



COAG
Energy Council

Senior Committee
of Officials

Mr John Pierce
Chair
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235


Dear Mr Pierce

I write in relation to recommendation 2.8 of the Independent Review into the Future Security of the National Electricity Market (Finkel Review) that: *“By end-2018 the Australian Energy Market Commission should review and update the regulatory framework to facilitate proof-of-concept testing of innovative approaches and technologies.”*

As you are aware, Ministers accepted this and other recommendations of the Finkel Review. A working group of Commonwealth and state officials has considered the case for introducing a regulatory sandbox and options for progressing implementation of the recommendation. Based on the outcomes of this work, the Senior Committee of Officials (SCO) believes there is merit in looking at a more formal and systematic approach to supporting experimentation within the regulatory framework where there are potential for benefits to energy consumers.

The attached paper provides the working group’s assessment following consultation with key stakeholders. It acknowledges that market bodies have sought to facilitate trials under the existing regulatory framework, but argues that this framework may not be sufficiently flexible to allow the testing of some technologies and business models that could offer benefits to customers. For example, it would be useful to be able to perform in-market trials of wholesale demand response to inform the current rule change process. A regulatory sandbox could also help to test a range of distributed energy technologies and business models, to inform the Distributed Energy Integration Program.

In August 2016, the Energy Council used its powers under section 41 of the National Electricity Law (NEL), to direct the Australian Energy Market Commission to monitor and report annually on whether the electricity network economic regulatory framework is sufficiently flexible and robust to continue to achieve the National Electricity Objective.

In its 2018 annual review of the economic regulatory framework the AEMC stated that, as part of the 2019 annual review, it will consult and advise on whether there is a need to implement more formal regulatory sandbox arrangements.

As part of this work, SCO requests the AEMC to provide interim advice by February 2019 on how to best facilitate co-ordination of proof-of-concept trials and the need for formal regulatory sandbox arrangements to support innovative projects offering benefits to customers while managing any risks. This advice should consider whether existing or proposed projects could be used as a sandbox trial.

Noting that the attached paper highlights the importance of better co-ordinating the efforts of market bodies and the Australian Renewable Energy Agency (ARENA), SCO requests that AEMC engage closely with the Australian Energy Regulator, Australian Energy Markets Operator, Energy Consumers Australia and ARENA as part of this work.

SCO also notes that issues for innovative projects and reforms extend beyond economic regulation, and requests that this work also consider the need for regulatory sandbox arrangements in other parts of the national electricity framework, for example relating to consumer protections.

Yours sincerely



Mr Rob Heferen

Chair

COAG Energy Council Senior Committee of Officials

24 October 18

REGULATORY SANDBOX TO SUPPORT PROOF-OF-CONCEPT INNOVATION

Background

Innovative technologies can help reduce the costs of providing reliable and secure electricity supply, contribute to reducing emissions and deliver better consumer outcomes. It is therefore important to ensure that the energy market encourages this innovation, and market frameworks and processes are aligned to support emerging technologies and the ability to test them. Technology innovation may also require regulation to adapt, which may itself require trialling prior to introduction.

The Independent Review into the Future Security of the National Electricity Market (Finkel Review) highlighted that new concepts which are inconsistent with the National Electricity Rules must be proven to the point where a rule change can be made prior to it being used in the National Electricity Market (NEM). The review noted that Formal proof-of-concept provisions in the Rules would help and recommended that: *“By end-2018 the Australian Energy Market Commission should review and update the regulatory framework to facilitate proof-of-concept testing of innovative approaches and technologies.”*

In its update on implementation of the Finkel Review recommendations in *The Health of the National Electricity Market 2017 Annual Report*, the Energy Security Board did not consider changes to the existing framework for managing proof-of-concept trials are required at this stage, noting “AER considers each proposal on a case by case basis and can issue a letter of no action to allow proof-of-concept testing”.¹ However, stakeholders have continued to raise this issue in other review processes, and in their 2018 annual review of Economic Regulatory Frameworks the AEMC stated that it will seek feedback from stakeholders on these issues and consider them as part of the 2019 Economic Regulatory Frameworks Review.²

In February 2018, the Energy Market Transformation Project Team (EMTPT) agreed that the Commonwealth and other interested jurisdictions³ would undertake further research and consultation on the case for introducing a regulatory sandbox and options for next steps to progress implementation of the Finkel recommendation.

This consultation involved the market institutions, ARENA, the Australian Securities and Investments Commission (ASIC), representative industry participants from network business, incumbent and new entrant providers, and consumer representatives. As consideration of the concept is still in early stages, consultation with market institutions was undertaken on an unofficial basis.

The purpose of this paper is to summarise for the Senior Committee of Officials (SCO) the key issues identified in consultation undertaken so far and provide options for next steps if SCO considers further work is warranted.

What is it?

Broadly, a regulatory sandbox is a controlled ‘light touch’ regulatory environment in which participants can experiment with new ideas. This allows innovators to trial business propositions without meeting all of the usual regulatory requirements.

¹ Energy Security Board (2017) *The Health of the National Electricity Market 2017 Annual Report*, p53.

² The AEMC report states that their current view is existing powers can be used to enable regulatory sandboxes and other forms of innovation. However, they are interested in stakeholders’ view on the need for any more formal regulatory sandbox for the NEM. p109 AEMC (2018) *Electricity network economic regulatory framework review*

³ Victoria, Queensland and New South Wales have participated in the consultation process.

Other sectors in Australia, such as financial services, have introduced regulatory sandboxes to their frameworks to facilitate innovation. The UK energy market regulator, Ofgem, has also introduced a regulatory sandbox which includes a regulatory advice service and a framework for conducting time limited trials.⁴ Singapore Energy Market Authority has a similar scheme.⁵

These initiatives recognise the challenges of working out how some innovative businesses fit into the regulatory framework, help make regulators aware of rules that needs updating, and enable trials to take place to inform market reforms.

Most stakeholders took a broad view of what could be tested in a NEM sandbox to include both new technologies and business models, and also new regulatory approaches or market design. Stakeholders also saw potential application of a regulatory sandbox across a number of areas including network regulation, wholesale markets and retail.

ARENA considered that a range of tools could exist within the concept of a regulatory sandbox to support different outcomes in different circumstances. This could involve a more co-ordinated approach that includes regulatory exemptions and/or a wide range of complementary activities including technical advice, industry capacity building or funding.

Other areas of potential application are provided at **Attachment A**.

What happens now?

Currently, the AER can issue 'no action' letters to indicate they will not enforce requirements in the rules to allow proof-of-concept trials in the NEM. The AER also has the ability to provide a range of exemptions and waivers (including under its Network Exemption Guidelines, Retail Exemption Guidelines and Ring-fencing Guideline), and is able to provide individual exemptions if existing guidelines do not cover the situation.

Proponents of innovative projects raised concerns that 'no action' letters do not provide protection from third party legal action, must be specific, limit flexibility, and are opaque for the market, which creates investment and regulatory risk. AER officials largely agreed that no action letters are opaque and risky. AER officials are also concerned that a 'no further action' approach provides band-aid solutions to regulatory problems, and if anything, can perpetuate or mask them. AER noted that in some cases, the lack of certainty (real or perceived) offered by a no action agreement discourages parties from proceeding.

In its 2018 Economic Regulatory Frameworks Review, the AEMC noted that technological change and innovation are transforming the electricity sector faster than in the past and there may be merit in applying a regulatory sandbox. The AEMC noted that trials and other forms of regulatory innovation can be facilitated by the AER exercising its enforcement discretion, including though no action letters, but that it is interested in stakeholders' views on the need for a more formal regulatory sandbox for the NEM.

In the early part of 2018, AEMO thought there would be adequate flexibility within the existing framework to allow the operation of new technologies. For example, time-limited in-market trial projects could be undertaken using existing registration categories in conjunction with notices of no action from AER. AEMO noted however that their approach to date had been to look for less contentious features to test (e.g. using 'small generation' from batteries to increase available reserves during peak demand, rather than reducing demand via some (non-rules based) demand response program).

⁴ At <https://www.ofgem.gov.uk/about-us/how-we-engage/innovation-link>

⁵ At <https://www.ema.gov.sg/Sandbox.aspx>

ARENA and AEMO have a memorandum of understanding (MOU), which facilitates priority projects for trialling. They are working with the AER and AEMC to support trial projects such as Virtual Power Plants, which will test the bounds of the 'no-action' approach.

AEMO also conducts a range of advisory and outreach activities through its Centre for Innovation to help new providers understand and meet requirements to participate in the market, although this can be onerous for AEMO.

The AER is also testing a new approach to electricity network regulation, called NewReg, in collaboration with Energy Consumers Australia (ECA) and Energy Networks Australia via a trial with Victorian distribution network AusNet Services. In the trial, AusNet will seek to reach agreement on its revenue proposal with a representative customer forum before it is submitted to the AER. The trial is operating within the existing regulatory framework and once the revenue proposal is submitted, the AER will still make a determination under the rules. As part of the trial, the parties and a steering group that includes the AEMC are also assessing whether there are any regulatory barriers to increased agreement on proposals between networks and consumers and whether any rule changes should be recommended.

In addition, there are work streams underway to make existing regulatory arrangements suitable for new technologies and services. For example, AEMO is developing guidelines for distributed energy resource provision of ancillary services. AEMO can do this because updates to the market ancillary services specification is within its control.

Is there a need?

Some stakeholders argued a sandbox initiative may help cut through a range of barriers that prevent new products and services coming to market to achieve better consumer outcomes. The complexity of the electricity system and the underpinning regulatory framework appears to be one of the key barriers with innovators pointing at the regulatory culture and cost of complying. This potentially links to another Finkel recommendation (rec 7.7) that *'the AEMC, or alternatively the Energy Security Board or other suitable body, complete by end-2020 a comprehensive review of the National Electricity Rules with a view to streamlining them in light of changing technologies and conditions.'*

ASIC's Innovation Hub to address fintech sector developments was partly a response to challenges faced by start-ups, such as lack of experience with the regulatory framework, limited resources, etc., but is also a way of recognising that innovative products and services often do not fit within existing rules and policy. As with Ofgem's Innovation Link, this service helps the regulator understand emerging trends in the sector and identify areas in which regulation may need to adapt to sustain innovation. Both initiatives emphasise the need to maintain provision of important protections for consumers.

AEMO has advised that with further first-hand experience developing some of the in-market trials, and the prospect of future more involved trials, a robust regulatory sandbox would facilitate such development. This would include clear principles, processes and decision making responsibilities.

Several stakeholders, particularly those involved in network services, saw merit in enabling the trialling of innovative regulatory approaches prior to actual rules being set in stone, particularly for major reforms, such as introducing an 'off-grid' regulatory framework or introducing new market mechanisms. This could help to iron out potential problems with rules before they are adopted across the market. Stakeholders argued regulatory reforms could benefit by better understanding the potential contribution of emerging technologies and business models and how their benefits and risks can be best managed.

At a high level, some incumbent and new providers argued the scale of the transformation of the energy sector and system-wide impacts, means incremental change, in some areas, is insufficient. Australia in particular is a world leader in distributed energy with a significant amount of behind-the-meter PV and increasing battery deployment. The growth in distributed generation is a major departure from the original design of the system, requiring new technologies and services that transcend the historic market structures.

In their joint submission to the AEMC's Reliability Frameworks Review, ARENA and AEMO have foreshadowed a new industry-wide distributed energy program, which will seek to prioritise proof-of-concept demonstrations and regulatory reforms and achieve better coordination of efforts from the market bodies and industry.

We believe AEMO and AEMC are considering trialling this concept with the AER using Virtual Power Plants as an example, to demonstrate how small-scale batteries could provide scheduled wholesale market and Frequency Control Ancillary Services (FCAS) services⁶: This might involve:

- A Distributed Energy Resource (DER) aggregator being provided with a regulatory exemption by the AER or AEMO to test how they could offer services to the market from small-scale batteries.
- Funding to help the proponent meet prudential requirements or to otherwise de-risk the service for participating customers, for example where a customer becomes spot exposed.
- Specialist advice to help shape the services to meet or work around regulatory obligations.
- A Rule Change may be required to provide more flexibility for the AER or AEMO to provide exemptions to support a trial.
- AEMO or other parties may need to change their procedures or IT systems to accept bids from an aggregator.
- Insights from the trial could be used to design specific rule changes to better facilitate these types of services in the future.

ARENA, AEMO and the AEMC, in consultation with ECA are also developing a Distributed Energy Integration Plan, in conjunction with a range of other stakeholders. The purpose of this plan is to coordinate the work of various parties in relation to distributed energy projects, including numerous trials that are currently taking place or are proposed.

This indicates there is coordination occurring in some areas, which could provide a model for broader cooperation in other areas of market transition.

A more formal approach to proof-of-concept testing appears to offer a range of benefits including:

- providing a better linkage between innovation and broader policy objectives, including consumer benefits and outcomes
- providing a better framework to prioritise projects, consider when market bodies should allocate time and resources to an innovative project and what types of projects should be supported, and

⁶ AEMO feedback

- addressing potential opportunities, impacts and risks (e.g. impacts on customers, impacts on infrastructure, benefits for consumers etc).

How would it work?

If a regulatory sandbox were to proceed, a key consideration is deciding how suitable trial projects could be identified – an arms-length, reactive approach with broad Expression of Interests (EOIs) versus a more supervised or coordinated process targeting particular priorities.

Both the Ofgem and ASIC regulatory sandboxes were designed for proponents to bring innovative ideas to the regulator. Ofgem's Innovation Link is a 'one stop shop' offering support on energy regulation to businesses looking to introduce innovative or significantly different propositions to the energy sector. In many cases, these are technology start-ups not familiar with energy market regulations. A key service provided is clarifying what they want to do and whether it can be done within the regulatory framework ('fast, frank feedback'). The fast, frank feedback service helps most innovators find a way to go ahead within the current regulation.

Ofgem can also look at granting a sandbox to enable a trial if it could benefit consumers and depending upon agreeing the regulatory arrangements for the duration of the trial, including protection for consumers and in some cases agreement with third parties. So far, three projects have been granted a regulatory sandbox (two exploring peer-to-peer energy trading and the other offering an innovative tariff), though others are being considered. Ofgem's approach is therefore not so much a separate regulatory environment, but an offer of more intensive help through regulatory processes and possible exemptions if needed. This is something like what we have now, but more coordinated and focussed.

ASIC suggested a similar experience assisting fintech start-ups to navigate their regulatory framework. They outlined the significant resourcing required for staff to work with potential applicants, which includes providing access to senior people to streamline processes, offering informal guidance to help bridge any knowledge and resourcing gaps, and helping entrepreneurs expand into other jurisdictions.

Some stakeholders supported allowing any proponent to apply to access a NEM regulatory sandbox on the basis that we don't know what new products and services could benefit consumers and a broad scope would encourage the market to bring ideas forward.

Most stakeholders pointed out a broad EOI approach would need a process to review, filter and prioritise potential initiatives so as to understand the nature of the barrier or opportunity being presented, whether it is real or just perceived and whether the barrier is regulatory or otherwise. This could require dedicated resources, supported by specialist regulatory expertise, to administer the process.

In this regard, Singapore Energy Market Authority has developed evaluation criteria to assess applications for sandbox trials. This includes whether the project:

- uses technologies/ products in an innovative way
- addresses a problem or brings benefits to consumers and/or the power sector
- has clearly defined test scenarios and outcomes
- has defined boundary conditions, monitoring and evaluation procedures
- assesses and mitigates foreseeable risks

- has a defined exit and/or transition strategy⁷

AER officials saw the need for a more formal prioritisation process as trials are likely to be resource intensive and it is important proponents do not use the sandbox as a way of avoiding regulation. Also, some proposals would not lend themselves to trials, for example if they involved the creation of infrastructure – like an embedded network – which are costly to undo, if the trial does not succeed. ARENA is also leaning toward this sort of approach to get more ‘bang for the buck’. Under this model a problem or issue is identified, and third parties are invited to submit proposals (e.g. ARENA’s recent short term forecasting trial for large-scale solar and wind).

Other issues identified by stakeholders included:

- Ensuring consumers retain equivalent protections, and/or provide clear informed consent where exemptions from customer protections are granted. ECA suggested a ‘not worse off’ approach.
- Ensuring co-ordination between market bodies, for example in overseeing a sandbox initiative, identifying priority areas, or more broadly in bringing market bodies together to ensure trials more effectively target future needs and inform rule-making processes.
- Securing a funding source. This could include contributions from ARENA if this was determined by ARENA’s Board to be aligned with its renewable energy innovation and commercialisation remit. It could also consider the role of programs like the Demand Management Innovation Allowance or other government grant programs (e.g. current initiatives around VPPs) to support appropriate trials.

Benefits of a regulatory sandbox

AER can issue ‘no action’ letters, but these can represent opaque, ‘band-aid’ solutions, and third party liability remains a risk.



A dedicated sandbox could shift risk from the AER and proponents, and provide greater transparency for other market participants.

AEMO uses flexibility within the frameworks to facilitate start-ups and new entrants where possible



A sandbox could better target support for proponents in priority areas, enable other potential barriers (financial, technical etc) to be addressed together, and feed into future reforms

Some cooperation between AEMO, AER, AEMC and ARENA



Under a sandbox, there could be a clearer co-ordinating framework for market bodies, ARENA and other stakeholders to identify priority areas

⁷ At <https://www.ema.gov.sg/Sandbox.aspx>

Conclusion

EMTPT notes the existing ways AEMO, AEMC, AER and ARENA have been working together to support proof-of-concept trials within the existing regulatory framework, and acknowledges that this appears to be adequate to deal with current demand.

EMTPT however, sees merit in a more structured process to facilitate experimentation within the regulatory settings as a tool that could support major future reforms. This appears to be particularly relevant where there would be benefit in testing significant changes to regulatory models prior to rules being finalised. A framework for coordination would enable knowledge gaps and priorities to be defined at an industry level, rather than just from a particular stakeholder viewpoint. It would also enable energy market bodies to identify key priorities, and develop trials which address particular problems or help define the design of reforms.

However, timing appears to be a major concern for some stakeholders. In the short term, it may not be desirable to undertake another large review while other work and major reviews are underway (e.g. stand-alone power systems). This could divert resources and industry attention away from these high priority reforms. It is therefore not proposed to immediately task the AEMC to undertake a specific new review on this issue.

EMTPT suggests a better approach would be to undertake further work on designing a regulatory sandbox initiative, coordinated across all market bodies, as a pilot to support future reforms with a specific and limited project scope.

- Some of the trial projects AEMO and ARENA are managing (e.g. AEMO's VPP trial) and the proposed Distributed Energy Integration Plan being established by ARENA, AEMO, the AEMC, ECA and other bodies could potentially be used as the basis for a pilot, and/or
- The pilot design could make use of ARENA's A-Lab initiative to ensure collaboration and buy in from all relevant stakeholders.
 - o The proposed Distributed Energy Integration Plan utilises this approach. (A list of other example projects is at **Attachment A**), and/or
- As part of its 2018 Economic Regulatory Framework Review, the AEMC committed to consulting and advising on whether there is a need to implement more formal regulatory sandbox arrangements as part of its 2019 Economic Regulatory Framework Review. The 2019 report is due by 30 June 2019, but the AEMC intends to publish interim reports on specific issues prior to that date. As part of that review, the AEMC could be requested to provide advice on a more co-ordinated framework for trials and the need for more formalised regulatory sandbox arrangements.

EXAMPLE PILOT PROJECTS

Short-term forecasting trial

ARENA is currently working with AEMO and industry to facilitate improved short-term (5 minute pre-dispatch) forecasting for variable renewable energy generators. By allowing wind and solar farms to submit their own forecasts, AEMO can reduce forecasting error (and requirements for regulation FCAS), increase the participation of these resources and reduce need for higher cost resources to be dispatched. This trial has required AEMO to develop a new IT interface and procedures as well as funding from ARENA to encourage generators to opt-in to the trial. Outcomes can inform new requirements for semi-scheduled or unscheduled generators which in turn will drive innovation in generator design and operation, supporting system reliability and security while reducing wholesale prices. No specific regulatory exemptions have been identified at this stage of the trial.

Incentives for rapid frequency response

The AEMC's Frequency Control Frameworks Review has identified the need to incentivise alternative technologies to support primary frequency control as synchronous generation is withdrawn from the market. A project could be designed to simulate a new very fast frequency (sub-second) control market to test the capability of batteries and demand response to provide very fast frequency response in light of real-world technology limitations and commercial trade-offs. Depending on the design of the trial, exemptions could be required to facilitate market settlement and funding, or alternately a 'shadow market' could be used funded by a third party such as ARENA. Importantly, such a trial could benefit from the input from all market bodies to ensure the information generated matches their respective needs. ARENA notes that section 7.3 of AEMO's Market Ancillary Services Specification (Version 5) provides that "AEMO, at its absolute discretion, may allow an Ancillary Service Facility to participate in a trial to test the performance of new technologies".

Dynamic network tariffs for large-scale batteries

Investments in large-scale batteries in Australia are exposing limitations in the network pricing for flexible loads. Network charges for large-scale storage units do not generally provide an incentive to efficiently support local network outcomes. For example, large-scale storage units get charged the same regardless of immediate network capacity constraints providing a flat incentive for the battery regardless of whether the battery generation/load is having a detrimental or beneficial effect on the network (e.g. in relation to voltage/thermal constraints). In order to assess alternative approaches, the network provider may need to develop alternative tariff structures for expedited (and/or sunsetted) approval by the AER. Outcomes could include input into revised network pricing principles, the process for trialling innovative tariffs and broader reforms seeking to support the co-optimisation of energy storage for reliability, security and network outcomes including network access regimes.

Wholesale market access by DER

Bloomberg New Energy Finance has forecast 2.7 million behind the meter solar-battery systems could be installed by 2030. Based on an average sustained peak output of 5kW, this could represent over 13GW of dispatchable generation/load and nearly 40% of historic NEM peak demand. These resources are generally not able to access spot prices and therefore are insensitive to short term supply demand imbalances in the market. While electricity retailers (registered market participants) are able to pass through spot market value for demand response services, they generally only offer this as a service to large-industrial customers.

This presents significant barriers to DER providers/aggregators recruiting customers and leaves significant potential value untapped. A trial could be constructed to either allow aggregators to receive spot value or simulate this participation with third-party funding. Such a trial could inform the development of a demand response mechanism or other market reforms. Depending on the outcomes sought and trial design, AER exemptions and/or AEMO procedure or IT system changes could also be required.

