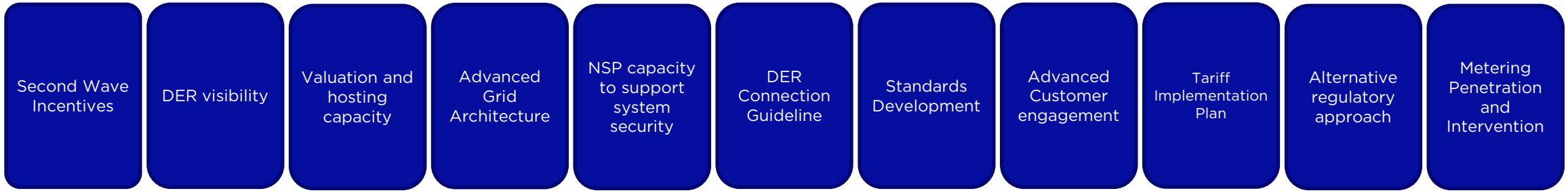
ENTR - Implementation

ENTR – 45 Milestones/158 Actions

11 Flagship Programs



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ENTR - Implementation

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11 Flagship Programs

- Second Wave Incentives
- DER visibility
- Valuation and hosting capacity
- Advanced Grid Architecture
- NSP capacity to support system security
- DER Connection Guideline
- Standards Development
- Advanced Customer engagement
- Tariff Implementation Plan
- Alternative regulatory approach
- Metering Penetration and Intervention

Grid Orchestration: Architecture and Procurement Models

Enablers

Policy Priorities

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Grid Orchestration: Architecture and Procurement Models

Enablers

Policy Priorities

1. Establish Governance and working groups
2. Establish Reporting Framework
3. A-lab process
4. Outcomes Report and recommendations for further work
5. Outputs consistent with milestone/actions
6. Recurring activity

CSIRO | AEMO | ARENA

Greensync | Retailers | Network Partners

AER | ECA | Other Stakeholders

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11 Flagship Programs

Second Wave Incentives

Valuation and hosting capacity

NSP capacity to support system security

Grid Orchestration: Architecture and Procurement Models

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Other Stakeholders

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Commonality and interdependency of “spine” projects

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Unlocking NSP capacity for System Security

Milestones	Actions	Process 17/18	Outputs	Stakeholders and budget

• By 2018, the central and transformed role for the transmission system to support power system security has been defined
• By 2018, market based approaches for providing efficient capacity, and balancing and ancillary services, have been established, including a set of fully tested options that would cater for a very low emission generation mix
	• By 2017, review, and if appropriate, establish augmented market frameworks supporting timely and efficient capacity investment
	• By 2017, Revise the regulatory test for transmission investment including interconnectors
		1. Establish Governance and working groups
		2. Establish Reporting Framework
		3. A-lab process
		4. Outcomes Report and recommendations for further work
		5. Outputs consistent with milestone/actions
		6. Recurring activity
			• Reporting Framework for market and physical frameworks for efficient capacity
			• Stocktake of trials:
			  • Forecasting renewables
			  • power system pricing approaches
			  • Synthetic inertia
			• Gap Analysis
			• Options for system security markets and frameworks
				• Business Case owners of existing trials
				• AEMO
				• ARENA
				• AEMO/ARENA process*
				• ECA*
				• AER*
				• Budget $135k for logistics and consultancy for reporting framework, gap analysis, outcomes and options framework
				• $10k budgeted
				• $125k additional budget required

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Second Wave Incentives

Milestones	Actions	Process 17/18	Outputs	Stakeholders and budget
• By 2018, networks with high DER are implementing basic NOM functions • By 2027, 1/3 customers 'selling DER' on a dynamic/locational basis	• 2017 - Identify key locations of DER • 2018 - Framework options for procuring DER • 2019 - simple procurement mechanisms developed • 2020 - Initial utilisation DER using procurement mechanism • 2018-21 - Networks develop frameworks • 2019-2021 - Incorporate into TSS	1. Establish Governance and working groups 2. Establish Reporting Framework 3. A-lab process 4. Outcomes Report and recommendations for further work 5. Outputs consistent with milestone/actions 6. Recurring activity	• Stocktake of trials: Frameworks for procuring DER • Process for enrolling customers and locations • Gap Analysis • Framework for identifying key locations • Options for procuring DER for Network Optimisation	• Business Case owners of existing trials • AEMO • ARENA • ECA* • AER* • Budget for logistics and consultancy for reporting framework, gap analysis, outcomes and options framework • $10k budgeted through existing PRC budget

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DER Visibility for AEMO*

Milestones	Actions	Process 17/18	Outputs	Stakeholders and budget
• By 2019, approach developed for coordinating and optimising decisions across the power system incl interfacing between IMO and DNOs	• 2018 - Specifications for scope/access to infoarmation at interface IMO/TNO/DNO • 2019 - Real-time capability for communication / controls between IMO/DNO • 2019 - Enhanced intelligence / decision making at interface IMO/TNO/DNO	1. Establish Governance and working groups 2. Establish Reporting Framework 3. A-lab process 4. Outcomes Report and recommendations for further work 5. Outputs co 6. nsistent with milestone/actions 7. Recurring activity	• Frameworks for operational interface and coordination between AEMO, transmission and distribution networks • Evaluate appropriate DER adoption forecasting tools and techniques • Determine what data is required about DER, and at what level of detail, for AEMO's operational needs spanning real time operation, short-term planning and forecasting, and long-term planning and forecasting • Evaluate tools to incorporate DER forecasts into network planning processes identifying localised grid issues likely to emerge due to DER population and operation	• Business Case owners of existing trials • AEMO • ARENA • ECA* • AER* • TBA • AMC budget

Advanced Grid Architecture*

Milestones	Actions	Process 17/18	Outputs	Stakeholders and budget
• By 2019, integrated suite of distributed grid intelligence & control architecture / tools for high DER • By 2020, integrated suite of advanced network operation mechanisms & tools	• 2018 - identify technical priorities for distributed grid intelligence / control • 2018 - develop framework to faciliate DR & monitoring • 2019 - Min tech standards for LV sensing & measurement • 2019 - Min tech requrements for DER / Microgrid interoperability • 2020 - min tech requirements for real-time identification / communication Network support requirements • 2020 - min tech requirements for visibility communication and coordination between IMO/DNO	1. Establish Governance and working groups 2. Establish Reporting Framework 3. A-lab process 4. Outcomes Report and recommendations for further work 5. Outputs consistent with milestone/actions 6. Recurring activity	• Shared view on the efficient, fit for purpose functional, technical and operational requirements for enhanced distributed grid intelligence, monitoring and control • Quantify adoption and penetration requirements of new monitoring and control technology required to provide required functionality • Processes and criteria for creating a sufficiently documented distributed grid architecture and system specifications to deliver functional requirements	• Business Case owners of existing trials • AEMO • ARENA • ECA* • AER* • TBA • AMC budget

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Hosting Capacity and DER Valuation

Milestones	Actions	Process 17/18	Outputs	Stakeholders and budget

• By 2019, integrated planning, forecasting and valuation techniques mainstream for DER as NNA
• By 2020, new tools and models developed to provide forecasting to anticipate where system constraints could lead to system security issues
	• 2017 - Techniques for reliable forecasts of DER & VRE
	• 2018 - Tools to evaluate cost/benefits of a range of technological / commercial solutions for:
	  • Forecasting DER & Demand/Supply
	  • Forecasting grid impacts
	  • Hosting capacity
	  • Value of DER
	• 2019 - Develop and run tools
		1. Establish Governance and working groups
		2. Establish Reporting Framework
		3. A-lab process
		4. Outcomes Report and recommendations for further work
		5. Outputs consistent with milestone/actions
		6. Recurring activity
			• Reporting Framework
			• Stocktake of trials:
			  • Forecasting DER
			  • Forecasting Grid impacts
			  • Forecasting future costs
			  • Hosting capacity
			• Gap Analysis
			• Evaluation Framework
			• Options for forecasting, hosting, costing and procuring DER for Grid Orchestration
				• Business Case owners of existing trials
				• AEMO
				• ARENA
				• ECA*
				• AER*
				• Budget for logistics and consultancy for reporting framework, gap analysis, outcomes and options framework
				• $10k budgeted through PRC

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Next steps

- Working Group Reviews
- PRC AMC Endorsement
- ENA Board update
- Partner engagement
  - AEMO
  - ARENA
  - CSIRO
  - AER*
- Key player engagement
  - CEC
  - Greensync
  - Retailers
- Stakeholder engagement
  - ECA
  - AER
  - AEMC
  - COAG

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