The Australia Institute
Research that matters.

Post 2025 Market Design Consultation Paper Submission

Australia's electricity sector is being revolutionised by the rise of renewable energy and storage but the market framework holds back these innovative technologies. A redesign of the NEM should increase clean energy competition and facilitate coal retirements.

Dan Cass

October 2020

ABOUT THE AUSTRALIA INSTITUTE

The Australia Institute is an independent public policy think tank based in Canberra. It is funded by donations from philanthropic trusts and individuals and commissioned research. We barrack for ideas, not political parties or candidates. Since its launch in 1994, the Institute has carried out highly influential research on a broad range of economic, social and environmental issues.

OUR PHILOSOPHY

As we begin the 21st century, new dilemmas confront our society and our planet. Unprecedented levels of consumption co-exist with extreme poverty. Through new technology we are more connected than we have ever been, yet civic engagement is declining. Environmental neglect continues despite heightened ecological awareness. A better balance is urgently needed.

The Australia Institute's directors, staff and supporters represent a broad range of views and priorities. What unites us is a belief that through a combination of research and creativity we can promote new solutions and ways of thinking.

OUR PURPOSE – 'RESEARCH THAT MATTERS'

The Institute publishes research that contributes to a more just, sustainable and peaceful society. Our goal is to gather, interpret and communicate evidence in order to both diagnose the problems we face and propose new solutions to tackle them.

The Institute is wholly independent and not affiliated with any other organisation. Donations to its Research Fund are tax deductible for the donor. Anyone wishing to donate can do so via the website at https://www.tai.org.au or by calling the Institute on 02 6130 0530. Our secure and user-friendly website allows donors to make either one-off or regular monthly donations and we encourage everyone who can to donate in this way as it assists our research in the most significant manner.

Level 1, Endeavour House, 1 Franklin St
Canberra, ACT 2601
Tel: (02) 61300530
Email: mail@tai.org.au
Website: www.tai.org.au
ISSN: 1836-9014

Contents

Introduction

The electricity industry in Australia is going through a rapid transition from fossil fuels to clean energy. Renewable energy and batteries are held back from delivering reliable energy, by an outdated system of rules and markets. In October 2018 the old COAG Energy Council 'asked the ESB to provide advice on a long term, fit-for-purpose market framework to support reliability that could apply from the mid 2020's (sic)'.[1]

In this submission to the ESB's Post-2025 Market Design project (P2025) The Australia Institute supports the work done by the ESB and a number of the options raised in the September 2020 *Consultation Paper*. In our assessment some reforms are intended to change the structure of the wholesale markets and some will modernise other elements of the regulatory system. It is hoped that all these changes will be integrated, providing a holistic step change, all based on common principles.

The ESB has raised several options for new market designs that would provide for operational reserves and essential security services. As is any complex policy area, any particular type electricity market scheme can be designed well or badly.

The key question is whether a new market will be effective in stimulating new infrastructure that suppies energy or services and facilitates the retirement of ageing thermal generators. This new infrastructure should include generation (almost exclusively from renewable energy), storage and demand-side resources such as aggregated demand response.

The big risk is that reform will lead to a capacity market that entrenches ageing coal generators, which has happened in other countries that go down the capacity market path.

There are currently numerous barriers to renewable energy in the NEM. We support the ESB's work to remove regulatory obstacles and allow renewables and enabling technologies such as batteries and demand response to compete fully against fossil fuels.

One of the most complex aspects of the transition will be the integration of millions of consumer devices including batteries and rooftop solar into the physical system and the wholesale energy and other markets. The ESB's staged approach to DER integration and the two-sided market makes sense, as long as the implementation process keeps up with consumer demand and is open and adapts to technological innovations and new business models as they emerge.

[1] COAG Energy Council (2018) *20th COAG Energy Council Communique*, p.1.

We will also raise a second set of governance and policy issues that were not explicitly posed in the *Consultation Paper*. Governments have large electricity sector investments already and continue to drive or make direct investments. Government investment and other support polices such as procurement should be taken as a given and leveraged as a complimentary policy mechanism that works in harmony with any market redesign.

State and territory governments are united in their efforts to reduce emissions to net zero by 2050 (if not better like the Australian Capital Territory) and the P2025 redesign should be able to accommodate state level clean energy policies. For example, we propose that state governments should be able to procure reserves and security services in their NEM regions to maintain reliability and advance their emissions targets.

The energy regulatory system was built for a business-as-usual (BAU) situation, where there is no problem with greenhouse gas emissions, no profound shift in the large-scale generation mix and consumers are not actively investing in small-scale energy resources and managing their own energy.

In 2020 the Australian Energy Regulator (AER) and Australian Energy Market Commission (AEMC) and to a lesser extend the Australian Energy Market Operator (AEMO) are busy with ongoing BAU regulatory work at the same time as helping drive a major step-change for 2025. In 2020 the market bodies have started to address these conflicts through a regulatory coordination process.

The current regulatory workload is unrealistic and fragmented. There is a risk that some of the BAU rule changes and network pricing determinations on foot will undermine the good work the same agencies are doing through the ESB P2025. The companies which dominate the generation and retail markets also dominate the marketplace of ideas in NEM regulatory work. This imbalance needs to be addressed and the ESB is well placed to help correct it. There is an compelling case for governments to fund innovative energy companies to participate in the P2025 process at the highest level, to balance the dominant regulatory input from the incumbents.

There are some rule changes afoot that are not supporting the general direction of the P2025 process or pre-empt it, such as COGATI, DER integration and system security markets. The AEMC and AER should terminate rules that conflict with or pre-empt the P2025 and instead work *from* the P2025 and bring forward any elements that are urgently required. This is the approach that energy ministers have already endorsed.

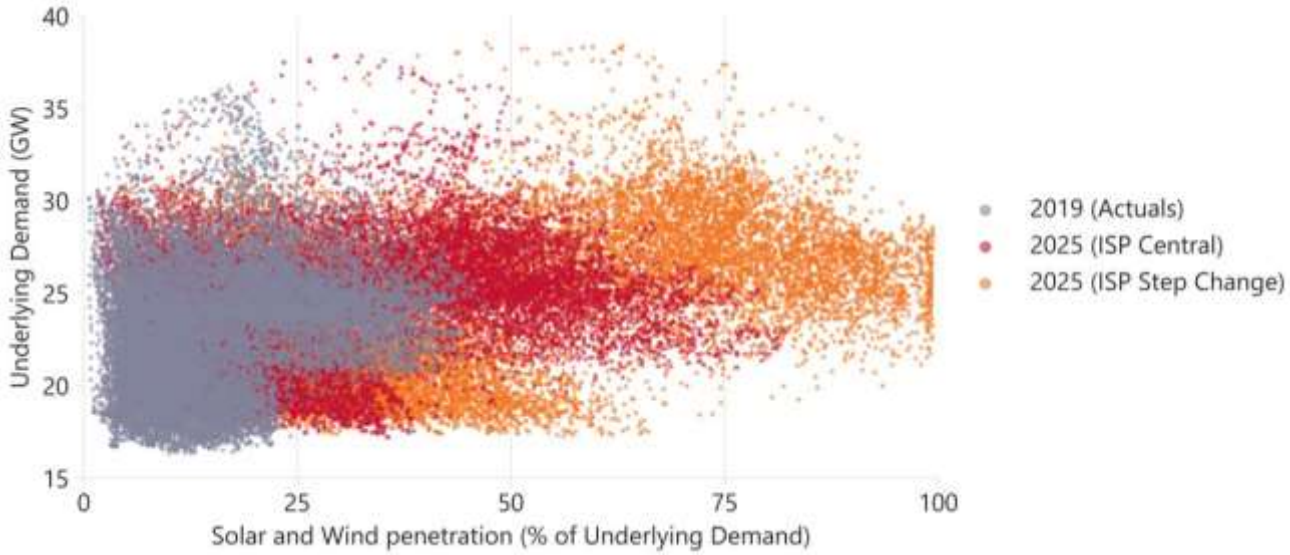
1. Problem definition

Australia is making a rapid and largely unplanned energy transition. In electricity we are moving from system based on centralised, coal power stations and passive consumers, to a more innovative and competitive market based around distributed, renewable energy and empowered producer-consumers. This is occurring against a background of rising climate risk and the need to retire coal more rapidly and meet our international climate obligations.

The steady rise of renewables has been going on for more than a decade. There is now broad recognition that the energy regulatory framework needs to updated. In 2019 the Council of Australian Governments Energy Council gave the ESB the significant task of redesigning the National Electricity Market (NEM) to facilitate this transition.

There is urgency to the ESB's challenge. By the time the main elements of the P2025 redesign are implemented in 2025-2026, the instantaneous penetration of renewable energy is likely to be over 75% of underlying demand (see red dots in Figure 1).

Figure 1: Instantaneous (half-hourly) penetration of solar and wind in the NEM, 2019 actual and 2025 forecast (ISP Central, Step Change scenarios)

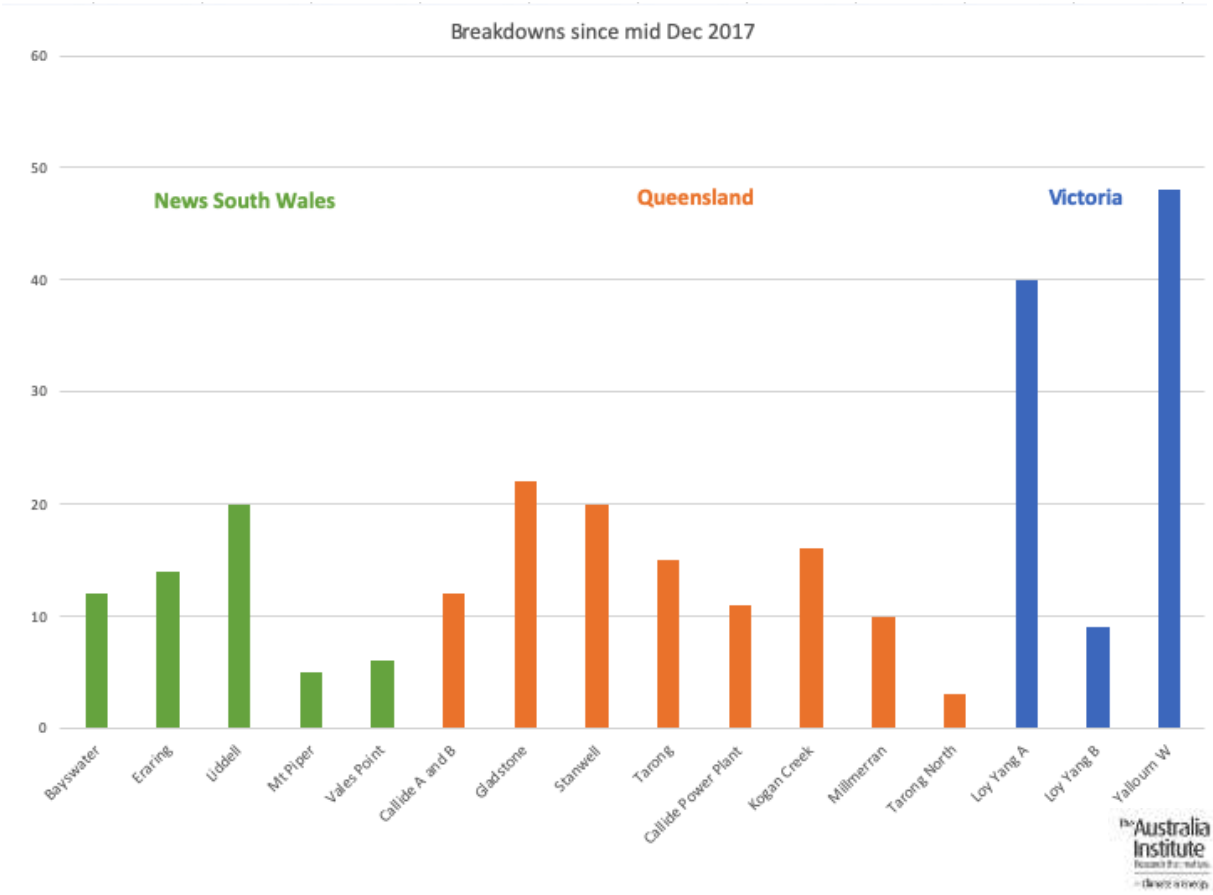


Source: AEMO (2020) *Renewable Integration Study: Stage 1 report*, p.6.

At the same time as renewable energy is growing, Australia's thermal generators are ageing, which means less reliability and higher cost. Gas and Coal Watch, a research project of the Australia Institute, documents outages at coal and gas power stations in the NEM (Figure 2).

Ageing thermal generators are more a problem than an opportunity and it would be unwise to rely on them to provide resource adequacy or essential system services or any other new market mechanism created by the P2025 redesign.

Figure 2: Coal power station outages in the NEM, December 2017 – 2020



Source: The Australia Institute (2020) Gas & Coal Watch, https://www.tai.org.au/gas-coal-watch

The core issue in the P2025 is how to enable ageing and failing coal power stations to retire without harming system security. The question is therefore what mechanisms are required to schedule retirements, replace the security services that are lost.

The opportunity is that reforms which open up the NEM to competition from clean energy can address the energy trilemma of price, reliability and emissions. The *Consultation Paper* states that an 'increasing proportion of energy produced by variable renewable energy (VRE) or inverter based resources (IBR) has the potential to drive down both emissions and supply costs'.[2]

The NEM was designed for another era. The scope of the P2025 project is broad and the pace of change in energy technology and the market means the reform task is urgent. The first set of issues this raises are to do with design. The issues canvassed in the *Consultation Paper* encompass many aspects of the NEM redesign, from the politically vexed issue of

[2] ESB (2020) *Post 2025 Market Design Consultation Paper*, p.18.

emissions reduction to the wholesale and retail energy markets, reliability markets, quasi and non-market reliability mechanisms, system planning, economic regulation of networks and issues that are at the periphery of the NEM law and rules, such as technical standards for consumer devices such as HVAC (heating, ventilation, and air conditioning), batteries and solar.

There are a second set of issues that we raise in our submission, which go to role of the ESB. This includes the integration of regulatory and policy decisions. It also includes how the regulatory system performs and whether it supports or hinders the process of formulating the P2025 reform and then implanting it.

With regard to the first set of issues, we support many of the key principles proposed by the ESB in the *Consultation Paper*.

We agree with the ESB that as clean energy technologies increasingly outcompete fossil fuels, for generating energy and maintaining the reliability of supply, this is a great opportunity. Renewable energy, batteries, demand response and enabling technologies that aggregate and orchestrate them, such as Virtual Power Plants (VPP) should be able to compete across all markets. These technologies should be able to sell the full 'value stack' of energy and other services. Standards and markets should be designed to be technologically neutral and also adaptive.

The rise of rooftop PV, batteries and demand response mean that energy consumers can increasingly produce and actively manage their energy and thus compete against their own retailers. This should lead to good direct price and emissions outcomes for the participating consumers and indirectly for all consumers.

The rise of producer-consumers creates a conflict of interest for the retailers and to a lesser extent the distribution networks, who have a financial incentive to restrict this competition directly in their relationship with their customers and also to advocate against market reforms that would enable increased competition. Regulators and governments are aware of this risk and it is why the Australian Competition & Consumer Commission has warned about 'gaming of the regulatory system by network companies'.[3]

In 2020 the Australian Energy Market Commission tackled this challenge in the Wholesale Demand Response rule change. The solution was to create a new market participant to purchase demand response from energy consumers and aggregate it for the wholesale energy market, in competition with generation. Crucially, the rule change prevented retailers using their pre-existing relationship with consumers to inhibit them from contracting separately with an aggregator for their demand response. This is an important design principle that should be adopted in the P2025 redesign.

[3] ACCC (2018) *Retail Electricity Pricing Inquiry—Final Report*, p.x.

The ESB has raised several market options, such as for operational reserves and essential security services. The key question is whether the new market will be effective in stimulating investment that increases supply and security services when they are needed.

A key challenge is that both generation and retail are already concentrated and there is a risk that already dominant companies will further entrench their position in new markets and keep coal running longer. According to the Australian Energy Regulator in 2019 the two largest market participants supplied over two thirds of generation in all regions except South Australia, and AGL Energy, Origin Energy and EnergyAustralia had two thirds of the small electricity customers in the NEM (and three quarters of small gas customers over the same area).[4] Any new markets or changes to the existing energy and FCAS (frequency control ancillary services) markets, should decrease the market power of the dominant companies.

In addition to these and other design questions posed by the ESB, we also raise issues about how the P2025 and ESB fit in the evolving policy landscape.

Firstly, we do not believe is it efficient for the P2025 to overemphasise the role of the market and downplay the continuing active role of governments in delivering supply and regulating or influencing price. In very rough terms, federal and state governments collectively own perhaps a quarter to a third of the NEM. The NEM is a mixed economy now and will continue to be.

Both tiers of government are making or driving new investments in supply and reliability, ranging from the federal government's Snowy 2.0 to Tasmania's Marinus, mainland interconnectors between the big NEM states, accelerated Renewable Energy Zones (REZ) in NSW and contracting for reserves and reliability services in South Australia.

Australia is making the clean energy transition in response to both changing market conditions and the unfolding climate emergency. It is efficient and rational that government will actively facilitate this transition. We propose a rebooted version of the ACCC's recommendation for government offtakes (recommendation 4 of the Retail Electricity Pricing Inquiry) could help supply any clean energy reserves and security that the market does not.

[4] AER (2020) *State of the energy market 2020*, pp.23, 83.

2. Emissions reduction

The P2025 redesign is intended to deliver an electricity system with lower emissions.[5] Australia lacks a national emissions target for mid-century, so the *defacto* target for the NEM and the P2025 redesign is set by state and territory climate policies. The challenge for the ESB is to ensure that any new market mechanisms and other rules are compatible with state targets and can ratchet up with increasing climate ambition over time, as intended under the Paris Agreement.

The *Consultation Paper* points out that carbon emissions and many other externalities are not reflected in price signals in the NEM.[6] Whilst the ESB does not propose any emissions target is added to the NEM, the *Consultation Paper* states that the first stage of assessment of the discrete reforms (the MDIs) will include consideration of the future integration of the wholesale energy market with any potential emissions market.[7] The principle here is not a new emissions goal *per se* but rather efficiency, in that '[c]osts to consumers will be minimised when markets complementary to energy, such as ancillary services and emissions, are designed in a way that is consistent with the price discovery mechanism.'

Australia's state and territory governments all have net-zero emissions targets for 2050, or better. In November 2019 the Australia Institute conducted a national poll which demonstrated a high level of public support for these targets:[8]

- 67% of Australians support states and territories setting net-zero targets, including a majority (62%) of Coalition voters
- 21% of voters support the federal government setting a target of net-zero by 2050 and 41% support a target of net-zero earlier than 2050

The second state of assessment which will be applied to the whole P2025 redesign package includes emissions under two principles. Environmental considerations broadly will be included as an element of evaluation in term of community support for the reform. Emissions reduction are also included as their own discrete principle for evaluation.[9]

We ask that the ESB will present energy ministers with credible recommendations for how to accommodate state and territory targets and rising ambitions. One option that has been canvassed many times before is to amend the National Electricity Objective to include emissions or even broader environmental outcomes along with reliability, price and

[5] ESB (2020), p.12.
[6] ESB (2020), p.34.
[7] ESB (2020), p.122.
[8] The Australia Institute (2019) *Polling - November 2019 - Net zero by 2050*, pp.1-3
[9] ESB (2020), p.124.

security.[10] Indeed this is returning to some of the long-lost principles of the National Grid Management Council charged with coordinating the interstate grid. The Council was required (among other things) to encourage economical and environmentally sound development of the electricity supply in eastern and southern Australia.[11]

Another option could be for some sort of mechanism that allows a state to use the electricity market to implement its own target. In August 2020 the NSW Productivity Commission (NSWPC) published its *Green Paper* which presents the case for NSW implementing a state-based emissions intensity scheme unilaterally on the basis that benefits would exceed costs.[12]

The NSWPC argues that an emissions intensity scheme could also replace the renewable energy targets of Victoria and Queensland as it would be less costly. The *Green Paper* proposes that if the federal government did not support this development then NSW and other states should proceed through state legislation that derogates from the National Electricity Law.

This is also a live issue in America currently. The United States of America's federal government has over the last four years dismantled energy policies that protect the environment and the climate. Despite this, there are Republican and Democrat state governments which have their own emissions targets and are seeking ways to integrate these with federally regulated electricity markets. Last month the Federal Energy Regulatory Commission (FERC) held a technical conference on the topic.[13] It seems that one of elements that makes integration difficult is that full day ahead markets are hard to incorporate with carbon pricing. This is because demand and dispatch change significantly in the 24 hours so there is no credible baseline.

Before moving to any new wholesale market design a cost benefit analysis should be done to assess the impact of the new market on coal and gas retirements and any future state (or eventually national) emissions intensity targets.

[10] Global Access Partners (2017) *The Case for National Electricity Reform: A Strategic Overview of Core Systemic Failures and Necessary Interventions*, p.6.

[11] Pears (2020) *Our energy market was never fit for purpose, because it was obsessed only with price* https://reneweconomy.com.au/our-energy-market-was-never-fit-for-purpose-because-it-was-obsessed-only-with-price-83408/

[12] NSW Productivity Commission (2020) *NSW Productivity Commission Green Paper*, p.175.

[13] Federal Energy Regulatory Commission (2020) *Technical Conference regarding Carbon Pricing in Organized Wholesale Electricity Markets*, https://www.ferc.gov/news-events/events/technical-conference-regarding-carbon-pricing-organized-wholesale-electricity

3. Thermal generation, reserves and security (MDIs A, B & C)

The primary purpose of the Post-2025 project is to provide energy ministers with a new NEM architecture to enable the smooth and rapid retirement of ageing thermal generators, in particular coal. The challenge is that when coal exits – or fails - it withdraws a large amount of generation and system services in one go. As the Consultation Paper, the transition is 'at the centre of the ESB's market design project.'[14]

In this section we will jointly address three market design initiatives: resource adequacy mechanisms (initiative A), ageing thermal generation strategy (initiative B) and essential system services (initiative C). We are putting these initiatives together because they are the most difficult and critical outcomes of the P2025 project. It is also useful to address these three MDIs concurrently because the reform process must have design integrity. The P2025 redesign should be a holistically conceived system shift, not a set of fragmented measures.

The pace and smoothness of thermal generation retirement will be particularly sensitive to the design of resource adequacy mechanisms and essential system services. The annual energy generation capacity provided by coal is far less critical.

The other MDIs are important and impact on the rate of thermal generation retirement, but resource adequacy and system services are more critical. If there are not enough dispatchable resource available during tight supply and high demand, or not enough system service capacity in the market, then the NEM will be held hostage to existing coal generators. This will lead to calls to subsidise them to stay open, even when the bulk of their 'baseload' energy is not required and is more expensive than clean energy.

There is an abundance of low-cost, new renewable generation and storage projects either committed or anticipated that will be able to fill the gap left by coal plants as they retire the market. For example, there are over 27 GW of renewable and storage projects proposed in Queensland alone.[15] These projects entering the market have largely been driven by the need to reduce emissions from the electricity sector through policies such as the RET as well as the market signals that Australia's fleet of aging coal-fired generation will be retiring over the coming 20 years.

If the clean energy transition was slow and predictable, then it would be reasonable to expect that a pure market solution could provide the signal for investors to build

[14] ESB (2020), p.47.

[15] Department of Natural Resources, Mines and Energy (2020) *Electricity generation map*, https://maps.dnrm.qld.gov.au/electricity-generation-map/

generation, storage and demand-side resources to maintain resource adequacy and deliver system services as coal retires. However, this is not the case. There is no plan on the table to direct the pace of coal retirements and no national climate policy to drive retirements. There is also a serious prospect that existing coal generators will exit the market earlier than expected, as a result of lower revenue, higher costs and climate risks.

It is prudent for the ESB to expect governments to continue to play a role in system services and resource adequacy after 2025. This would be more pragmatic than being ideologically committed to a purely market solution intended to solve all problems and risks.

It is also true that governments already own significant generation, transmission and retail interests and are continuing to invest in the NEM. This can be taken as a given feature of energy policy in the NEM going forward. Governments clearly want a mixed economy NEM, where they can directly deliver certain reliability and price outcomes. The best outcome for is for the P2025 to help guide governments where to invest and how to do this in ways that promote competition and innovation.

Scheduling coal retirement

The NEM has done a pretty good job for a system that was not designed for the clean energy transition. However we can not know whether or not the energy market mechanism will work efficiently so that each coal retirement (or failure) triggers wholesale price rises that drive enough investment in energy and essential security services to keep everything going smoothly at a reasonable cost, until the next coal retirement.

There are already a range of non-energy market measures in place to support reliability, ranging from AEMO's 10 year forward Electricity Statement of Opportunities (ESOO) to the Retailer Reliability Obligation (RRO) and short term reserve notices but there is a risk these are not up to the task particularly if there are sudden plant failures[16]. The Australia Institute's Gas and Coal Watch research shows that coal and gas plants have had almost 300 outages since mid-2017.[17]

Given there is no plan for thermal generator retirements or a national emissions policy, the only retirement control mechanism in the NEM is an information requirement, the three year notice of closure rule which applies to both scheduled and semi-scheduled generators. The rule allows for a civil penalty against a generator. It is not clear to us how significant this penalty would be and if it would be a material factor for a generator that does compel them to continue operating until the notice period had ended. On this point further market

[16] ESB (2020), see figure 15, p.55.

[17] The Australia Institute (2020) *Gas & Coal Watch* http://www.tai.org.au/gas-coal-watch - Accessed 13th October, 2020

research is required. There is also some risk that multiple thermal generators could give notice of closure at around the same time.

We support the ESB developing options for regulating and therefore scheduling coal and gas retirements, in line with emission reduction targets in NEM states. We propose that states with emissions targets could participate and that the mechanism would be a hybrid of direct regulation and market mechanism. One model proposed a capacity closure target being set and then coal generators bidding for the right to exit and receiving a payment for closure from the remaining generators. This solves many problems such as information asymmetry between generators and the regulators seeking to schedule retirements.[18]

Reserves and system services

To ensure the critical security of the NEM is maintained as the aging fleet of coal generation assets exit the market, the essential system services that have been previously provided as a by-product of generation (in particular inertia and system security) will have to be provided by clean energy, storage and demand side resources. As the composition of the NEM changes, new mechanisms will be required to ensure provision of adequate system services.

In AEMO's Renewable Integration Study, it was found that the NEM 'could easily be operated securely with up to 75% instantaneous penetration of wind and solar' but the current design can only accommodate 50 – 60%.

This problem is compounded by the increasing age of coal and gas generators. The Australia Institute's Gas and Coal Watch research has found that in the 36 days following the release of the Post-2025 market design consultation paper on 7 September 2020, 14 outages occurred (Figure 3).[19]

[18] Jotzo & Mazouz (2015) 'Brown coal exit: A market mechanism for regulated closure of highly emissions intensive power stations', *Economic Analysis and Policy*, p.74.

[19] The Australia Institute (2020)

Figure 3: Coal and Gas Outages in the NEM immediately following the release of ESB Consultation Paper

#	Time/Date	Unit Trip
1	1:30 PM OCTOBER 7, 2020	Mortlake
2	10:45 AM OCTOBER 7, 2020	Stanwell
3	8:35 AM OCTOBER 7, 2020	Yallourn W
4	7:45 AM OCTOBER 6, 2020	Tarong
5	2:20 PM OCTOBER 4, 2020	Bayswater
6	6:40 PM SEPTEMBER 28, 2020	Yallourn W
7	4:40 PM SEPTEMBER 28, 2020	Loy Yang B
8	8:50 AM SEPTEMBER 22, 2020	Tarong
9	2:00 PM SEPTEMBER 21, 2020	Vales Point "B"
10	9:25 AM SEPTEMBER 18, 2020	Stanwell
11	11:10 AM SEPTEMBER 11, 2020	Callide Power Plant
12	10:15 PM SEPTEMBER 10, 2020	Liddell
13	7:45 PM SEPTEMBER 9, 2020	Gladstone
14	6:55 AM SEPTEMBER 8, 2020	Mt Piper

Source: The Australia Institute (2020) Gas & Coal Watch http://www.tai.org.au/gas-coal-watch - Accessed 13th October, 2020

Despite the market responding to the need for additional capacity to both reduce emissions and fill the gap from coal retirements, the market has not responded to the need for essential system services. Due to this market failure to supply essential system services, AEMO has imposed restrictions and constraints on several renewable assets across the NEM due to system strength issues.

In principle, The Australia Institute supports a move towards real-time markets for services and dispatchable reserves and notes that wholesale demand response will enter the wholesale market in October 2021. It may be possible to construct a market that co-optimises energy and operating reserve and security services, even synthetic inertia. An effective market would require new companies to build these new capabilities and business models, which will take time.

One key risk with a purely market-based approach is that it may not deliver enough resources early enough and this is where there is a role for government, including through network investments. Governments should drive coal retirements as discussed in the section above, and coordinate this with the provision of system security to replace inertia and FCAS.

The other key risk is that a new market will be created that is effectively a subsidy insulating ageing thermal generators from competition. This has occurred in capacity market reforms in other countries. For example, in 2014 the UK created a capacity market which in theory was technology agnostic. It was criticised on the basis that it became a 'subsidy scheme to

keep heavy polluters online, rather than as a mechanism to encourage new investment – only five per cent of auction revenues will go to new investment.'[20]

Government are playing a direct investment role, with state-owned networks replacing inertia services provided by coal and gas. Powerlink recently became the first transmission company in Australia to deliver system strength as a service, electing to install its own large synchronous condenser in north Queensland and then sell the 'service' to wind and solar farms in the region. This follows ElectraNet in SA investing in four synchronous condensers to provide security services to the market.

This comes at a time where solar in South Australia met 100 per cent of the state's demand for the first time. South Australia currently has a requirement for gas-fired generation to fulfil the system service role however this will soon be displaced by the four synchronous condensers due to come online as well as the likelihood of synthetic inertia from the states large Hornsdale Power Reserve which is estimated to be able to provide up to 50 per cent of the states inertia requirements.

Both resource adequacy and system services should be provided by the market where possible but governments should stand behind both markets and build resources when required. This can not be a technologically neutral exercise and it should align with efforts to lower the NEM's emissions intensity. The ESB's proposed structured procurement option is a sensible compromise that uses government investment pragmatically, while developing demand that innovators will supply through new business models and technologies.

AEMO could determine a baseline level of services required and then offer to procure services on behalf of state governments, to support their emissions targets, if the market does not stimulate investment. With regard to resource adequacy we recommend the a similarly practical approach.

The ACCC's Retail Electricity Pricing Inquiry (REPI) recommended a scheme which was adulterated to end up as the federal government's Underwriting New Generation Initiative (UNGI). There are significant problems with UNGI, namely that it has no legislative basis, no formal guidelines or criteria, and is following no clear process, and it will soon be investigated by the Auditor General.[21]

We recommend that the P2025 returns to ACCC's original REPI and expand it to be able to satisfy the ESB's proposal of a structured procurement option for essential system services. Governments are already procuring large scale batteries and this could be done efficiently with a national scheme created in the P2025 redesign. The financial model behind the Hornsdale Power Reserve should be replicated, where the state government has an offtake

[20] Hope (2015) *UK capacity market: success for new gas, old coal*, https://energypost.eu/uk-capacity-market-success-new-gas-old-coal/

[21] Swann & Merzian (2020) *Problems with UNGI* https://www.tai.org.au/content/problems-ungi

for some services and the rest of the battery operates on a merchant basis, in multiple markets.

This could accelerate the rollout of large batteries with 4-8 hour storage, to energy both as reserve headroom and also intraday trading to reduce wholesale prices, in addition to the rest of the value stack: FCAS, new security services such as synthetic inertia and also network support, when located at appropriate points in the distribution network.

Competition and new technologies

A key outcome for the P2025 project should be to increase competition in the NEM. Any new markets should be designed so that new entrants and technologies can compete fairly against the incumbents.

Currently, in addition to the backstop mechanisms such as the RERT and AEMO interventions, the Retailer Reliability Obligation (RRO) places the responsibility of procuring energy security services on retailers allowing gentailers to dominate the market, reducing competition.

Under the RRO, gentailers that have existing synchronous generation assets like high-cost gas peaking plants and may turn on these assets to meet their own requirements or sell the services to other liable entities. This may lead to sub-optimal outcomes for consumers as new technologies, new entrants or solutions such as demand response may not be incentivised to enter the market due to the gentailers dominance.

Given the concentration of the retail market in particular, the ESB must carefully consider whether or not to structure any reserve or essential services markets around retailers. The same concern was shared by the ACCC regarding its original recommendation in REPI, which excluded the gentailers for this similar market power reason.

4. Two sided markets, scheduling & distributed energy resources (MDIs D, E & F)

We have brought together three MDIs in this section: Two-Sided Market, Scheduling and Ahead Markets and Distributed Energy Resources (DER). The ESB has done a lot of useful work in these MDIs, however there is too much focus on wholesale and retail market solutions and not enough on network reform. The debate around networks and DER often portrays active energy consumers as a problem and does not credit that they can solve so many issues in the NEM, ranging from emissions and consumer prices to network support, wholesale prices and peak demand.

Technological progress and changing customer preferences are both fundamentally changing the nature of the electricity industry. Since 2008, the cost of installing household solar PV has declined by around 80% and it accounts for almost all distributed energy resources (DER) in the NEM. Australia has become a world leader in household PV, which has brought benefits to households with lower bills, more control over their energy costs and reduced emissions.

A study of Victorian households and networks calculated that the net effect of rooftop solar in in 2019 was to reduce prices for all consumers by $217 million.[22] This net figure takes into account network cost increases, which were less than the wholesale price decreases caused by household solar.

Large, centralised generators now competing with the distributed, embedded generation and other demand-side resources including batteries. In addition to solar PV, a proliferation of more advanced DER (digital metering, smart inverters, energy storage, energy management systems, household appliance with smart controls etc. are now entering the customer market.

These technologies offer new opportunities for customers to more actively manage their energy use and to share in value beyond the home- whether sharing energy with peers or participating in programs which support the operation of the distribution network or the wholesale market.

The future network and other benefits of DER could be very significant. According to Energy Networks Australia, if DER is used to provide network services, that would obviate the need

[22] Mountain, Percy, & Burns (2020) Rooftop PV and electricity distributors: who wins and who loses?, p.1.

for $16.2 billion in network investment by 2050.[23] This translates into a reduction in the network component of consumer bills by around 30% compared to today.

Network pricing should be reformed to provide consumer incentives to change behaviour and provide a means to value consumer participation. A leading jurisdiction with a progressive solar tariff is SAPN and that was driven significantly by the SA Government to ensure reliability of supply. There needs to be an ESB priority to deliver a framework and roadmap for tariff reform as part of the P2025 work to enable DER and 2 sided markets.

The procurement of non-network solutions by distribution networks must be made mandatory and innovation programs need to be more effective. This includes use of controllable load management in planned peak events and energy storage services and demand response to support the network using customer assets through aggregators and service providers. Distribution networks need to improve voltage management to enable more rooftop solar and battery export.

There is already progress towards a two-sided market and greater DER integration. In August 2018, The Australia Institute, with the Public Interest Advocacy Centre and Total Environment Centre co-sponsored the wholesale demand response rule change, a reform that will now be implemented in 2021, after being first proposed in 2004 in the Parer Review. Under this rule, large consumers are able to sell demand response in the wholesale market, either directly or through specialist aggregators. The next step is to open this up to small commercial and household consumers and we encourage this to be a priority for the first stage of the P2025 implementation.

We encourage the ESB to give consideration to a principle-based framework that promotes competition and innovation in technology and business models as the primary means for meeting the co-optimisation challenge and aligning the interests of energy service providers with their customers. As with the issues discussed in the previous chapter it will be important to not design a market that is particularly suited to incumbent coal and gas generators and protects them from competition.

We agree with the ESB and AEMO that there is a need for greater visibility and transparency of the resources available in the system to support to achieve real time economic dispatch of the system and reduce reliance on operator intervention into the market.

However the system operator needs to be pragmatic about how much it should insist that scheduling and orchestration occurs as DER expands. The demand side is almost entirely invisible and uncontrolled currently. It is better to encourage more visibility and orchestration, than require all price-responsive demand to be like some sort of generator.

[23] CSIRO & Energy Networks Australia (2017) *Electricity Network Transformation Roadmap, Final Report*, p.43.

In the wholesale demand response consultation and technical working group we encourage an approach based on risk management and innovation. Tranches of demand side resources with different reliability profiles could be enrolled in each region, in stages. This would help create more demand for innovation and allow AEMO to adapt systems to the new resources.

There could be a value in new ahead markets in the NEM if they reward the development of new resources. However we are concerned that the proposed unit commitment for security mechanism could prop up thermal generation. The *Consultation Paper* notes that slow-start generators could use this to compensate for uncertainty in wholesale prices.[24] We do appreciate that if this was fully open to competition from demand response and batteries, perhaps these markets would grow, by stacking value across this and other markets.

Modelling of these mechanisms is necessary to understand whether they will increase revenues for existing coal and gas or drive new investment. It may be that a purely voluntary ahead market, which could be co-optimised energy and system services, is a low risk way of moving forward, rather than leaping to a compulsory market.

Again we note that in a well designed market, batteries with high storage capacity would be expected to be the most successful technology as they could play in multiple markets as well as benefit from intraday trading in wholesale energy, which no generator can participate in, as they are export-only assets.

The P2025 market redesign needs to take into account the fact that large retailers (and generators) face the threat of competition from their own consumers in a two-sided market. The AEMC established a principle in the Wholesale Demand Response rule change that in this situation it is important to force the market open through a new participant category, aggregators. Retailers are not allowed to obstruct competition in this model and must allow their consumer to contract separately with an aggregator for demand response, with appropriate reimbursement to the retailer.[25] We support the expansion of the aggregator role in the NEM.

Smart appliances, smart inverters and intelligent control systems are also entering the market. In combination with solar PV and battery systems, these technologies enable the creation of small-scale electricity ecosystems 'behind-the-meter' - that is, on the customer side of the meter, with a single connection to the grid.

One of the most significant obstacles to innovation are outdated technical standards and we support the ESB's work on governance of DER standards.

[24] ESB (2020), p.75.

[25] AEMC (2020) *Wholesale demand response mechanism: rule determination*, Figure 3.2, p.42.

Since 2017 we have supported the move to five-minute settlement, enable sharper price signals that align better with physical operations, pushing out opportunistic bidding strategies – such as are currently subject to a class action in Queensland. Participation of fast response technologies, such as batteries, fast-start plants and demand response, is expected to be encouraged by this reform. We opposed implementation being significantly delayed due to Covid-19 impacts.[26]

The AEMC recently received and consulted on three related rule changes which propose to change NEM by allowing distribution networks to charge the households with solar PV for the energy they export. These include change proposals from SA Power Networks (SAPN), the St Vincent de Paul Society Victoria (SVDP), and Total Environment Centre (TEC) with the Australian Council of Social Service (ACOSS).

As previously highlighted to the AEMC, our concern with these rule change proposals is that they seem to fragment the regulatory process leading to the major reform effort in the NEM, which is the Post 2025 Market Redesign project (P2025) being driven by the Energy Security Board.[27]

There is also a problem that the AER network regulation role does not seem to be as well integrated into the P2025 at it should be. We agree with the ESB that some DER services can be delivered through markets and others through technical and regulatory tools, much of which sits with distribution networks.

Network tariff arrangements do not provide sufficient incentives which should deliver benefits to customers and maximise investing in DER; for example, by storing electricity generated by solar PV during the day, for subsequent use in peak times when electricity is more expensive. The existing pricing arrangements also risk driving additional inefficient investment in the poles and wires networks which are paid for by all consumers.

Network cost reflective tariffs and transparency is critical element of the design. Introducing real cost reflectivity of network pricing will drive increased uptake of demand side participation where its cost effective for the whole system. This should be a priority to address by the ESB and Market Bodies to be delivered in the short-term priorities. The AER regulatory pricing review process is an obstacle as tariff reform has been a matter of discussion for many years and recognised as fundamentally the main barrier to the integration of DER, however little if nothing has been done to address the issues. As we mentioned earlier, while there has been a new tariff introduced in South Australia by SA Power Networks, in their recent Tariff Structure Statements (Solar Soak), this has been after many years of deliberation and a clear direction from the SA Government to address the

[26] Cannon-Brookes et al. (2020) *Delayed implementation of five minute and global settlement (ERC0298)*
[27] Cass (2020) *Fairness for solar PV consumers*

reliability issues on the network in SA. This needs to be a national focus across all states to enable the MDIs of both two-sided markets and DER integration.

The post-2025 market design could consider introducing voltage management incentives either through the Demand Management Incentive Scheme (DMIS) or the Service Target Performance Incentive Scheme (STPIS). The STIPIS in particular, is used to incentivise network companies to improve their performance in relation to the reliability of supply. An update to the STPIS rules on power quality to include new benchmarks for voltage management could address over-voltage issues.

5. Transmission networks (MDI G)

Inadequate economic and system regulation of electricity distribution and transmission networks in Australia first delivered us gold plating, which pushed up prices, and it is now acting as a handbrake on the growth of renewable energy. In both cases, incumbent energy companies are the only winners, consumers and the environment lose out.

The P2025 process is an opportunity for an honest reset of the role of regulators in delivering market conditions that are in the public interest. If the AER and AEMC believe they will struggle to deliver adequate regulation of networks to enable the clean energy transition, then it needs to be communicated to policy makers and the P2025 is the perfect time for that. A comprehensive reform package can be written and enacted by ministerial power, sidestepping the market bodies's regulatory process.

The transmission design challenge is to create a framework that gets network elements built where they need to be and on time and encourage private investors to build renewable energy and storage developments at a pace that keeps up with the pace of retirement of ageing coal generators.

States appear to have lost faith in the national regulatory process and are moving ahead unilaterally with their own plans to get transmission built. NSW has sensibly decided to accelerate the development of REZs, effectively bypassing the AER. The federal government is supporting this policy, through a national pilot REZ in Central West Orana.[28] In 2020 Victoria legislated to give the Energy Minister power to rapidly enact subordinate legislation that derogates from the National Electricity Law and National Electricity Rules and avoids the AER's RIT-T process entirely.[29]

In September 2020, the Australia Institute made a joint submission with the University of Sydney Environment Institute to the ESB's Interim REZ Framework consultation.[30] Our key recommendation was that REZs will have broad social and economic impacts once the transmission and all energy projects are built. This means that there is a need for REZ economic development planning and coordination well beyond the scope of the National Electricity Rules.

[28] (n.d.) *Memorandum of Understanding - NSW Energy Package*

[29] *National Electricity (Victoria) Amendment Bill 2020* (Vic)

[30] Connor, Cass, & Pearse (2020) *The Australia Institute and University of Sydney Response to Consultation Paper and Draft Rules – Interim REZ framework*

The AEMC's proposed solution to network and generation investment, COGATI, has been rejected by clean energy investors and innovators, for being too complex and counterproductive, as it would create risk that slows down the investment we need to keep the grid reliable as coal retires. Tesla raised the prospect that it may even create incentives for gaming by generators and inefficient investments by networks.[31]

As we discuss in section 6, COGATI is one of the rule changes on foot that should now be set aside to allow P2025 to design a more coherent approach. The good analysis and consultation work already done by the AEMC can be migrated to the P2025 process.

For example, in principle, there could be benefits from locational marginal pricing. Useful work done by the AEMC in this area should be utilised by the ESB. A well designed pricing regime will alter the price paid to assets according to the instantaneous value of electricity at that location, in order to improve the efficiency of investment and dispatch. This price signal has to be an integrated part a total reform package including the future of energy and any allied markets, in order to facilitate coal retirements through increased investment in renewable energy and storage. A simpler course of action may be to deliver the ISP priorities, allowing states to drive interconnectors and REZ development such as the Central West Orana pilot in NSW and only then consider if new pricing is necessary.

We suggest that the financial viability of battery project are a simple test against which to evaluate market redesign options. Batteries are the most flexible asset that can be deployed (eg compared to synchronous condensers) as they can deliver a full stack of services to the NEM: network support, reduce congestion, provide frequency control and trade in energy to reduce price peaks. If a new transmission network arrangement will increase risk for battery projects and reduces their financial viability, then this is probably an unhelpful reform proposal.

[31] Tesla (2019) *Coordination of Generation and Transmission Investment – Directions Paper submisson*, p.2.

6. Governance and implementation

In 2020, the NEM market bodies have done a great deal of important work to coordinate the regulatory timetable. However, the P2025 project has not yet been given adequate priority. The ESB must work collaboratively with the heads of the market bodies to ensure there is strict and rigorous prioritising from now on.

Currently the AER and AEMC are pulled between business-as-usual rule making activity and the market redesign.[32] The AER is currently making network determinations and other decisions which set the direction for network investment in the 2020s, before the ESB has even recommended on its design to the National Cabinet Energy Committee.

For example, there are seven rule change requests on system services and reliability before the AEMC. These rule changes overlap with and pre-empt the P2025 work. It is impossible to tell from the *Consultation paper* if the ESB itself is confident these seven rules will end up supporting the direction the P2025 design is taking.

COAG Energy Council and the ESB have agreed to bring some elements of the P2025 redesign forward. We support this intermediate work but need to be careful how we prioritise our work going forward. We propose that other substantive rule making and decisions should be suspended until the National Cabinet Energy Committee signs off on the new P2025 design, unless there is a compelling reason to continue.

In tthe past, the AEMC has discontinued rule change processes that had been formally initiated.[33] The legislative authority for this practice is found in the National Electricity Law, which states that where the Law authorises a power, it also 'includes [the] power to amend or repeal the instrument, decision or determination' made under that power.[34] This power to amend or repeal a prior decision can be applied to the power to initiate a rule change.[35]

The same flexibility to repeal prior decisions may well apply to the AER.[36]

---

[32] AEMO's rule making power is more delegated than the AEMC and AERs so it is less relevant to this discussion about pre-emption. AEMO staff is incredible hard-working like the other market bodies and would surely appreciate more a more focused workload.

[33] For example AEMC ERC0084.

[34] *National Electricity (South Australia) Act 1996* (SA), schedule 2, clause 20(a).

[35] Ibid., section 94.

[36] Whilst the AER was established by the *Competition and Consumer Act 2010* (Cth), the section on powers (44AH) simply points to any law of the Commonwealth and it is in the *National Electricity (South Australia) Act 1996* (SA) and Commonwealth mirror legislation that these powers are defined (National Electricity Law Schedule, clause 15). It would make sense that the repeal clause cited above that applies to AEMC also applies to the AER.

As recently as 2017 the AEMC made a determination 'not…make a final rule', on the basis that other reform processes flowing from the Finkel Review were underway and it would not be appropriate to interfere with those.[37] That is exactly the situation now with the P2025 and we encourage the AEMC to build on this sensible precedent or use its power to amend decisions already taken to initiate rule changes.

This prioritisation is vitally important from the perspective of technological innovators, new retailers, and energy consumers. The input of these stakeholders is critical to the P2025 work and unfortunately many of these stakeholders are under resourced when faced with the number of regulatory consultations currently underway.

The whole point of the P2025 redesign is to innovate, yet the voice of the innovative energy tech sector is effectively drowned out by the volume of rule changes and reviews and the vastly better resourced regulatory teams retained by the incumbents.

In a previous paper, we recommended that the Federal Government should make funding of at least $700,000 to new technology companies to participate fully in the P2025 redesign.[38] Consideration should be given to financing the inputs of stakeholders beyond the incumbent energy generators and retailers.

On a final point, the federal government's new Technology Investment Roadmap does not seem to be integrated with the ESB's work. The Technology Investment Roadmap has five priorities and one is 'electricity from storage for firming under $100 per MWh'.[39] It also includes 'Generation enablers' as one of its secondary, emerging technologies, defined as those that 'support the grid to integrate more renewable generation'.[40]

This integration goal should have been included within the priority goal for energy storage and that would assist the P2025 agenda, as it would help storage technology deliver the reliability services such as synthetic inertia are also crucial for enabling coal to retire. We therefore recommend that the ESB take the lead here and put integration with P2025 on the agenda of the Technology Investment Advisory Council.

As we have highlighted in our previous discussion paper, accelerating the Post-2025 Market Redesign Project could deliver benefits earlier - from 2023 onwards. This could form part of the public sector response to the economic impact of the Covid-19 crisis, whereby speeding up NEM reform will help drive economic recovery by providing market signals for new technologies to enter the market through additional revenue streams for services like inertia and system strength.

[37] AEMC (2020) *Alternatives to grid-supplied network services: Final Rule Determination*, p.69

[38] Cass (2020) *Energy reform after COVID-19*, p.15.

[39] Department of Industry, Science, Energy and Resources (2020), *Technology Investment Roadmap: First Low Emissions Technology Statement – 2020,* p.6.

[40] Ibid., p.25.

By bringing forward the Post-2025 market design, the NEM could see an accelerated exit of coal generation which would ultimately deliver a more secure and reliable power grid at least cost to consumers in addition to bringing forward investment that would drive economic recovery. This will create jobs in the short term and attract investment across the energy sector as more renewables will be able to safely connect into the grid ultimately lowering costs to consumers and national emissions.