
Supporting proof-of-concept trials using a regulatory sandbox approach

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Submission to the AEMC's Consultation Paper on Regulatory
Sandbox Arrangements to Support Proof-of-Concept Trials

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1. Context

It is now widely accepted that the way electricity is produced and consumed is undergoing the most fundamental change since the system was first developed. In our role as the energy system and market operator, AEMO is witnessing, managing and embracing change in many of the areas of our future-focused and operational work. As new technologies proliferate, we are faced with unprecedented challenges and opportunities to design and operate energy systems in new ways to deliver the outcome of affordable, secure and reliable energy supply to consumers. Ensuring this outcome using new technologies and approaches necessitates new and innovative solutions. Often, these solutions were not contemplated by the current regulatory framework, meaning the rules can act as a hinderance to highly innovative market and/or technological solutions. Proof-of-concept trials are often a key step in the rollout of new technologies, demonstrating their potential to add value to the market while also identifying the magnitude of risks and costs associated with their implementation. AEMO is currently involved in the design and conduct of a number of such trials.

The importance of enabling innovation as part of the energy transition was emphasised by the Finkel review's *Blueprint for the Future of the National Electricity Market*. The Blueprint highlighted the difficulty in testing new concepts that are inconsistent with the current rules, in order to inform rule changes that will regulate those new models.¹ The Finkel panel recommended that the Australian Energy Market Commission (AEMC) "review and update the regulatory framework to facilitate proof-of-concept testing of innovative approaches and technologies".²

The AEMC is now consulting on the need for formal 'regulatory sandbox' arrangements in order to provide advice requested by the COAG Energy Council's Senior Committee of Officials (SCO).³ This submission responds to the AEMC's published Consultation Paper, *Regulatory Sandbox Arrangements to Support Proof-of-Concept Trials* (the Consultation Paper).⁴

2. The need for a regulatory sandbox⁵

It remains AEMO's experience that trials of the technical capability and performance of innovative technologies can generally be designed to fit within the current rules. However, it is often not possible to conduct meaningful 'in-market' trials within the current rules, even with the agreement of the Australian Energy Regulator (AER) to issue letters of no action (discussed below). In-market trials will generally be desirable where the demonstration and evaluation of a new service or business model is expected to provide value to the market, but the actual potential value and/or costs are not fully understood. In-market trials can provide essential data on market outcomes and can significantly aid the design of permanent regulatory arrangements, where appropriate.

The transformation of the energy sector will see further significant growth in consumer participation and distributed energy resources.⁶ Importantly in the current market environment, many such trials will involve small retail consumers. As new technologies and business models are developed and rolled out, the ability to conduct trials will be critical to understand the extent to which these customers are impacted in terms of both regulatory and market arrangements.

¹ Dr Alan Finkel (Chair), *Independent Review into the Future Security of the National Electricity Market: Blueprint for the Future*, June 2017, p 66. Available at: www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market

² Recommendation 2.8, p 66.

³ Letter from Mr Rob Heferen, SCO Chair, to the AEMC dated 24 October 2018.

⁴ AEMC, *Consultation Paper: Regulatory Sandbox Arrangements to Support Proof-of-Concept Trials*, December 2018, p. 1. Available at: www.aemc.gov.au/market-reviews-advice/electricity-network-economic-regulatory-framework-review-2019

⁵ This section responds to Question 6 in the Consultation Paper

⁶ AEMO, *Integrated System Plan*, July 2018, p 32. Available at: www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Integrated-System-Plan

An example of this type of trial, also referred to in SCO's request to the AEMC, is the aggregated demand response trial intended to commence in 2019. As outlined in the next section, AEMO has concluded that conducting trials that demonstrate new forms of consumer participation, such as aggregated demand response, require either the protection of a regulatory sandbox framework or specific rule changes for each trial. Accordingly, AEMO has reached the view that a regulatory sandbox framework is a necessary and important tool in efforts to manage the energy transition in the long-term interest of consumers.

3. Aggregated demand response – The inability to conduct ‘in market’ trials⁷

While demand response (where consumers reduce their consumption at certain times for agreed compensation) is not new, it is expected to play an increasing role in the future operation of the NEM. Since mid-2018, AEMO has been working with the AER, Australian Renewable Energy Agency (ARENA), AEMC and the South Australian (SA) Government to develop and facilitate an in-market trial of aggregated demand response from distributed energy resources (DER). The aim is to trial the participation (dispatch and settlement) of a demand response aggregator in the energy and Frequency Control Ancillary Services (FCAS) markets. Under the draft trial design, customers with DER would enter into a financial agreement with the demand response aggregator to reduce their consumption at certain times or would do so in response to a direct control signal. The demand response aggregator would receive the NEM spot price with performance measured against a calculated ‘baseline’ level of consumption set by what its customers would have used if not providing demand response. The trial is intended to commence in July 2019.

Having considered the implications of implementing this trial as designed, AEMO has concluded that the resulting inconsistencies with the current National Electricity Rules (NER) and National Electricity Law (NEL) are too significant for the trial to proceed unless authorised through changes to those instruments.

Implementing the draft trial arrangements would require significant departures from the current operation and administration of the NEM as contemplated in the NER, including by establishing a second participant (the demand response aggregator) in the spot market with a financial relationship at an individual connection point, and creating a different basis for settlement of that additional participant (i.e. the difference between the specified baseline and actual metered energy). The extent of these departures from existing market rules and regulatory constructs presents barriers to the implementation of the trial that, in AEMO's view, cannot be overcome within the existing regulatory framework. Implementing the draft trial arrangements will, therefore, only be possible if specific amendments are made to the NER authorising the arrangements necessary for this trial. Alternatively, the trial could be conducted within a new regulatory sandbox framework.

The two most significant barriers to an in-market trial of this nature can be described as follows:

- A trial that seeks to alter financial outcomes in the wholesale market, to the detriment of a party that is entitled to the outcomes subsequent to the NER, is susceptible to challenge unless all potentially impacted parties formally agree to the changed arrangements.
- While AEMO's statutory functions encompass the promotion of NEM development and operational or administrative improvements, AEMO is also required to operate the wholesale exchange in accordance with the NEL and NER. There is no clear authority for AEMO to conduct an in-market trial that is inconsistent by design.

⁷ This section responds to Questions 2 and 3 in the Consultation Paper.

3.1 AER 'No-Action' letters alone are insufficient⁸

The exercise of enforcement discretion by the AER, in the form of no action letters or similar, provides specific parties comfort that the AER will not take action for a specific and identifiable breach of the NEL or NER. Such assurances may be suitable for individual non-compliance of a technical nature but are unable to extend outside of the regulatory framework as it stands.

However, no action letters do not help manage risk where a trial has the potential to disadvantage or reduce a benefit for parties generally (especially those outside of the trial). No action letters cannot prevent other parties from commencing a dispute in relation to payment matters or initiating legal proceedings on grounds other than the rules breach they specify. Further, regarding AEMO the AER cannot authorise it to undertake a course of action that may not be within the scope of its functions. Accordingly, a reliance on letters of no action limits the scope of activities possible in an 'in-market' proof of concept trial to those already contemplated by the rules frameworks, including any flexibility conferred by the current rules.

It is also difficult to envisage that market participants would voluntarily agree to a trial model that involves them giving up a right they would otherwise be able to enforce under the Rules. However, even if all potentially impacted parties and the AER were to agree to a particular trial model varying the application of the rules, risks still remain. Depending on the nature and extent of a contractual arrangement that sits outside the regulatory framework, these risks could include:

- Residual third-party exposure where AEMO does not operate the market in accordance with the rules during the trial.
- For participants that are competitors, the potential for the trial agreement to infringe restrictive trade practices prohibitions under competition law.

4. AEMO initiatives to drive innovation

As previously stated, the fundamental transition of the energy system presents both the need and opportunity for the use of innovative technologies and market designs. AEMO makes extensive use of research and trials as a way to improve its understanding of new technologies and facilitate the development of the market in the long-term interest of consumers.

4.1 AEMO's strategic partnerships for research and innovation

AEMO collaborates with a number of key scientific and research bodies. These arrangements aim to better coordinate and facilitate the innovation and trials needed to manage the energy transition, with many of them leading to direct involvement in proof of concept trials.

4.1.1 ARENA

As the SCO Paper notes, AEMO has a memorandum of understanding (MOU) with ARENA. The MOU is intended to support a number of initiatives, including bringing "a specific focus to allow new and emerging technologies to be deployed into the market, e.g. 'proof of concept' projects" and "advanced grid management technologies", amongst others.⁹ The AEMO-ARENA MOU sets a framework for the development of a shared work program, including collaboration on specific shared projects, and establishes a role for AEMO to support ARENA in the design of programs and trials with the aim to maximise their benefits and the knowledge gathered in their execution. AEMO assists ARENA to assess the feasibility of integrating potential new technologies and services into the markets AEMO operates. In so doing, AEMO and ARENA have been able to collaborate to ensure ARENA-funded projects have the best chance of providing value to

⁸ This section responds to Question 5 in the Consultation Paper.

⁹ ARENA, *AEMO Memorandum of Understanding* (webpage), <https://arena.gov.au/about/aemo-memorandum-of-understanding/>

energy or ancillary service markets, therefore promoting the long-term interest of consumers and supporting the efficient investment of ARENA's funds.

AEMO and ARENA will be working closely with other stakeholders through the Distributed Energy Integration Program (DEIP).¹⁰ AEMO and ARENA are also collaborating to design trials in the DER space, including Virtual Power Plants (VPP) for example.

4.1.2 Bureau of Meteorology (BOM)

The Australian Government Minister for Energy, The Hon Angus Taylor MP, recently announced an agreement between the Government, AEMO and the BOM.¹¹ The primary aim of the collaboration is "the sharing of weather and climate data to better inform both short and longer-term decisions about the efficient management of the domestic energy industry",¹² including real-time operational decisions in AEMO's control rooms. The agreement also provides a framework for joint projects with BOM, in addition to weather observation services BOM provides to AEMO.

4.1.3 Commonwealth Scientific and Industrial Research Organisation (CSIRO)

AEMO established a strategic relationship with CSIRO in August 2018, facilitating deeper collaboration between the organisations to leverage their respective capabilities for projects of common interest. Likely areas for AEMO–CSIRO collaboration are expected to include forecasting, power system engineering and data analytics, amongst others. It is anticipated that these projects will involve development and trialling of new technology and applications.

4.2 Encouraging third parties to innovate

In 2017, AEMO established a dedicated internal Centre for Innovation to encourage, foster and facilitate innovation across the energy sector, particularly where a new technology or process may lead to increased market efficiency or improved system security. The Centre for Innovation is AEMO's 'front door' for businesses seeking to discuss an idea or project. AEMO can help to shape project concepts by explaining our market and system perspectives, outlining relevant policy and procedures, and discussing potential pathways for a new product or service to enter the market. In suitable cases, AEMO's relationship with strategic partners such as ARENA provides a vehicle for introduction and collaboration with innovators seeking to refine their project concepts. Where AEMO sees the need to encourage innovation in a specific area, the Centre for Innovation may also run workshops to stimulate discussion and generate ideas that develop opportunities for new technologies to better support the market, power system and/or advance the long-term interest of consumers.

One of the roles that the Centre for Innovation plays is similar role to the outreach function of the UK Office of Gas and Electricity Markets (Ofgem) innovation framework. The October 2018 publication, *Insights from running the regulatory sandbox* (the Ofgem Report), summarises learnings from seven regulatory sandboxes that had been approved in two rounds of that framework.¹³ Ofgem approved seven sandboxes in the two rounds. The Ofgem Report states that "Innovators commonly need advice" and that "innovators are focused on launching businesses, not trials".¹⁴ This is consistent with AEMO's own experience with third party innovators, who are often come forward in the early stages of development, well before a trial would be

¹⁰ DEIP reference. <https://arena.gov.au/where-we-invest/distributed-energy-integration-program/>

¹¹ See <http://energylive.aemo.com.au/News/BOM-partnership>

¹² Ibid

¹³ Ofgem, *Insights from running the regulatory sandbox*, October 2018. Available at: www.ofgem.gov.uk/publications-and-updates/insights-running-regulatory-sandbox

¹⁴ Insights 1 and 3, p 2-3.

conducted. Were a sandbox framework in place, AEMO anticipates that third parties would require significant support in scoping and developing sandbox trial proposals.

5. Design of the regulatory sandbox¹⁵

While the AEMC is currently considering whether there is the need for a regulatory sandbox framework, the Consultation Paper also asks what the key features of a regulatory sandbox framework should be. The Consultation Paper further states that “if a clear need for formal regulatory sandbox arrangements is identified ... more detailed consultation and consideration on the design of a sandbox will be undertaken”.¹⁶ Accordingly, AEMO provides the following commentary on the desirable features of a regulatory sandbox that should be fully considered in the AEMC’s work:

1. The arrangements or rules resulting from the AEMC’s work should establish a framework (or ‘building code’) for regulatory sandboxes, with each trial undertaken in its own regulatory sandbox (i.e., containing the related specific exemptions and parameters).
2. The AEMC’s proposed objective for the sandbox, “to facilitate further proof of concept trials in the NEM”, risks constraining trials to those that are technical in nature. A trial of new forms of market participation is less about proving that a concept can work and more about collecting data on consumer behaviour and market outcomes. These types of trials would see great benefit from being conducted within a regulatory sandbox.
3. Individual sandboxes should be limited in both time and scale. Running trials on a small scale is an effective risk-management tool when new approaches and technologies are being tested ‘in market’. Limiting the time of any sandbox will ensure that the framework cannot be used as an enduring form of regulatory change.
4. Proposals for a regulatory sandbox should be assessed against publicly available criteria and the reasons for decision also published. At this stage, AEMO’s view is that the AER would be the most appropriate body to approve regulatory sandboxes, given their extensive expertise in assessing plans and proposals in energy markets. A high-level of transparency inspires confidence in decision making and also helps address the scenario in the Consultation Paper of how a choice could be made between two similar proposals received at the same time.
5. AEMO has an important role to play in both the scoping and approval of applications for regulatory sandboxes. AEMO would provide advice about whether a proposal will help address an existing need or is likely to negatively impact other areas of power system and market operation. The AEMC should consider whether it is appropriate for advice from AEMO to form a binding part of the parameters of the trial (this may depend on the nature of the trial and/or may be at the discretion of the AER or final decision maker otherwise).
6. AEMO favours a high degree of engagement between proponents of sandbox trials and NEM market bodies when trials are being considered and designed.
7. The sandbox framework must also include strong and blanket consumer protection measures. This could take the form of a “no-worse off” provision for consumers who agree to be part of in-market trials.
8. As well as providing scope for exemptions from requirements in the Rules, the sandbox framework will also need to have scope to accommodate new concepts. For example, a sandbox for the demand response aggregator trial currently being explored would need scope to create a number of things for which there is currently no provision in the rules, including: the calculation of the baseline energy;

¹⁵ This section responds to Questions 7 and 4(c) in the Consultation Paper.

¹⁶ Ibid p20

settlement of the aggregated demand response in relation to the baseline; and, a demand response interval.

9. The Ofgem Report states that start-up sandbox applicants were looking to use the process to signal low risk to investors and secure funding. These proponents were “looking for Ofgem to review their business idea and confirm that it faced no regulatory issues”.¹⁷ The implications of proponents seeking to use a NEM sandbox in the same way should be considered and managed at the design stage.

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¹⁷ Insight 4, p 3.