



Australian Government
Australian Renewable
Energy Agency

ARENA



Briefing Pack

Designing a demand response initiative

ACCELERATE

A-LAB



The event

9am - 4pm, Friday 19th May
The Studio at Space&Co.

Level 3, 530 Collins Street
Melbourne



Please note dress code is casual

ARENA's A-Lab Accelerate program is designed to support the co-design of large scale projects and programs

At this A-Lab Accelerate event, ARENA and AEMO are seeking to work closely with leading thinkers and doers to ensure that any joint effort to support demand response has maximum viability and impact.

Through A-Lab's Accelerate you will:

- ❖ Collaborate with your peers, through a facilitated process intended to support and enhance development of multi-stakeholder projects and programs
- ❖ Provide input into the design of a new ARENA and AEMO initiative that could provide critical learnings for future market frameworks

Program

- 1 Welcome and introduction by ARENA and AEMO
- 2 What is the problem we are trying to solve?
- 3 What demand response products and services does the market require?
- 4 How could a demand response funding program be designed?
- 5 What are our key risks and mitigation strategies?

What is A-Lab?

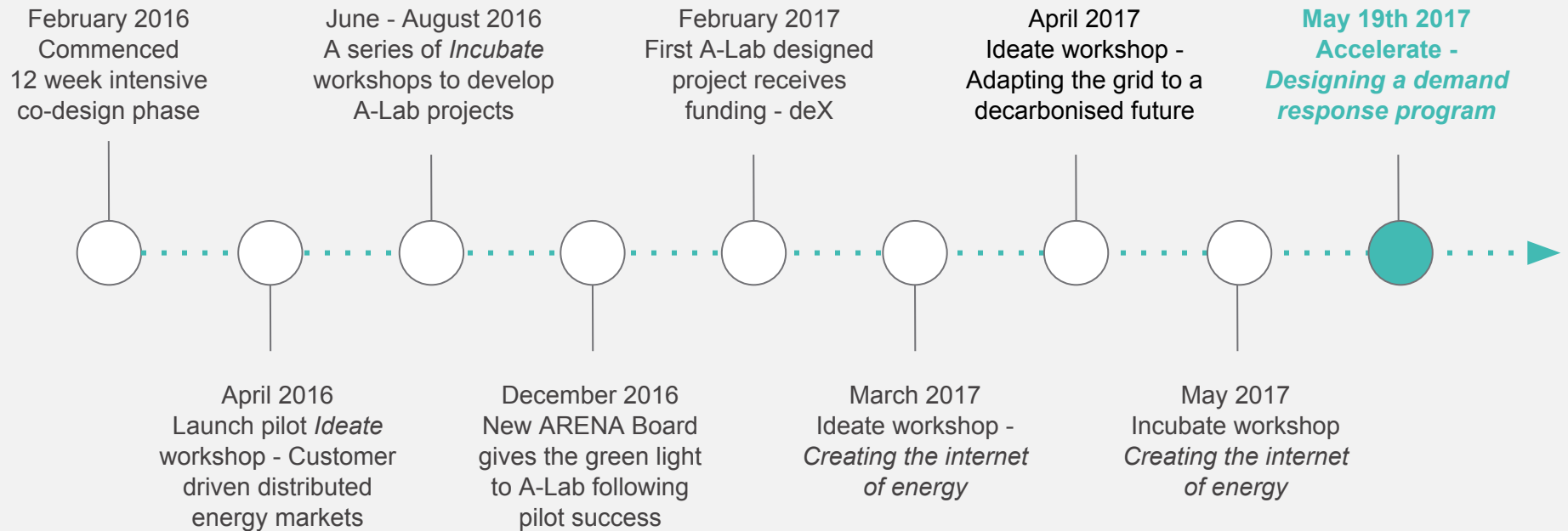
A-Lab is ARENA's innovation lab creating cross-sector partnerships and world first projects to transform Australia towards a clean energy future.

A-Lab brings a diverse network of people together to generate new ideas and initiatives by using a variety of tools and approaches to facilitate intensive, collaborative processes.

Innovation labs have emerged as a way to tackle large-scale, complex, whole of system challenges particularly those which have a strong social element. They are used in business, community and government contexts across the globe to drive systemic change through exploring, developing and testing new ideas rapidly.



The A-Lab story... so far



Key numbers

200+

Over 200 individual participants and counting

75+

More than 75 organisations represented

\$700,000

\$700,000 worth of funded projects

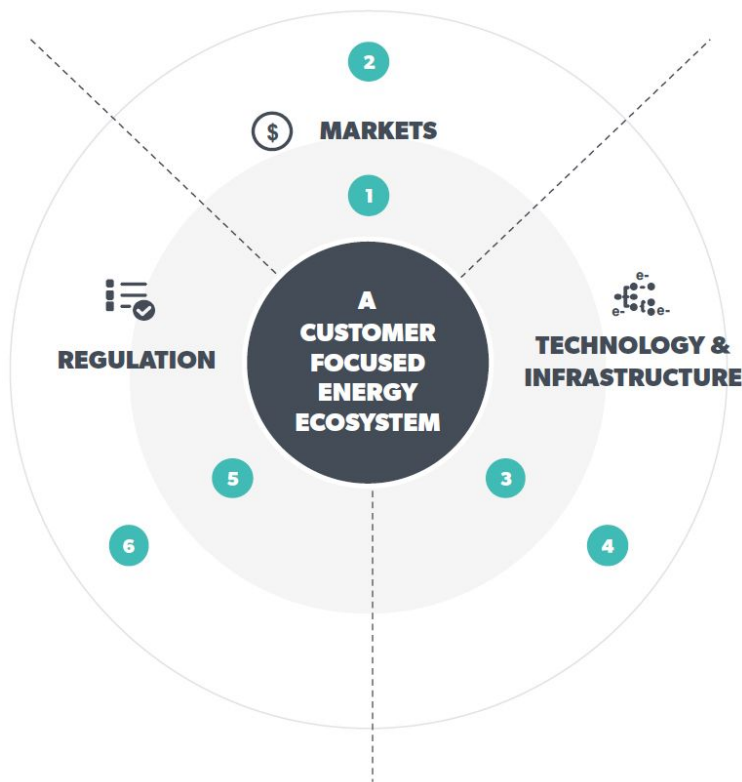
200+

200 new project ideas generated

Innovation frames

Rather than focus on the challenges of today, A-Lab has chosen to focus on where we could innovate to make a significant impact – these themes are the A-Lab innovation frames.

They are used to provide focus whilst being cognisant of the broader system and context. Innovation frames are a way to break the large and complex energy system into more manageable chunks, to enable A-Lab participants to work effectively on new innovations. They provide shape to the questions and activities needed to drive innovation to overcome the challenges.



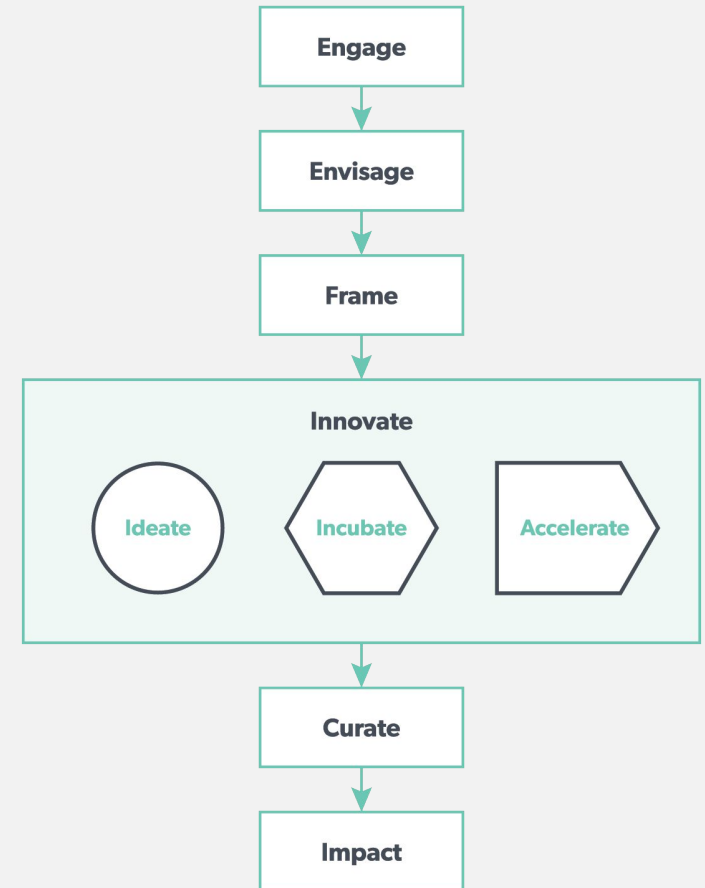
- 1 Show me the customer driven distributed energy market in action
- 2 The wholesale market is designed for renewable energy
- 3 Creating the internet of energy
- 4 Adapting the grid for a decarbonised future
- 5 A rule change framework to support innovation
- 6 Simple rules that encourage dynamic markets

A-Lab structured innovation process

To develop the A-Lab structured innovation process, we undertook extensive research to **engage** the electricity sector, brought together thought leaders to **envisage** a preferred future, and developed the concept of an innovation **frame** (previous page) to realise the future.

The **ideate** stage is used to generate ideas, concepts, and thoughts with the key purpose that these are generated by diverse people in the network, and could not be developed by any single participant alone. Ideas which generate enthusiasm and have potential for significant impact are explored and refined during the **incubate** phase. The goal at the end of this phase is to have an idea suitable for ARENA funding consideration. The **accelerate** stage is a collaborative, facilitated process intended to support and enhance large and multi-stakeholder projects and programs.

For each of the steps we need to ensure we **curate** the knowledge, insights and stories generated and share these with the broader sector and community. The final step is to measure the **impact** of A-Lab and update our future vision and innovation frames.





Designing a demand response initiative

Market need

Greater utilisation of demand flexibility is important to enable increasing penetration of variable wind and solar generation.

As uptake of renewables drives withdrawal of fossil fuel generators, it is critical that the NEM has adequate reserve capacity for extreme peak days that may coincide with low renewable energy output (high temperatures, low wind).

Why is ARENA interested?

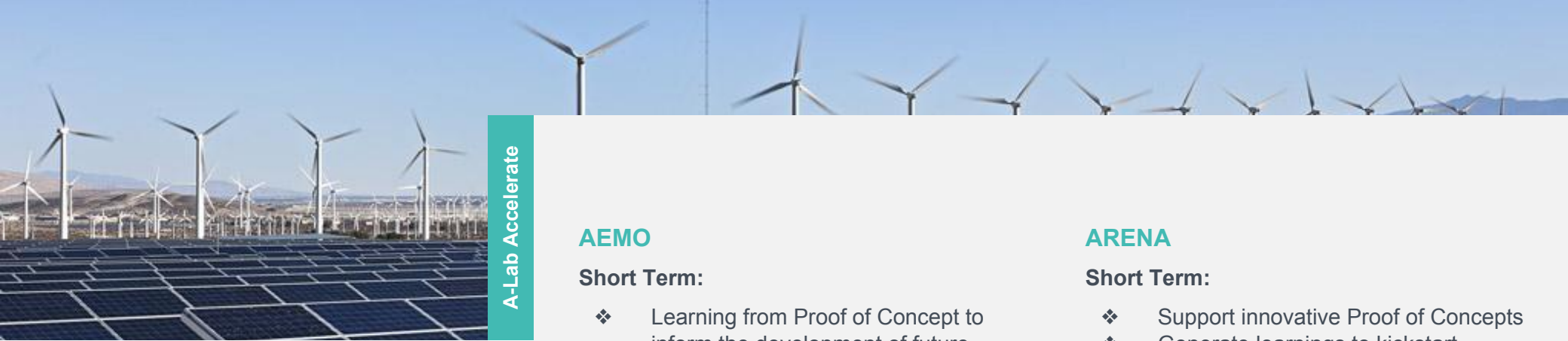
Exploring the potential for a demand response initiative is aligned with ARENA's investment priority to drive innovation in the delivery of a secure, reliable and renewable electricity system, specifically through helping develop and commercialise flexible capacity technologies (and associated business models) that can complement renewables.

Through this initiative, ARENA will seek to generate learnings in key areas, including:

- ❖ role of aggregators
- ❖ DR potential from: flexible loads (e.g. thermostats, air conditioners, pool pumps), storage, large C&I
- ❖ inform future market design
- ❖ price discovery
- ❖ impact of program parameters on quantum and price of DR

Further information on ARENA's investment priorities can be found [here](#).

Please note - all of the program design considerations outlined in this briefing pack are draft and are presented in order to stimulate discussion with participants in the A-Lab Accelerate workshop, and the broader market.



Objectives for the demand response initiative

AEMO

Short Term:

- ❖ Learning from Proof of Concept to inform the development of future market design
- ❖ Expanded tool-kit to support system reliability in light of regulatory changes to the RERT

Long Term:

- ❖ Established market design for emergency response reserves

ARENA

Short Term:

- ❖ Support innovative Proof of Concepts
- ❖ Generate learnings to kickstart market design process
- ❖ Demonstrate demand response's role in renewable energy integration

Long Term:

- ❖ Thriving market without ARENA support



Current framework

Reliability and Emergency Reserve Trader (RERT)

The Reliability and Emergency Reserve Trader is a function conferred on AEMO to manage reliability and power system security using reserve contracts.

Three approaches to procuring RERT:

- ❖ Long notice (> 10 weeks) - Open tender. AEMO can contract up to 9 months ahead of anticipated need
- ❖ Medium notice periods (1 to 10 weeks) - AEMO can either tender openly or seek offers from the RERT panel
- ❖ Short notice periods (3 hrs to 1 week) - AEMO seeks quotes from RERT Panel

What is the RERT Panel?

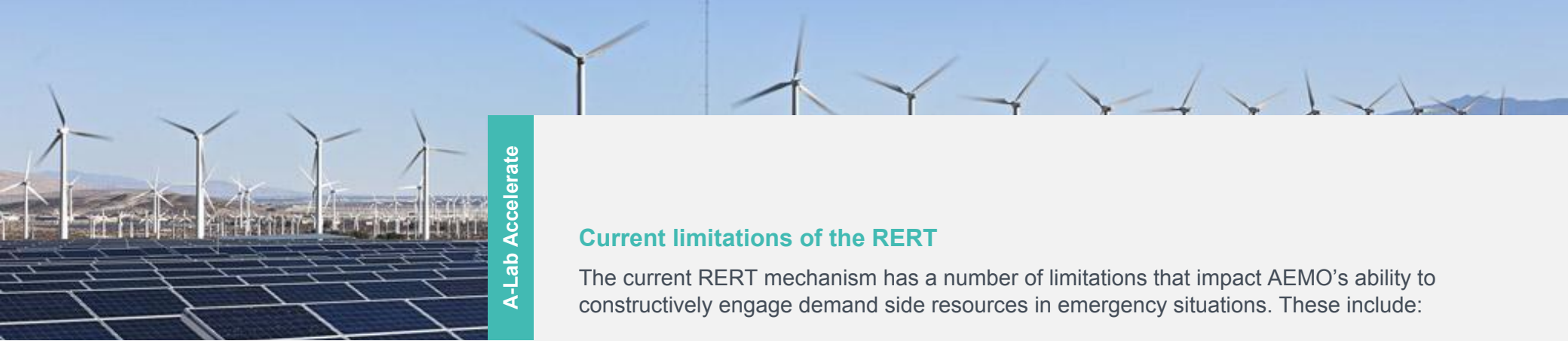
- ❖ Panel of providers for whom technical details is pre-agreed
- ❖ Able to run expedited tender in short / medium notice situations
- ❖ Makes use of defined contracts and standard bid / offer forms

Dispatch Trigger:

- ❖ Forecast reliability and security outside of a relevant NEM standard and no prospect of a market resolution
- ❖ Continuous assessment using various forecasting tools
- ❖ Reserve provided under RERT contracts must not be available to the market through any other arrangements

Further information available at:

- ❖ [Electricity guidelines and standards](#)
- ❖ [RERT Panel expressions of interest](#)



Limitations of current framework

Current limitations of the RERT

The current RERT mechanism has a number of limitations that impact AEMO's ability to constructively engage demand side resources in emergency situations. These include:

- ❖ RERT (Long, Medium and Short Notice RERT) cannot be triggered unless a specific, quantified reserve shortfall is forecast. RERT is unable to be accessed for unanticipated shortfalls.
- ❖ AEMO can only enter into reserve contracts up to 9 months prior to the reserve being required. From 1 November 2017, this period will be reduced to 10 weeks as Long Notice RERT will no longer be available. RERT is a year-by-year assessment and not an ongoing program.
- ❖ Short and Medium Notice RERT only allow AEMO to enter into contracts with very short lead times, limiting the scope of RERT providers and potentially leading to higher prices.
- ❖ Direct contracting, with range of bespoke products driven by bilateral negotiations results in limited price discovery. To date, RERT has incentivised limited demand side participation.



Demand response product parameters

Key parameters for discussion

We recognise that there is a trade off when designing a DR program with respect to maximising participation, minimising cost, and meeting the requirements of both the market and the customer. Below are the key discussion items that we will seek your input to help us design a proof of concept demonstration that balances these objectives.

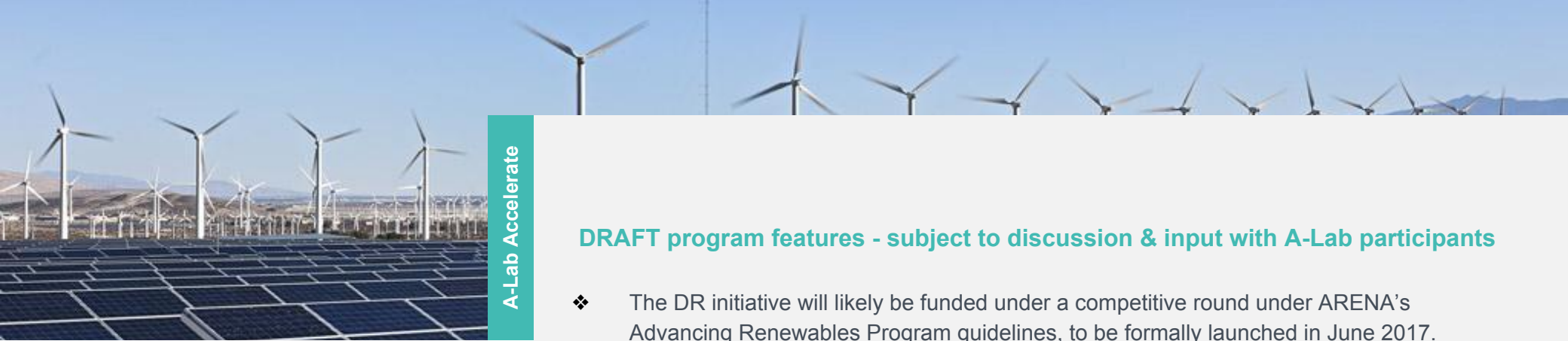
Program Life:	Single year	←————→	Multiple years
Locational requirement:	National	←————→	Regional
Event notification:	Minutes	←————→	Hours
Dispatch duration:	Min	←————→	Max
Dispatch trigger:	Defined	←————→	Undefined
Availability period:	Peak	←————→	24/7
Performance penalties:	Min	←————→	Max
Testing requirements:	Individual	←————→	Portfolio

Portfolio Guidelines:

- ❖ Innovative business models
- ❖ Portfolio diversity
- ❖ Allowable response type
- ❖ Regional preferences

Other Considerations:

- ❖ Real-time monitoring
- ❖ Software integration with AEMO NOC
- ❖ Knowledge Sharing requirements

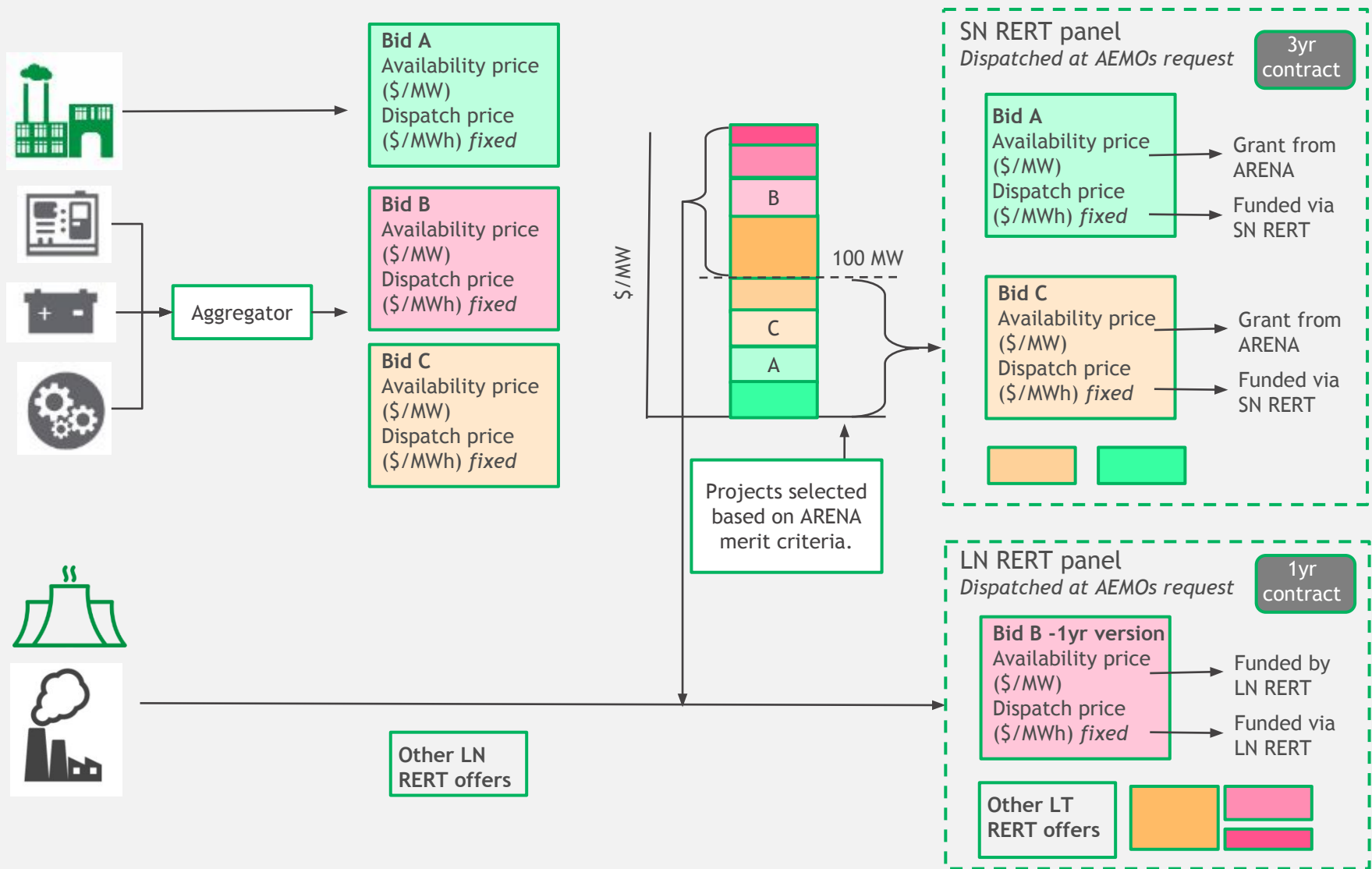


Demand response compensation structure

DRAFT program features - subject to discussion & input with A-Lab participants

- ❖ The DR initiative will likely be funded under a competitive round under ARENA's Advancing Renewables Program guidelines, to be formally launched in June 2017.
- ❖ Pay as bid, not pay as clear.
- ❖ ARENA will seek to demonstrate a range of innovative demand response approaches.
- ❖ ARENA and AEMO aim to demonstrate approximately 100 megawatts of demand response capacity can be trialled in an operational context to support system reliability in the upcoming summers.
- ❖ ARENA intends to provide grant funding to enable a range of energy users to become 'demand response' enabled, while compensation for dispatch (the available capacity being called) would be paid by AEMO under the existing short notice (SN) RERT procedures.
- ❖ Under ARENA's contracting arrangements, participants in this pilot program would be required to sign up to the SN RERT panel and be available to be dispatched by AEMO when required.
- ❖ The pilot projects chosen by ARENA through this initiative would aim to be deployed by summer 2017-2018.

How could demand response be compensated?





Some initial questions

Compensation structure

- ❖ What is the impact of fixing a usage price (\$/MWh) to be paid by AEMO through SN RERT, and allowing competition between participants on the enablement/availability grant amount paid by ARENA?
- ❖ Can both prices (enablement/availability and dispatch) be floating, or does this complicate competitive bidding?
- ❖ If a dispatch price is fixed, at what level should it be set?

Timeline

- ❖ Can applicants deliver full detailed applications within one month including merit criteria response, detailed project proposals, financial models, contract reviews, knowledge sharing compliance, risk registers etc.?
- ❖ How long will it take between being “invited to negotiate” and / or “ARENA Funding Agreement in place” to having the capacity available?

Allowable response

- ❖ Is there any existing DR options that ARENA should exclude e.g. diesel, response that is already available for any other market?

Application content

- ❖ ARENA requires a financial model from each applicant, which will need to include key assumptions, sensitivities, returns etc. Is there any items that should be included / excluded when taking this into consideration?

Questions? Please contact:

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