



Australian Government
Australian Renewable
Energy Agency

ARENA

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Energy Security Board

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ARENA - Consultation on Proposed Strategic Energy Plan Metrics

This submission provides information on projects funded by the Australian Renewable Energy Agency's (ARENA) as relevant to the Energy Security Board's (ESB) Consultation on Proposed Metrics. In particular, the submission is intended to inform the development of metrics for the innovation objective set out in the ESB's consultation paper.

About ARENA

ARENA was established to make renewable energy solutions more affordable and to increase the supply of renewable energy in Australia.

ARENA provides financial assistance to support innovation and the commercialisation of renewable energy and enabling technologies by helping to overcome technical and commercial barriers. A key part of ARENA's role is to collect, store and disseminate knowledge gained from the projects and activities it supports for use by the wider industry and Australia's energy market institutions.

How innovation can be supported in the energy sector

ARENA welcomes the objective of ensuring *innovation is incentivised and enables value from new technologies* and the supporting metric of *increased transparency of information and knowledge sharing from proof of concept trials*. This submission seeks to inform the ESB of the active trials ARENA is supporting which illustrate how innovation can be supported through active collaboration between market bodies and industry, and this may inform the further development of metrics in this area.

The three metrics proposed for innovation are appropriate, with the first two in particular relating to some significant likely areas of change in the electricity system, namely the need to deliver a secure system accommodating the physical characteristics of new entrant generation and storage technologies, and the likely continued growth of consumer-owned distributed energy resources.

More generally innovation, as a driver of productivity, has the potential to improve outcomes for consumers of energy over time helping to reframe and resolve problems as they currently present. It could therefore also be assessed through changes in (or reduced trade-offs between) other metrics, such as the ability of the energy system to deliver the 'trifecta' of affordable, reliable and low-emissions energy.

ARENA's experience illustrates that innovation in the energy sector can take years to translate from an idea through to implementation and benefit realisation. In the context of measuring the overall health of the energy system, it is therefore important to take a long term view and consider the processes that will foster ongoing innovation, rather than just considering the extent of innovation at a point in time.

To give a more concrete sense of the range of processes that could be employed (and measured) and how this could translate into improved outcomes, examples of initiatives ARENA is supporting are outlined below.

- **Wind farm provision of frequency control services** - ARENA provided funding to Neoen, which worked with AEMO and Siemens-Gamesa Australia to trial the provision of frequency control services at Hornsdale Wind Farm 2. The trial is now complete and has shown the technical potential for wind farms to provide six of the eight currently-defined frequency control services. A follow-on trial at Musselroe Wind Farm is expected to provide additional information on the remaining two services, as well as examine commercial aspects of participation in frequency control markets. AEMO has been able to draw on the trial to clarify how the market ancillary services specification applies to variable renewable generators, making it easier for wind farms and similar technologies to participate in these markets. Participation by variable renewable generators will increase the supply of frequency control services, and in particular will allow provision of these services at times when traditional generators may not be operating. This will contribute to electricity system security as the technology mix changes.
- **Emergency demand response trials** - In 2017 ARENA partnered with AEMO and the NSW Government to trial the use of innovative demand response solutions under the Short Notice Reliability and Emergency Reserve Trader (RERT) mechanism. This \$35.7 million program, now entering its second year, is aiming to provide 189 MW of new demand response capacity (up from 143 MW in year one) which is available to AEMO to manage potential supply shortfalls. Importantly, the trial is demonstrating the capacity of new forms of demand response, such as distribution network voltage control and small customer behavioural response, which had not previously been observed in Australia. The trials are demonstrating that these innovative approaches have potential to provide additional resources for AEMO to avoid the need for load shedding and reduce the costs of it maintaining an emergency reserve capability.
- **Wholesale market demand response** - The outcomes of the RERT trial are providing an evidence base to inform the wholesale market demand responses rule change processes currently underway, with detailed information on physical performance, cost and baseline performance. ARENA is currently working with AEMO and the AEMC to develop additional targeted trials to inform the design of a wholesale market demand response mechanism including in relation to market registration, scheduling and dispatch. These trials will help test key assumptions and policy design options thereby

accelerating and enhancing certainty in the decision about how best to encourage greater levels of demand response in wholesale electricity markets.

- **Short term forecasting** - ARENA has partnered with AEMO to trial the ability of semi-scheduled generators, including wind, solar and hybrid energy systems, to self-forecast their production to AEMO. This \$10 million initiative will commence in 2019 and will explore the ability of generator self-forecasting to reduce forecasting error and inefficient constraints on generation using innovative technology and services. This in turn will contribute to reduced wholesale market prices and emissions (by increasing renewable energy supply), reduced requirements for regulation FCAS and reduced causer-pays charges for generators.
- **Network hosting capacity** - ARENA will announce in Q1 2019 the projects to be funded under its network hosting capacity funding round, which will include studies and demonstration projects exploring how networks can be managed to enable higher penetration of distributed energy resources (DER) such as solar and battery storage while meeting the technical constraints of the distribution network. The funding round elicited a very strong response (72 applications) from industry including participation by most distribution network businesses. The initiative will explore innovative ways for networks to obtain real-time visibility of localised network constraints and communicate these to DER aggregators, who in turn can use this to optimise market participation of their DER portfolio while supporting system reliability and security.

Distributed Energy Integration Program (DEIP) is a further example of where ARENA is helping to support innovation and reform in the energy sector. DEIP is a collaboration of energy peak bodies, market authorities, industry associations and consumer associations aimed at maximising the value of customers' distributed resources for all energy users. A key element of DEIP is to facilitate demonstrations and research that will enable evidence-based learning to better integrate DER into Australia's energy market frameworks and operational processes. Early outcomes from DEIP include an industry-wide project stocktake and a functional analysis of a 'future state' power system including an identification of functional maturity gaps. This informs priorities for further studies and proof-of-concept demonstrations.

Many of these initiatives involve a combination of technology change, new approaches to engaging consumers, and business model innovation. In many areas, realisation of the potential benefits will depend on changes to regulatory arrangements or operational practices, and proof-of-concept projects are intended to inform this. ARENA therefore agrees with the ESB that information and knowledge from proof-of-concept trials should be shared, particularly where this will progress the industry as a whole. What ultimately matters, though, is that innovation leads to productivity improvements and therefore supports increased benefits for consumers of energy over time.

Please contact Jon Sibley, Principal Policy Advisor (jon.sibley@arena.gov.au) if you would like to discuss any aspect of ARENA's submission.

Yours sincerely

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