



COAG
Energy Council

ENERGY SECURITY BOARD

National Energy Guarantee: High Level Design Document

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EXECUTIVE SUMMARY

Over the past fifteen years the energy sector has undergone a significant transformation. New and evolving technologies are changing the way we consume and produce electricity. This transformation of the sector continues with many technologies currently maturing and competing with traditional technologies while new and emerging technologies (for example, batteries) look likely to further revolutionise the sector. While undergoing this transition has had many positive benefits, it has also left our energy system vulnerable to escalating prices while being both less reliable and secure.

The National Energy Guarantee (Guarantee) provides the opportunity to resolve fifteen years of energy and climate policy instability. It is designed to integrate energy and emissions policy in a way that will encourage new investment in clean and low emissions technologies while allowing the electricity system to continue to operate reliably. The Guarantee will provide a clear investment signal, so the cleanest, cheapest and most reliable generation (or demand response) gets built in the right place at the right time.

Alone the Guarantee cannot solve all the challenging policy issues that the electricity sector currently faces. As recommended in the Finkel review, Energy Security Board members are also continuing to explore a range of other complementary measures including strategic reserve/s, demand response and day ahead markets to ensure we have the operational flexibility we need in the rapidly changing electricity market.

A well-designed Guarantee will bring together climate and energy policy for the first time in Australia contributing towards resolving all three aspects of the 'policy trilemma' – maintaining reliability, lowering emissions in line with international commitments, and improving affordability. Providing long-term policy confidence is critical to lowering investment risk in the NEM and ultimately bringing down electricity prices.

The Guarantee will require retailers to support a range of different generation technologies through their contracting. Increased contracting in deeper and more liquid contract markets is expected to reduce the level and volatility of spot prices.

In general, the greater the extent of competition in the retail and generation sectors, the more likely consumers are to benefit from all three objectives of the Guarantee. The Guarantee has been specifically designed to ensure it does not undermine but rather enhances the liquidity, transparency and level of competition in the retail and wholesale electricity markets.

The reliability and emissions reduction components complement one another, working together to ensure the market has a fair opportunity to deliver adequate reliability whilst lowering emissions. Retailers are expected to contract in a variety of ways to meet both of these requirements. Cognisant of the risks to liquidity and transparency in the contract market the ESB has sought to ensure that the contracting approach to meet compliance remains flexible.

Emissions requirement

The emissions reduction requirement ensures that the Guarantee works in a way that is integrated with existing electricity market operations without compromising financial market liquidity. The ESB is recommending a generation and emissions reallocation approach that draws on existing reporting obligations, through the *National Greenhouse Energy Reporting Scheme (NGERS)*. Incorporating this data into a registry and allowing a mechanism for retailers to have the generation and associated emissions allocated to them provides an

efficient approach to providing retailers with the infrastructure necessary to demonstrate their compliance.

Under this approach, retailers will continue to enter into financial contracts to hedge their position in the spot market and manage any obligations under the reliability requirement of the Guarantee. They can then use their existing contracts, or enter into new ones, to obtain the right to assign generation and any associated emissions for the purpose of the emissions reduction requirement.

This could be done in any way the retailer deems appropriate. The retailer would submit to the registry the volume of output from a generator to which they have obtained the rights. This would operate in a similar way to AEMO's *Reallocation Request Service* platform which has operated under the National Electricity Rules since 2007. What a retailer submits to the registry (X volume from Y generator) can be based on any contractual arrangement held with a counterparty outside the registry, as long as both counterparties verify the claim in the registry.

At the end of a compliance period, once NGERs emissions data has been reported, the registry would automatically match up the emissions to a retailer based on the allocated generation volumes and associated emissions recorded in the registry. The Regulator would compare the average emissions intensity of the retailer against the electricity emissions target in assessing compliance.

Reliability requirement

The reliability requirement also builds on existing spot and financial market arrangements to facilitate investment in dispatchable capacity. The Energy Security Board has identified eight key steps to a reliable electricity supply:

1. **Forecasting the reliability requirement:** Using the Electricity Statement of Opportunities (ESoO), AEMO will forecast, from ten years out, whether the reliability standard is likely to be met (or not) in any NEM region over the forecast period. If the reliability standard is unlikely to be met, AEMO will identify the size of any 'gap' in supply/demand response.

An appropriate accountability framework will be introduced to support and improve the development of these forecasts which will include rules pertaining to transparency and stakeholder consultation.
2. **Updating the reliability requirement:** AEMO will update the forecasts of the reliability requirement annually or if there is a material change to the supply-demand outlook for example, generator retirement or the loss of a significant load.
3. **Triggering the requirement:** If a **material** reliability 'gap' is identified in the forecasts, the market would be expected to react. This could take the form of investment in new capacity (for example, generation, transmission, storage or demand response) or to offer additional existing capacity to the market.

If, three years from the period in question, a **material** 'gap' continues to exist or a new **material** 'gap' emerges, as a result of a generator giving notice that it intends to close, then the reliability obligation will be set to trigger, and retailers may be expected to demonstrate future compliance.

An 'independent entity' (for example, the AER or the Reliability Panel) will need to approve a request from AEMO that the reliability obligation on retailers be triggered and, if this approval occurs, the trigger will be operative.

4. **Liabe entities:** If the reliability obligation is triggered, then all retailers and large customers will need to assess their likely share of system peak demand and secure sufficient qualifying contracts, by the compliance date, to cover this. Large customers will have the option to have their reliability obligation managed by a retailer on their behalf.
5. **Qualifying contracts:** If the reliability obligation is triggered, liable entities will be required to enter into sufficient contracts for 'dispatchable' capacity (including demand response) to cover their share of system peak demand at the time of the reliability 'gap'.

There are a range of existing contracts, such as cap and swap contracts, that expose the sellers of those contracts to very high prices if generation or demand response is not available when the system needs it. Generally speaking, these types of contracts are only offered if they are underpinned by 'dispatchable' capacity or demand response, that is capacity that is available to be dispatched when the system needs it.

To help manage concerns about the level of concentration in the electricity market, only those contracts bought from centrally cleared trading platforms and/or reported to centralised trade repositories (exchange traded or over-the counter) will qualify. Vertically integrated retailers will not be able to use their own generation to comply (unless purchased via a centrally cleared trading platform and/or reported to centralised trade repositories). Large customers who are subject to the reliability requirement will be able to use existing contracts to comply.

To further support competitive market outcomes and provide liable entities with sufficient optionality, AEMO will conduct a voluntary 'book-build' to help match buyers of contracts with new capacity coming into the market. Contracts secured through the 'book-build' will comply.

The development of demand response products that qualify under the reliability obligation will be central to ensuring the reliability requirement of the Guarantee is met at least-cost.

6. **Procurer of last resort:** One year from the forecast reliability 'gap', AEMO will again review its forecast. If the reliability standard is now forecast to be met there is no further action.

However, if a sufficient 'gap' persists then AEMO will procure the remaining necessary resources via an enhanced RERT/Strategic Reserve.

Liable entities will be required to disclose their contract positions to the AER at the point that AEMO commences its 'procurer of last resort' function. However, any assessment of compliance with the reliability obligation will be done ex-post.

7. **Compliance:** The AER will only assess compliance with the reliability obligation if AEMO had to procure resources to meet the forecast reliability 'gap' via the enhanced RERT/Strategic Reserve **and** if actual system peak demand exceeds that which would be expected to occur one in every two years.

In this event, the AER will, using data from the relevant period/s, determine each liable entities' share of system peak demand. The AER will then review the contract positions of all liable entities to assess whether they had adequate enduring contracts in place to meet their share of system peak demand. As a safe harbour provision, their

share of system peak demand could be assessed based on the system peak demand that would be expected to occur one in every two years.

8. **Penalties:** Penalties will be assigned to retailers that are assessed to have fallen short of their reliability obligation. These penalties will include at least some of the cost of procuring necessary resources via an enhanced RERT/Strategic Reserve.

The ESB continues to support the implementation of the Guarantee through existing governance arrangements for the NEM. The key benefits of this approach to governance being greater certainty for market participants about the operation of energy and climate policy in the NEM, ultimately supporting long term investment in the electricity sector which will improve affordability.

ENERGY SECURITY BOARD

1 Introduction and next steps

1.1 Background to the consultation paper

On 24 November 2017, the COAG Energy Council requested the Energy Security Board (ESB) provide further advice on a National Energy Guarantee (Guarantee). This paper sets out this advice.

The Guarantee comprises changes to the National Electricity Market (NEM) and its legislative framework such that:

- the reliability of the system is maintained
- the emissions reductions required to meet Australia’s international commitments are achieved
- the above objectives are met at the lowest overall costs.

1.2 Purpose of this paper

This paper sets out the ESB’s high-level design for the Guarantee including the emissions reduction and reliability requirements. The ESB seeks COAG Energy Council’s in-principle support for the design and agreement to undertake more detailed consultation so that a final design can be presented to COAG Energy Council for approval at the August 2018 meeting.

This paper does not include the elements of the emissions reduction requirement that are the responsibility of the Commonwealth Government, namely: how the national emissions target will be set, how external offsets may be used and how EITE exemptions will be treated. Advice on these matters will be provided by the Commonwealth through a separate process. That Commonwealth advice will also be presented at the April COAG Energy Council meeting.

On 15 February 2018, an initial consultation paper was released by the ESB to facilitate public consultation on the high-level design of the proposed Guarantee. This advice incorporates the feedback from stakeholders that was received in response to that paper, including the 14 presentations at the public forum; and the 188 submissions received.

1.3 Consultation process

Next steps

If the COAG Energy Council agrees, in principle, to proceed with more detailed design of the Guarantee, further consultation will be undertaken from May to July 2018.

The timeline for further progression of the Guarantee, if it is agreed, is set out below.

Date	Action	Status
Late April 2018	High-level design paper published	
May – June 2018	Energy Security Board working papers / workshops on various detailed elements of Guarantee design	Stakeholder input requested on detailed design elements including legislative and rule change requirements Energy Security Board will shortly release information about how stakeholders can be involved with these processes

Date	Action	Action	Status
July 2018	Energy Security Board releases final design document for consultation	Stakeholder input requested on final design proposal	
August 2018	Energy Security Board provides final design of the Guarantee for COAG Energy Council approval	Final design includes drafting instructions for legislative changes to the National Electricity Law and requirements for new rules and rule changes. Legislation may also be required at the Commonwealth level.	
August 2018	COAG Energy Council approves final design of the Guarantee	Legislation and rule drafting begins for legislation in 2018	

1.3 Structure of this consultation paper

This consultation paper is structured as follows:

- Chapter 2 explains the context of the Guarantee. As the Finkel Review has made clear the NEM is in transition and the reliability of our electricity system needs to be underpinned by an orderly transition that integrates energy and emissions reduction policy.
- Chapter 3 discusses the ESB’s design for the emissions reduction requirement. This chapter also discusses state based renewable energy and emissions reduction schemes and how these sit with the ESB design for NEM emissions reduction.
- Chapter 4 discusses the ESB’s design for the reliability requirement and the compliance obligations on retailers.
- Chapter 5 addresses the effect on customer affordability within the NEM of the proposed Guarantee and discusses how the ESB has responded to competition concerns in the design of the Guarantee.
- Chapter 6 outlines the ESB’s preferred governance option for the Guarantee.

2 Context

2.1 Overview

Fifteen years of climate policy instability has complicated long-term investment decisions in the NEM and has compromised system security and reliability. This has left our energy system vulnerable to escalating prices while being both less reliable and secure. Increased market intervention has been necessary to maintain the security and reliability of the system and this has further distorted price signals to producers and consumers.

The Independent Review into the Future Security of the National Electricity Market (Finkel Review) made a number of recommendations to ensure the future security and reliability of the electricity system while improving the affordability of electricity and enabling the sector to meet its share of Australia's international commitment to reduce emissions.

The COAG Energy Council unanimously agreed to the majority of these recommendations and tasked the ESB with implementing them.

The Finkel Review found that an orderly transition will be key to delivering a reliable and low emissions future for the electricity system. There were a number of key recommendations in the Finkel Review to support this orderly transition including notice of closure requirements for large generators, an emissions reduction mechanism to drive new investment in the sector and new standards on generators (Generator Reliability Obligation) to give greater confidence that reliability will be maintained as technological developments continue to affect the system.

The Guarantee integrates these Finkel recommendations with the existing operation of the NEM. The Guarantee will require retailers to contract with generation, storage or demand response so that:

- there is a minimum amount of dispatchable energy available to meet consumer and system needs (reliability requirement); and
- the average emissions level of the electricity they sell to consumers supports Australia's international emission reduction commitments, as set by the Commonwealth Government (emissions reduction requirement).

A well-designed Guarantee will bring together climate and energy policy for the first time in Australia to ensure we can meet the electricity sector's share of our international obligation to reduce emissions while supporting the reliability of our electricity system. Providing long-term policy confidence is critical to bringing down electricity prices.

The emissions and reliability components of the Guarantee will require retailers to support a range of different generation and demand-side technologies through their contracting. This will result in increased contracting levels, which in turn will create deeper and more liquid contract markets. These are expected to reduce the volatility and high prices in the NEM over the last year further improving the affordability of electricity.

'Retailers' is used throughout this paper and refers to the market participants that will be subject to the Guarantee.

The Guarantee is an opportunity to resolve some of the most vexing policy issues challenging the NEM today. But the Guarantee cannot solve all of these policy issues alone. As recommended in the Finkel review, ESB members are also simultaneously exploring a range of other complementary measures including strategic reserve/s, demand response

and day ahead markets to ensure there is the necessary operational flexibility in a rapidly changing electricity market.



2.2 A transforming energy system

2.2.1 Emerging trends

Australia's energy system is evolving and there are a number of emerging trends in both the supply and demand side that will continue to impact the shape of things to come.

The growing potential role of the **demand-side**, including the potential for loads to interact more directly in the wholesale market is a key emerging trend. Historically, a 'reliable' power system invariably meant back-up generation, the availability of additional generating units to ramp up if others failed or if demand spiked.

However, the emergence of new technologies and ensuing regulatory developments has meant that reliability is no longer the virtually exclusive domain of 'supply-side' solutions. Rather, the demand-side – including residential customers – now has an important role to play in delivering a reliable power system at the lowest possible cost. Indeed, consumers are becoming better-equipped than ever to manage and control their energy use and contribute to reliability and this will only improve in the future. The demand-side is a key factor in driving the transformation of the energy sector.

The changing mix of **supply-side** options with the increase in intermittent technologies, such as solar and wind generation, and the reduction in dispatchable coal-fired generation is another key emerging trend.

Historically, most of the installed generation capacity has been "dispatchable" (that is, able to generate as required) provided by coal, gas and hydro-electric plants. Provided these generating units have sufficient fuel (that is, coal, gas, stored water) and their operational positions allow it – and assuming no unexpected outages or transmission constraints – they can be called upon by AEMO to increase or decrease their output at any time in a predictable manner, given enough notice.

However, there will continue to be increasing penetration of intermittent renewable generation in the form of large scale wind and solar plant driven by the RET and the rapidly declining costs of these technologies. The levelised cost of large scale solar has fallen from around \$300/MWh in 2000 to around \$60/MWh at present. Similarly, the levelised cost of

wind generation has fallen from about \$240/MWh to about \$55/MWh now. The short-run marginal cost of this energy is close to zero¹.

The implications of the increasing penetration of variable renewable generation is being experienced globally. The International Energy Agency² has highlighted that once penetration of variable renewables exceeds around 25-30% the need for dispatchable power becomes critical for system reliability.

While some new wind and solar investments in Australia are seeking to make themselves “dispatchable” by co-locating with a battery, this is not true for the majority of these resources. Therefore, when wind and solar are not available an alternative source of power that can be dispatched is required. In Australia, the main alternatives are coal, gas, and hydro generation.

Australia’s ageing generators are also becoming less reliable and in recent years the retirement of old plant (mainly coal) has been replaced by cheaper variable renewable alternatives or gas-fired power stations. Since 2000, over 10,000MW of variable renewable generation has been built or is expected to be built; and about 5,500MW of generation fleet has retired³.

With the mix of generation in the NEM changing rapidly there is a steadily declining proportion of dispatchable generation. This creates challenges in operating the system in a secure and reliable manner because of the increased variability and uncertainty.

Operationally, this change in generation mix is challenging for system security, as well as reliability, because different technologies have different characteristics. The rules of physics dictate various technical features that are needed for system security - like frequency control, inertia, and voltage parameters. Coal, gas and hydro generation have spinning generators, motors and other devices that are synchronised to the frequency of the power system. This synchronous generation can support system security almost as a by-product. The ability of non-synchronous forms of generation such as wind, battery storage and solar photovoltaic powered generators to provide these features cost-effectively is still developing. As the proportion of non-synchronous generation rises, the security of the power system is becoming more challenging.

At present, these developments are manageable in the NEM though it is worth noting that in 2016/17, there were 22 lack of reserve notices issued. This is the highest number of lack of reserve notices since 2009/10. In one sense, this is an early warning of reliability concerns that could arise in the future. However, the current reliability standard is still not forecast to be breached.

2.2.2 Role of the Guarantee in a transforming energy system

Continued uncertainty around how any emissions reduction mechanism could be integrated with the energy market has not been positive for investment in new generation.

The Guarantee addresses these issues by combining reliability outcomes and emissions targets to guide investment in and operation of the lowest cost resources (demand-side or supply-side). The Guarantee is designed to integrate energy and emissions policy and signal

¹ Bloomberg New Energy Finance

² International Energy Agency (2017), *Getting Wind and Sun onto the Grid – A Manual for Policymakers*, OECD/IEA, Paris.

³ Clean Energy Regulator and AEMO data.

how much electricity the market needs and when it is needed, while also ensuring Australia's emissions targets are met.

The reliability requirement is designed to give confidence to all stakeholders that sufficient dispatchable power will be available when required as the system transitions. At present, reliability is within the current standard set by the Reliability Panel. However, there is more uncertainty across the system and supplying peak demand, especially in summer, is becoming more difficult. The ESB is looking to the future in the context of the developments underway to ensure there is no need for governments to intervene in the operation of the electricity market to secure reliability and disrupt crucial investment signals.

The emissions reduction requirement on retailers is designed to ensure that the NEM behaves in a manner that is consistent with the undertakings given by Australia in its execution of the Paris Agreement. There are a wide range of views in Australia about appropriate emissions policy and related targets. This situation has contributed to policy difficulties and uncertainty in recent years. What the emissions reduction obligation on electricity retailers can achieve is agreement that the Paris commitment must be met. At the same time, more ambitious State schemes can continue to operate along-side this national requirement and can contribute towards it. This approach can accommodate the different schemes and create greater confidence for the industry.

2.3 Reliability vs security

Currently, in the NEM, reliability means having an adequate amount of capacity (both generation and demand response) to meet consumer needs, as well as having an adequate amount of network capacity (including interconnectors) to transport this energy to where consumers want it. This involves longer-term considerations such as having the right amount of investment, as well as shorter-term considerations such as making appropriate operational decisions, to make sure an adequate supply is available at a particular point in time to meet demand. To deliver a reliable supply, the level of supply needs to include a buffer, known as reserves, so that supply is greater than expected demand. This allows demand and supply to balance, even in the face of unexpected changes. Reliability is different to security, as explained in Box 2.1.

Box 2.1: Reliability vs security in the NEM

System security: A secure system is one that is able to operate within defined technical limits, even if there is an incident such as the loss of a major transmission line or large generator. Security events are mostly caused by sudden equipment failure (often associated with extreme weather or bushfires) that results in the system operating outside of defined technical limits, such as voltage and frequency.

Reliability: A reliable system is one with enough energy (generation and demand side participation) and network capacity to supply consumers – this implies that there should be enough energy to meet demand, with a buffer known as reserves.

2.4 Australia's emissions reduction policy objectives

Under the Paris agreement, Australia has committed to reducing its emissions by 26-28 per cent on 2005 levels by 2030.⁴ The wholesale electricity generation sector accounts for around one-third of Australia's emissions.

⁴ See: <http://www.environment.gov.au/system/files/resources/c42c11a8-4df7-4d4f-bf92-4f14735c9baa/files/factsheet-australias-2030-climate-change-target.pdf>

Achieving Australia's emissions reduction goals at lowest cost to consumers must be done by encouraging new investment in a balanced mix of technologies that address both reliability and emissions reductions. Prices have been rising partly as a result of the same changes that are causing the system security and reliability concerns.

The principal national mechanism to reduce emissions in the wholesale electricity generation sector currently is the Renewable Energy Target (RET). The RET is a policy mechanism designed to encourage investment in large-scale renewable energy technologies. The RET policy sits outside the energy market framework and the design of the RET is not focused on working with the risk allocation and incentive mechanisms built into the NEM that align the financial incentives of market participants with the physical needs of the power system.

2.5 Contracting in the NEM

As the Guarantee imposes an obligation on retailers to support, through their contracting, investment in low emission and dispatchable generation or demand response, it is important to understand how contracting takes place in the NEM.

In interconnected power systems, the amount of electricity being produced from multiple supply sources needs to continuously match the amount of electricity being consumed. Because of the need to co-ordinate supply and demand in real time, the NEM has a formal spot market, operated by AEMO. This primarily operates to co-ordinate the operation of the power system, but also provides revenue to participants which assists with providing a return for capacity investments.

In addition, there is a hedge contracts market, in which derivatives (of the spot market) are traded, assisting market participants with their risk management. The contract market can also help new investment to be financed, influencing decisions as to whether and when to undertake maintenance and retire and smoothing retailers' wholesale electricity purchase costs.

An individual generator's revenues, and a retailer's costs, are determined by their net exposure to these two markets. All energy traded through the NEM must be settled through the spot market. Generators are paid the spot price for the electricity they produce and retailers pay the spot price for the electricity their customers consume.⁵ The variability of demand and supply conditions results in fluctuations in a spot price on a 30 minute basis.⁶ Prices in the spot market can currently range from the Market Floor Price of $-\$1,000/\text{MWh}$ ⁷ to the Market Price Cap (MPC) of $\$14,200/\text{MWh}$.⁸

These fluctuations in prices encourages both buyers and sellers to manage their volatility by entering into contracts that convert volatile spot revenues and costs into a more certain cashflow. Prices in the contract market are derived from outcomes in the spot market, with contracts typically settled by reference to the spot market price for a particular region. This financial derivatives contract market has been an integral part of the operation of the NEM

⁵ Generators and registered loads are also paid for ancillary services provided. AEMO co-optimises the need for energy and ancillary services and compensates generators accordingly.

⁶ Although note that the AEMC has recently made a final determination to move to five-minute settlement from mid-2021.

⁷ The market floor price forms part of the "reliability settings" in the NEM (along with the market price cap, cumulative price threshold and administered price cap). In particular, the market floor price prevents market instability, by imposing a negative limit on the total potential volatility of market prices in any half hour trading interval.

⁸ This arrangement is sometimes referred to as a "gross pool".

since its inception. Hedging against these risks can significantly reduce market participants' (and ultimately consumers') exposure to high price events.

The market for contracts serves the following four purposes:

1. It provides a mechanism for retailers and generators to manage their exposure to spot prices, by allowing participants to trade uncertain and variable spot market prices for fixed prices going forward.
2. On a short-term operational timescale (e.g. hourly), generators who have sold contracts are incentivised to be available when needed (i.e. when spot prices are high), in order to defend their position and so earn revenues in the spot market to fund payouts on their contract positions. This incentive to 'turn up' is heightened during high price/tight demand-supply periods, which is precisely when the system most values the generator's output.
3. It lowers the cost of financing investment in generation capacity, which lowers the cost of achieving and maintaining system reliability. Contracts provide generators a steadier stream of revenue compared to taking spot price exposure. This reduces the risks to parties providing funding to generators, such as debt and equity holders, that the value of their investments may not be recouped. This lowers the overall cost of capital required to finance the project and lowers the cost of the new generation capacity.
4. It underwrites retailers' fixed-price offers to end-consumers, such as households and small businesses. Like generators, retailers use the contract market to mitigate their exposure to the spot market. Contracts provide retailers with a consistent price for electricity, which in turn allows them to offer longer-term contracts, with stable prices, to their retail customers.

As noted in the ESB's November 2017 advice to the Commonwealth⁹, an increased amount of contracting by existing generators results in more competitive bidding in the spot market as generators bid lower to increase their chances of being dispatched in order to defend their contracted position. This is likely to result in lower spot prices.

Hedge contracts (e.g. swaps or caps) create a link between the needs of the system for capacity and the financial rewards that accrue to generators from being available and dispatched and the losses or penalties they incur if they are not. The various types of hedge contracts and the payments and receipts flowing from them have this effect because they are linked to the NEM spot prices reflecting the demand-supply balance at a particular point in time.

This link between the physical and the financial spot market outcomes is not as strong under any scheme that provides "certificate" revenue to generators sufficient to impact on financing decisions where the certificates are linked to a type of technology or its emission levels. The RET is a scheme with these design characteristics. Any generation capacity that is not financed through a mechanism linked to either spot prices or directly to a customer's load and retail contract, does not have a strong financial incentive to be available when the physical system needs it the most.

⁹ See Figure 3.1 (left-hand panel) in: <http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Report%20on%20the%20National%20Energy%20Guarantee.pdf>

New generation financed under the RET adds to the physical capacity of the system but does not directly result in a corresponding increase of hedge contracts.¹⁰ This is because typically, renewable generation is intermittent and so cannot easily enter into these contracts without undertaking other investments e.g. having a hybrid site with both wind and solar or installing a battery.

Policy mechanisms that incentivise investment in electricity generation capacity without incentivising the ongoing supply of hedge contracts risk adversely affecting wholesale and retail market outcomes and system reliability. They will inadvertently lessen the emerging competition from innovative new retail energy businesses, and place upward pressure on consumer prices. Conversely, where a policy mechanism is effectively integrated and aligned with the design of the NEM, it is likely to lead to a higher degree of investment certainty in the energy market and more availability of contracts. This will reduce pressure on the wholesale electricity market, reduce barriers to entry and result in lower prices for consumers.

The Guarantee will place a dual obligation on retailers to acquire a mix of resources on behalf of their customer demand that allows them to in turn supply electricity that is affordable, reliable and overall complies with emissions reduction goals for the electricity sector. In particular, retailers will be required to contract with generators or demand response providers for a minimum level of dispatchable electricity where there is an identified gap, with the emissions produced by that electricity not exceeding an agreed level. Bringing together climate and energy policy in this way will allow the two to evolve and keep pace with each other, which is important in light of the rapidly evolving power system.

The Energy Security Board's modelling from November 2017 found that requiring retailers to contract for a certain level of dispatchable generation will increase the proportion of generation capacity contracted, which should lead to more competitive bidding in the spot market as generators are incentivised to bid as low as possible to increase their chances of being dispatched in order to cover their contracted capacity, resulting in lower spot prices. If the higher demand for contracts was not able to be met by existing resources due to their physical constraints, the demand would be met from new entrants (particularly fast-start resources), which improves system reliability and reduces the likelihood of extreme spot price events, lowering price volatility.

¹⁰ In this report, 'contract', 'firm-capacity hedge contract' and 'firm contract' are terms used interchangeably unless noted otherwise.

3 Emissions reduction requirement

3.1 Overview

The design of the emissions reduction requirement discussed in this chapter will be established by the CoAG Energy Council using the existing national electricity governance framework (see Chapter 6).

At a national level, the Commonwealth Government will propose a trajectory of electricity emissions targets based on Australia's international obligations. The emissions reduction target will be expressed as average emissions per MWh (tCO₂-e/MWh), which retailers will be required to meet in respect of their load.

Many State and Territory Governments in Australia have also established schemes to encourage renewable energy and to reduce electricity sector emissions. These schemes can continue outside the NEM framework and are discussed further below.

It is proposed that the emissions reduction requirement under the Guarantee will be implemented in 2020 when the RET is likely to have been met.

The Guarantee consultation paper released in February 2018 set out a range of options for applying the emissions reduction requirement to retailers and contemplated the use of a registry to assist compliance. Stakeholder feedback overwhelmingly suggested that there are serious risks to the liquidity of existing contract markets if retailers are required to tie their financial contracts to the physical supply of electricity and the emissions associated with that supply.

A number of stakeholders suggested that the proposed compliance registry could be used to support the allocation of emissions to a retailer's load. This approach would ensure the Guarantee works in a way that is integrated with existing electricity market operations without compromising financial market liquidity. Importantly, it can draw on existing reporting obligations already faced by participants and complement existing NEM practices that track contract market positions and manage risk.

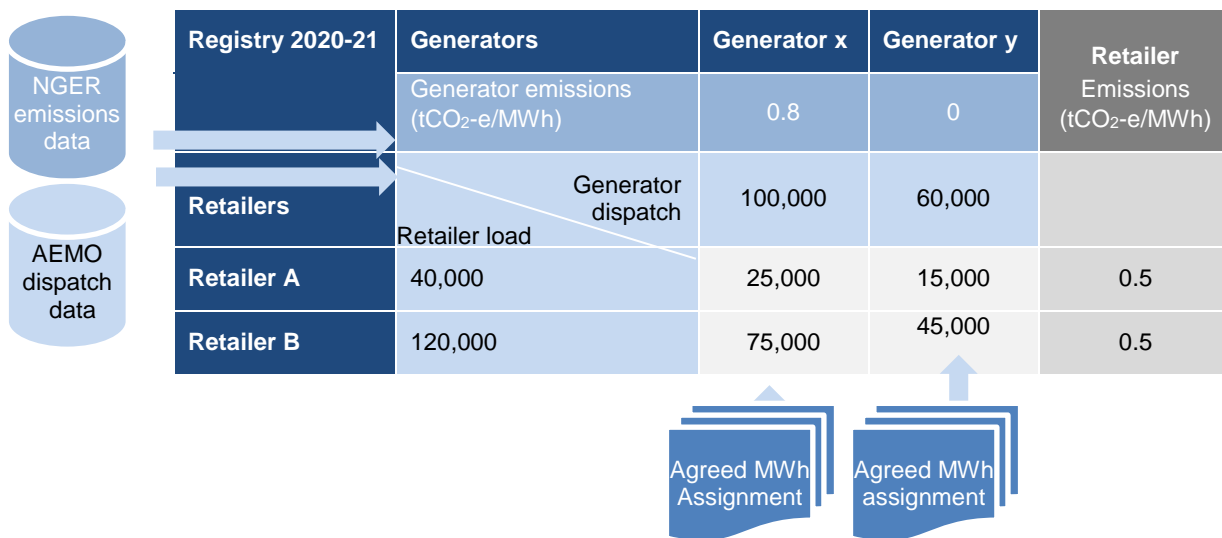
The *National Greenhouse Energy Reporting Scheme* (NGERS), which was legislated more than a decade ago, already requires generators in the NEM to report energy production and associated emissions. NGERS also includes zero-emissions renewable generation. Incorporating this data into a compliance registry and allowing a mechanism for retailers to have electricity generation and its associated emissions profile allocated to them would provide retailers with the infrastructure to demonstrate their compliance in an efficient manner.

Under this approach, retailers will continue to enter into financial contracts to hedge their position in the spot market and manage any obligations under the reliability requirement of the Guarantee. They can then use their existing contracts, or enter into new ones, to obtain the right to assign generation and any associated emissions for the purpose of the emissions reduction requirement.

This could be done in any way the retailer deems appropriate. The retailer would submit to the registry the volume of output from a generator to which they have obtained the rights. This would operate in a similar way to AEMO's *Reallocation Request Service* platform which has operated under the National Electricity Rules since 2007. What a retailer submits to the registry (X volume from Y generator) can be based on any contractual arrangement held

with a counterparty outside the registry, as long as both counterparties verify the claim in the registry.

At the end of a compliance period, once NGERs emissions data has been reported, the registry would automatically match up the emissions to a retailer based on the allocated generation volumes and associated emissions recorded in the registry. The Regulator would compare the average emissions intensity of the retailer against the electricity emissions target in assessing compliance.



3.2 Calculating the emissions intensity target

The emissions intensity target will be calculated to reflect the required emissions reductions across the NEM as legislated by the Commonwealth Government. This target will apply to all relevant load for entities covered by the emissions reduction requirement. The targeted reductions that are required to be sourced by retailers will also need to factor in reductions in emissions for exempt loads.

The Commonwealth Government will provide annual emissions intensity targets that reflect any exempt loads (e.g. Emissions Intensive Trade Exposed (EITE) loads). This will result in lower intensity targets for non-exempt loads to reflect the emissions reduction that would have occurred if the exempt loads had not been exempted. The assumed intensity for these exempt loads could be based on the average emissions intensity of electricity generation in the state in which the load is located, the NEM average emissions intensity, or some other value.

3.3 Applying the emissions reduction requirement

3.3.1 Entities covered by emissions reduction requirements

The design of the Guarantee places a requirement on retailers to ensure that the energy they are purchasing is in line with the emissions reduction targets set for the NEM. The simplest approach to implementing this requirement is through changes to the National Electricity Law and National Electricity Rules.

As discussed in the ESB's November 2017 report¹¹ and the 2018 consultation paper, the entities covered by the emissions reduction requirement will be each entity registered by AEMO as a Customer under the Rules (retailers and registered large users, together referred to in this chapter using the general term 'retailer'). Reporting and compliance will be managed by the definition of controlling corporations applied under the Rules in a consistent manner as used currently by the NGRS.

For each compliance year, each retailer will be required to meet the electricity emissions target in respect of its own load in that year. The calculation of a retailer's load is discussed in section 3.3.2 below.

A retailer's performance against the electricity emissions target will be determined in tCO₂-e per MWh with reference to its load and the emissions associated with its generator allocations from the compliance registry including any unallocated load as discussed in section 3.3.3 below.

The emissions target compliance calculation would be performed following the reporting deadline for a compliance year.

3.3.2 Calculation of load for compliance

The load used for compliance will be based on a retailer's wholesale purchases from AEMO plus any non-market embedded generation or behind the meter generation (e.g. solar panels). In the next round of stakeholder consultation, further consideration will be given to how to accurately account for non-market embedded generation or behind the meter generation, the role of aggregators in the market, voluntary green programs (discussed further below) and any transmission and distribution losses.

If the Commonwealth Government decides to exempt the electricity used for EITE activities from the emissions reduction requirement, electricity that a retailer sells for EITE activities in the relevant compliance year will be deducted from that retailer's load at the specified EITE intensity¹².

3.3.3 Generation and emissions reallocation approach

During consultation, several stakeholders raised concerns about the complexity of untangling hedge contracting arrangements to determine the allocation of emissions. Many stakeholders were also concerned about the potential for an increased requirement for there to be a physical linkage in contracts and the consequent potential for increased market power for vertically-integrated participants. Concerns were also raised about how increased physical linkage would make contracts less fungible and lead to a lowering of transparency and liquidity; all of which would risk adding to the costs faced by consumers.

Implementation of the emissions reduction requirement should not impose unnecessary complexity or harm the liquidity or competition in the electricity market as this would be detrimental to the affordability of electricity. The emissions reduction requirement should seek to build on existing legislative frameworks and market practices to minimise compliance

11 See: <http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Report%20on%20the%20National%20Energy%20Guarantee.pdf>

12 Emissions reductions for this load will be allocated across the rest of the NEM load as set out in section 3.2.

costs and aid in the implementation of the Guarantee. At the heart of the emissions reduction requirement is the need for an approach that matches retailers' energy consumption with emissions produced in the NEM.

The current NGERs already requires generators in the NEM to report emissions and energy production. Incorporating this data into a registry and allowing a mechanism for retailers to have the generation and associated emissions allocated to them provides an efficient approach to providing retailers with the infrastructure to demonstrate their compliance. A registry would allow compliance with emissions reduction requirements while working in concert with the existing and future energy contracts that facilitate the assignment from generator to retailers. Stakeholders supported the approach to mitigating the adverse impact on liquidity by keeping compliance options open and for the use of a compliance registry to monitor and verify a retailer's compliance with the emissions reduction requirement.

A reallocation approach described above would allow the emissions reduction requirement to work in a way that is integrated with existing electricity market operations through the allocation of generator output and emissions to retailers in a way that is conceptually similar to AEMO's current reallocation procedures for determining settlement amounts in the wholesale spot market. The ESB supports this type of approach as it will provide the flexibility that retailers require to meet their obligations at least-cost without damaging liquidity in the contract market.

A further benefit of the generation and emissions reallocation approach is that it could be easily extended and applied to other jurisdictions such as Western Australia and Northern Territory if desired. With COAG EC agreement, further work could be done on this in the lead up to the August COAG EC meeting.

3.3.4 The emissions registry – allocating generation and associated emissions

An emissions registry provides the necessary infrastructure to facilitate efficient retailer compliance with the emissions reduction requirement of the Guarantee.

The registry will keep a record of all electricity production and associated emissions profile for each electricity generator by year. The registry used could be an enhancement to AEMO's systems or a newly implemented compliance registry operated by the AER.

Throughout the compliance period, actual generation data from AEMO, combined with an emissions intensity value based on NGERs data from the previous year, will be provided into the registry. At the end of the compliance period, total emissions for each electricity generator will be updated to reflect more accurate figures and ensure consistency with the NGERs framework.

The design of the registry will allow retailers to have a share of a generator's combined production and associated emissions by station allocated to them, which could then be accepted by that generator and presented by the retailer for the purposes of compliance. Any unallocated energy and emissions within the registry would then contribute to calculating the emissions intensity applied to any unallocated loads. If retailers needed to adjust their portfolios after the compliance year has finished but before the reporting date, then further reallocations of emissions values and production could occur.

The emissions reduction requirement is intentionally designed to ensure there is sufficient flexibility for retailers to meet their compliance obligation at lowest possible cost. The transfer and allocation of generation and associated emissions profile will be driven by contracting between retailers and generators. They will continue to contract as they currently do to

manage price risk in the market for their customers and to meet their reliability requirement. As a part of this, or separately, they will agree to re-allocate production and any associated emission via the compliance registry.

Many of these contracts (for example OTC swaps and power purchase agreements) could specifically allow for the allocation of generation and any emissions to the retailer from the generator in the registry. Alternatively, retailers and generators may separately agree for the transfer to occur (for example, the retailer and generator may have hedged using a futures contract and therefore will look to arrange for the transfer of the allocation separately). The design of the registry should be such that the flexibility of contracting arrangements remains.

Obligations under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) apply to controlling corporations only, which require emissions from different facilities to be grouped together. Under the emissions reduction requirement of the Guarantee all controlling corporation loads would also be aggregated and their generator emissions and production would be automatically allocated to the relevant retailer, even if this resulted in the retailer being allocated more generator emissions and production than its load. The retailer may then choose to enter into contracts to reallocate some of these allocated amounts.

This approach will help to mitigate any concerns about the potential misuse of market power in the registry as discussed in Chapter 5.

Box 3.1: Example calculation of a retailer’s emissions per MWh

A retailer has a load of 12,000 MWh during a compliance year and the following allocations are in place. The unallocated emissions level is calculated using the unallocated emissions and production within the registry.

Arrangement	MWh covered	Emissions (tCO ₂ -e)
Owns black coal (emissions of 0.88 tCO ₂ -e/MWh)	4,000	3,520
Transferred black coal allocation under OTC Swap	2,000	1,760
Transferred wind farm allocation under PPA	1,000	0
Owns gas plant (emissions of 0.6 tCO ₂ -e/MWh)	1,500	900
Unallocated load (Total load less allocated production)	3,500	3,056

Its emissions per MWh for that year would be its total emissions divided by its total load in MWh:
 $9,236/12,000 = 0.77\text{tCO}_2\text{-e/MWh}$

(For simplicity, the retailer in this example does not supply EITE activities and does not make use of any flexible compliance options.)

3.4 Flexible compliance options

As discussed in the February 2018 consultation paper, providing flexibility in how retailers meet the emissions reduction requirement could minimise instances of non-compliance and reduce the costs of the mechanism to retailers and their customers. This flexibility will allow retailers to manage variables such as unexpected generator outages and potential delays to the entry of new generators. Importantly, providing this flexibility will not change the emissions outcome for the NEM. The required emissions outcome for the NEM will still be achieved over the medium-term despite year to year fluctuations.

The carrying forward of over-achievement and deferral of compliance were supported by most stakeholders. Views differed on whether limits on the amount carried forward should

apply. Limits on deferral were generally accepted, carrying forward for over achievement ranged between unlimited to not at all.

Arguments supporting the option of unlimited carrying forward of over achievement reflected keeping a consistent approach with the current arrangements for the Renewable Energy Target, managing flexibility around the timing of plant exit and managing long term costs of meeting emissions obligations.

Arguments against unlimited carrying forward of over achievement included mitigating market power of dominant firms and supporting liquidity in the re-allocation of emissions that would foster competition in the retail market and, in turn, help put downward pressure on prices.

3.4.1 Carrying forward overachievement

Retailers should be permitted to carry forward a limited amount of a previous year's overachievement, for use in the next compliance year. Allowing overachievement to be carried forward can incentivise investment when the market needs it and can enable retailers to achieve compliance at a lower cost. Further consideration of the appropriate limit to carrying forward overachievement, if any, will be undertaken in the next stage of stakeholder consultation along with any provisions necessary to prevent hoarding.

However, to ensure that a competitive market is fostered, there should also be a legal requirement that market participants not unreasonably withhold any overachievement from other market participants.

3.4.2 Deferring compliance

To ensure there is adequate flexibility for retailers while ensuring the emissions reduction trajectory is met, retailers should be allowed limited deferral of compliance. Further consideration of the appropriate limit to this will be undertaken in the next stage of stakeholder consultation. This approach balances the need for retailer flexibility while ensuring that this does not undermine the Guarantee's objective of providing long term policy confidence through delivery of the requirements of the Guarantee.

3.4.3 Use of offsets

If the Commonwealth Government determines that certain offsets may be used for compliance, the National Electricity Law and Rules could provide details regarding the use of offsets for the emissions reduction requirement. In addition, if the Commonwealth Government sets an overall limit on the use of offsets by the electricity sector, the Rules may address how to allocate that limit between retailers in the NEM.

If there was an absolute cap on offsets for each retailer, provisions could be needed to guard against the risk of large retailers splitting into several smaller entities to gain the benefits of obtaining relatively higher offset limits.

Consistent with the focus of the emissions reduction requirement being to reduce emissions in the electricity sector, retailers could be required to use within-NEM opportunities before relying on offsets to bring themselves into compliance. For example, it could be the case that a retailer would not be permitted to use offsets for compliance in a particular year if it would have any over-compliance in that year before taking the offsets into account.

3.5 Reporting and compliance

For the Guarantee to achieve its policy objectives, it is important to have a robust framework for monitoring and enforcing compliance with the Guarantee.

The primary aim of enforcement is to ensure policy objectives are met. Effective enforcement requires the enforcement agency to have resources to determine when an entity has not complied with its obligations, and to impose an appropriate penalty: one that is proportionate to the offence, acts as a deterrent, and provides greater certainty that the policy objectives are to be met.

3.5.1 The AER as the enforcement agency for the Guarantee

The AER was established in 2005 and enforces the laws for the NEM, and monitors and reports on the conduct of market participants and the effectiveness of competition. The AER is also the economic regulator of the electricity networks. This role currently extends to electricity networks in all jurisdictions except Western Australia. The AER operates under the *Competition and Consumer Act 2010 (Cth)* and is a part of the ACCC.

In light of the need to integrate the dual requirements of the Guarantee with the functioning of the energy markets, and the fact that the enforcement agency for the Guarantee would need to enforce requirements set out in the National Electricity Law and Rules (see chapter 6), the AER is considered best-placed to monitor and enforce compliance with both requirements of the Guarantee. In doing so, it will use information provided by agencies such as AEMO and the CER.

The AER already has access to a range of compliance tools under the NEL. The types of tools that are available to the AER under the NEL are discussed in section 3.5.3.

The AER would annually publish high-level compliance outcomes, such as the proportion of entities covered by the Guarantee that complied with the emissions reduction requirement and the reliability requirement.

3.5.2 The compliance period

Stakeholder comments in relation to the compliance period were mixed with a split between the preference for financial years to align with NGERs, corporate reporting and network pricing, and calendar years to align with the Renewable Energy Target compliance and EITE exemption processes.

Given financial year compliance would align with NGERs reporting, this may be the most appropriate approach for the compliance registry. However, further consideration should be given to the appropriate compliance period in the next round of consultation and as the detailed design is developed.

Compliance reporting should occur after the three month period following the end of the compliance year when companies need to submit their NGER reports to the Clean Energy Regulator. This would allow for emissions, production and load data to be finalised and a further period to resolve any re-allocation imbalances.

3.5.3 Enforcement tools for emissions reduction requirement

If, despite the flexible compliance options described in section 3.4, retailers fail to meet the emissions reduction requirement, the AER needs to be able to enforce compliance in a way

that minimises costs for consumers. The AER already has access to a range of compliance tools and discretion in deciding whether to take enforcement action and the nature of that action. Each case is assessed on its merits. In determining an appropriate enforcement response, the AER considers all relevant factors and circumstances.

Potential enforcement tools, based in most cases on the AER's current powers, are listed below (noting that these could apply in addition to the automatic carry-over of a retailer's under-compliance with the emissions reduction requirement in one compliance year to the next compliance year).

- **Culture of compliance:** Minimising non-compliance through informing, educating and engaging stakeholders is better than enforcement action after a breach has occurred.
- **Administrative undertakings:** Administrative resolutions are a more informal and less intrusive enforcement option which the AER uses to resolve certain matters. The AER may be more likely to act administratively where the effect of an actual or potential contravention is limited, and a business has taken (or agreed to take) appropriate steps to end the conduct and to remedy any harm done.
- **Infringement notices:** These will specify the nature of the contravention and the amount of the penalty that must be paid. The AER's current practice is to publish all infringement notices.
- **Enforceable undertakings:** These are written statements from an entity that it will take specified actions (for example, entering into contracts in order to resolve a breach). It is proposed that the AER be given the discretion to approve such undertakings instead of issuing a penalty.
- **Institute civil proceeding:** The AER can initiate civil proceedings in the courts for alleged breaches of civil penalty provisions of the national energy laws:
 - **Injunctions:** A court may order an injunction requiring a person to do something or desist from doing something.
 - **Civil penalties:** A court may order that an entity pay a financial penalty as a result of breaching its obligations. The definition of "civil penalty" in the NEL may need to be amended in order to provide for more meaningful upper limits on civil penalty amounts (as has been done in respect of rebidding civil penalty provisions).
- **Suspending or revoking authorisation:** As a final step, in cases of significant and repeated non-compliance, the AER may suspend or revoke an entity's retail authorisation, preventing it from participating in the retail market. This would result in the emissions reduction requirement resting with those retailers who pick up the load.

The primary approach should be to build a culture of compliance. Given that the Guarantee will be new to market participants, the AER will need to ensure that the appropriate information is easily available to retailers and that they understand the requirements and mechanism through which they can meet their requirements.

3.6 Other Considerations

3.6.1 Interaction with voluntary 'green' schemes

The design of the emissions reduction requirement needs to account for the interaction with voluntary green schemes. Some businesses and household consumers undertake voluntary

action to reduce emissions associated with their electricity use. Voluntary action provides additional demand for renewable energy above mandatory government requirements. In doing this, the signal for investment in these types of electricity generation assets is further strengthened. A prominent example is the GreenPower program.

Under the generation and emissions reallocation approach, retailers will be required to meet additional obligations above those set by the Guarantee to ensure they meet their commitment to customers and the voluntary action of customers is duly recognised. This would occur through retailers securing allocations of additional lower emissions generation than required under the Guarantee. A retailer would need to report in the registry the MWh sold to customers under a voluntary green program each year and the emissions level promised under that program, for example zero emissions generation.

In the case of GreenPower, retailers would still need to surrender large-scale generation certificates (LGCs) representing the additional electricity sourced from renewable energy generators.

3.6.3 Interaction with the large-scale renewable energy target

The Large-scale Renewable Energy Target (LRET) is designed to deliver 33,000 GWh of large-scale renewable generation per annum by 2020, the target does not increase beyond this. The current target operates in isolation of broader energy policy and consequently investment has been driven without regard to the security and reliability of the NEM. The Finkel review found that the “Large-scale Renewable Energy Target scheme should remain unchanged to the end of its design life, but not be extended in its current form”.

The Guarantee brings together climate and energy policy for the first time, consequently future investment in low emissions technology will be rewarded through the emissions reduction requirement of the Guarantee. However, the existence of the LRET and any participation in this scheme does not preclude this generation from also benefiting from the Guarantee and contributing to achieving the emissions reduction trajectory for the sector. Some stakeholders have argued that the LRET should be locked to new entrants once the target is met. This would artificially inflate the price of Large-scale Generation Certificates and unnecessarily increase costs to customers. It is expected that the reward provided by the combined LRET and Guarantee until 2030 will be sufficient to reward investment aimed at lower emissions.

The ESB supports the Finkel Review conclusion that no changes should be made to the Renewable Energy Target. The Renewable Energy Target is legislated to continue through to 2030. Following the implementation of the Guarantee, the Renewable Energy Target should continue as legislated without closure to new entrants as suggested by some stakeholders. All renewable generators will contribute to achieving the emissions reduction trajectory established for the electricity sector under the Guarantee.

3.6.4 Embedded and behind the meter consumption

To ensure that the emissions reduction requirement remains technology neutral all existing embedded generation and behind the meter consumption will be added to a retailer’s load but will also be automatically allocated to the relevant retailer for calculating their emissions. Further work will be required in the next round of consultation to develop an appropriate methodology.

3.6.5 Interaction with state and territory based renewable energy targets

Some States and Territories in the NEM have renewable energy targets that imply greater ambition out to 2030 than the proposed emissions trajectory for the Guarantee. All State and Territory renewable energy schemes can operate with the Guarantee and contribute towards achieving the emissions reduction trajectory for the Guarantee.

Further detail on individual state schemes is available at appendix B.

3.7 Calculation of emissions per MWh – overview

The following provides a high-level description of the way in which the emissions per MWh of each retailer's load would be calculated for a compliance year.

The calculation for each retailer would occur as follows using the information contained in the compliance registry for the relevant compliance year:

- *Total load* – The total load is equal to wholesale purchases plus all embedded generation and behind the meter generation not exported less any exempt load (for example, EITE) for each retailer as discussed in 3.3.2 above.
- *Allocated emissions and production* – The sum of the emissions and production that has been allocated within the registry at the compliance period reporting date to the specified retailer.
- *Unallocated emissions intensity* – The sum of all unallocated emissions divided by the sum of all unallocated production within the registry at the compliance period reporting date.
- *Unallocated load* – Total load less allocated production within the registry at the compliance period reporting date for the specified retailer.
- *Unallocated emissions* – The sum of the retailer's unallocated load multiplied by the unallocated emissions intensity.
- *Voluntary emissions reductions* – The load contracted by each retailer under a voluntary 'green scheme' for the given compliance year multiplied by the agreed emissions reductions.
- *Carry forward/Deferred emissions reductions* – In any year, subject to limits on carrying forward and deferral, the Emissions Intensity Target less the calculated Emissions per MWh multiplied by the total load at the compliance period reporting date for the specified retailer. If the value is positive then the retailer has over achieved the target and can bank this for later use, if negative then the obligation has been deferred to a later period.
- *Offsets* – Eligible emissions reductions subject to Commonwealth Government limitations.
- *Emissions per MWh* – (Allocated emissions + Unallocated emissions + Voluntary emissions reductions + Banked/Deferred Emissions - Offsets) divided by Total load.

4 Reliability requirement

4.1 Overview

The Guarantee will require retailers to achieve NEM-wide emissions reduction targets without compromising the reliability of the region/s in which they operate. Each region of the NEM has its own unique characteristics that will impact on the reliability of the region over time. The profile of likely generator retirements and the penetration of intermittent renewable energy technologies is likely to impact on the future reliability of a region. States or Territories that pursue their own emissions reduction or renewable energy policies (in excess of the emissions reduction targets for the NEM delivered under the Guarantee) will likely see increased penetration of intermittent renewable energy. These state-based policies will therefore increase the likelihood that a reliability obligation on retailers is triggered in a particular region.

The reliability requirement is designed to incentivise retailers and customers to support, through their contracting, investment in resources that maintain the reliability of the power system. If retailers do not secure sufficient contracts by a prescribed time, AEMO will be required to procure resources to fill any outstanding gap. The cost of AEMO procuring these resources will be met by those retailers who failed to comply with the reliability obligation.

The reliability requirement is intended to deliver sufficient incentives to market participants to ensure the reliability of the power system. If the market adequately responds to these incentives, then any **material** reliability 'gaps' should be resolved before a reliability obligation needs to be placed on retailers (that is, the reliability obligation does not need to be triggered to act as a safety net). However, should a **material** reliability 'gap' remain then the obligation is designed to balance the need to give retailers sufficient time to respond (or AEMO as a last resort) coupled with as light-handed a compliance framework as possible to ensure any costs of compliance are minimised.

There are eight high-level steps to the reliability requirement:

1. **Forecasting the reliability requirement:** Using the Electricity Statement of Opportunities (ESoO), AEMO will forecast, from ten years out, whether the reliability standard is likely to be met (or not) in any NEM region over the forecast period. If the reliability standard is unlikely to be met, AEMO will identify the size of any 'gap' in supply/demand response.

These forecasts will also detail the pipeline of potential generation projects over the forecast period along with the progress of their development. An appropriate accountability framework will be introduced to support and improve the development of these forecasts which will include rules pertaining to transparency and stakeholder consultation.

AEMO will work with the Reliability Panel on the appropriateness of the current Reliability Standard in the face of an increasingly 'peaky' supply-demand balance. The intention of the Guarantee is to remain aligned to the Reliability Standard while ensuring there are adequate resources available to meet peak (as opposed to average) demand.

2. **Updating the reliability requirement:** Consistent with current practice, AEMO will update the forecasts annually or if there is a material change to the supply/demand outlook. Examples of major changes could be the announcement of a major generator

addition or retirement, major changes in demand through retirements or entry of load or the development of independent micro-grids (to the extent that such development impacts reliability). The intent of the update will be to supply as much transparency as practical.

- 3. Triggering the reliability obligation:** If a **material** reliability 'gap' is identified in the forecasts, the market would be expected to react. This could take the form of investment in new capacity (for example, generation, transmission, storage or demand response) or to offer additional existing capacity to the market.

If, three years from the period in question, a **material** 'gap' continues to exist or a new **material** 'gap' emerges, as a result of a generator giving notice that it intends to close, then the reliability obligation will be set to trigger, and retailers may be expected to demonstrate future compliance.

An 'independent entity' (for example, the AER or the Reliability Panel) will need to approve a request from AEMO that the reliability obligation on retailers be triggered and, if this approval occurs, the trigger will be operative.

- 4. Liable entities:** If the reliability obligation is triggered, then all retailers and large customers will need to assess their likely share of system peak demand and secure sufficient qualifying contracts, by the compliance date, to cover this. As a safe harbour provision, their share of system peak demand could be assessed based on the system peak demand that would be expected to occur one in every two years. Large customers will have the option to have their reliability obligation managed by a retailer on their behalf. The threshold size of a retailer or large customer that would constitute a liable entity under the reliability requirement will be considered during the next round of consultation.
- 5. Qualifying contracts:** If the reliability obligation is triggered, liable entities will be required to enter into sufficient contracts for 'dispatchable' capacity (including demand response) to cover their share of system peak demand at the time of the reliability 'gap'. This could be assessed based on the system peak demand that would be expected to occur one in every two years.

There are a range of existing contracts, such as cap and swap contracts, that expose the sellers of those contracts to very high prices if generation or demand response is not available when the system needs it. Generally speaking, these types of contracts are only offered if they are underpinned by 'dispatchable' capacity or demand response, that is capacity that is available to be dispatched when the system needs it. Weather derivatives and certain insurance products are not likely to qualify. The specific types of contracts that will not qualify will be considered during the next round of consultation.

To help manage concerns about the level of concentration in the electricity market, only those contracts bought from centrally cleared trading platforms and/or reported to centralised trade repositories (exchange traded or over-the counter) will qualify. The introduction of centrally cleared trading platforms and/or centralised trade repositories for over-the-counter products will bring the electricity sector more in line with the changes made to other over-the-counter markets after the Global Financial Crisis. Vertically integrated retailers will not be able to use their own generation to comply (unless purchased via a centrally cleared trading platform and/or reported to centralised trade repositories). Large customers who are subject to the reliability requirement will be able to use existing contracts to comply.

To further support competitive market outcomes and provide liable entities with sufficient optionality, AEMO will conduct a voluntary 'book-build' to help match buyers of contracts with new capacity coming into the market. Contracts secured through the 'book-build' will comply.

The development of demand response products that qualify under the reliability obligation will be central to ensuring the reliability requirement of the Guarantee is met at least-cost.

- 6. Procurer of last resort:** One year from the forecast reliability 'gap', AEMO will again review its forecast. If the reliability standard is now forecast to be met there is no further action.

However, if a sufficient 'gap' persists then AEMO will procure the remaining necessary resources via an enhanced RERT/Strategic Reserve. This could include the use of reverse auctions to ensure efficient outcomes. However, consistent with the existing RERT, these resources would be 'out-of-the-market'.

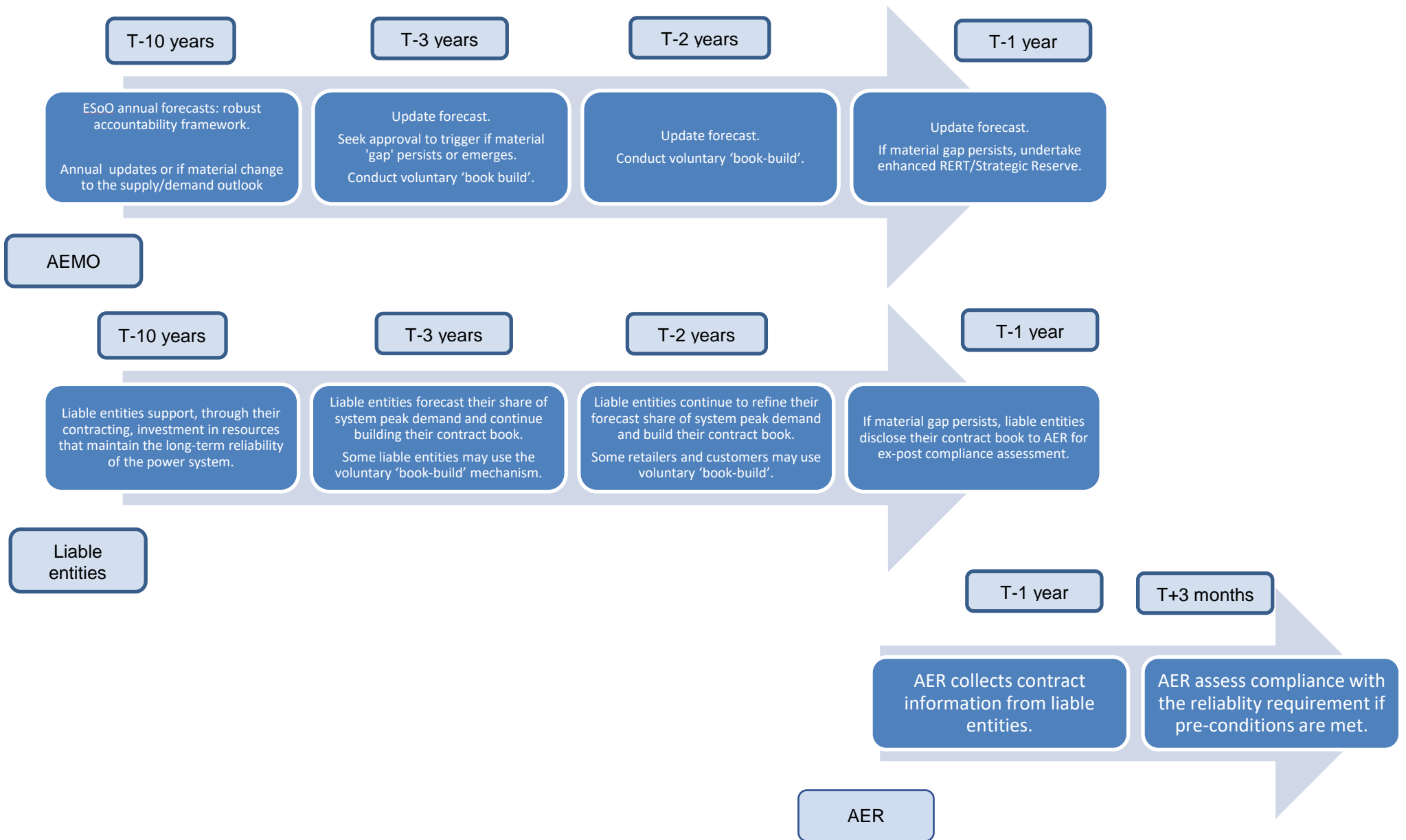
Liable entities will be required to disclose their contract positions to the AER at the point that AEMO commences its 'procurer of last resort' function. However, any assessment of compliance with the reliability obligation will be done ex-post.

- 7. Compliance:** The AER will only assess compliance with the reliability obligation if AEMO had to procure resources to meet the forecast reliability 'gap' via the enhanced RERT/Strategic Reserve **and** if actual system peak demand exceeds that which would be expected to occur one in every two years.

If AEMO had to procure resources to meet the forecast reliability 'gap' via the enhanced RERT/Strategic Reserve **and** actual system peak demand exceeded that which would be expected to occur one in every two years then the AER will assess compliance with the reliability obligation.

In this event, the AER will, using data from the relevant period/s, determine each liable entities' share of system peak demand. The AER will then review the contract positions of all liable entities to assess whether they had adequate enduring contracts in place to meet their share of system peak demand. As a safe harbour provision, their share of system peak demand could be assessed based on the system peak demand that would be expected to occur one in every two years. As noted above, contract positions will be disclosed to the AER at the point AEMO begins its 'procurer of last resort' function.

- 8. Penalties:** Penalties will be assigned to retailers that are assessed to have fallen short of their reliability obligation. These penalties will include the cost of procuring necessary resources via an enhanced RERT/Strategic Reserve.



4.2 Step 1: Forecasting the reliability requirement

AEMO will undertake modelling to forecast the future requirements for reliability in each NEM region. The purpose of the modelling will be to provide information to the market about the size of any forecast 'gap' in reserves. As discussed above, the profile of likely generator retirements and the penetration of intermittent renewable energy technologies and distributed energy resources behind the meter will particularly impact on the future reliability of a region.

The ESoO already provides information to market participants on the outlook for supply and demand and the likelihood of breaching the reliability standard in each region over the next 10 years. The forecasts use a combination of industry inputs (for example, committed generation and announced generator retirements) as well as stochastic modelling of supply and demand.

To support the Guarantee, the ESoO will publish a forecast of reliability in each region for the next ten years. For example, the ESoO published in 2020 will provide an estimate of regional reliability and any 'gap' in reliability, for each region, for each year until 2030. These forecasts will also detail the pipeline of potential generation projects over the forecast period along with the progress of their development.

As noted above, AEMO will work with the Reliability Panel on the appropriateness of the current Reliability Standard in the face of an increasingly 'peaky' supply-demand balance. The intention of the Guarantee is to remain aligned to the Reliability Standard while ensuring there are adequate resources available to meet peak (as opposed to average) demand.

Since AEMO's forecast of the reliability requirement will (potentially) form the basis of a regulatory obligation, it will be subject to a robust and transparent process along with an annual performance review. It is important that the inputs used in the forecast are transparent, and the methodology used to determine the forecast is clearly understood. Stakeholders were also concerned that systematic over-forecasting could add to the cost of delivering electricity to customers. To assist the forecasting process, market participants will have an opportunity to dispute and contest assumptions and parameters used in the forecasts.

In developing the forecasts, AEMO will be required to publish, for public consultation, its inputs, assumptions and methodology for determining the reliability requirement.

The dominant view among stakeholders was the forecasting period should be between 3 and 10 years. Use of the ESoO will give the market sufficient time to respond to any gaps identified in this forecasting horizon.

If a 'gap' is forecast, the market will have the opportunity to address the gap, either by building new capacity (either generation or demand response) or delaying retirement decisions. The market should respond to AEMO's forecasts and deliver the capacity, by adjusting their investment and retirement decisions to avoid the requirement being triggered.

The MT PASA and ST PASA processes will remain unchanged.

4.3 Step 2: Updating the reliability requirement

Consistent with current practice, AEMO will update the forecasts of the reliability requirement annually or if there is a material change to the supply/demand outlook, for

example if a generator announces retirement or there is the loss of significant load such as a smelter.

These updates will also allow AEMO to reflect new information, for example, changed forced outage rate assumptions or technological improvements. Any updates to the reliability requirement would be accompanied by a market notice from AEMO.

4.4 Step 3: Triggering the reliability obligation

If a reliability gap is identified in the forecasts, the market would be expected to react. This could take the form of investment in new capacity (either generation, transmission, storage or demand response) or to offer additional existing capacity to the market.

If a reliability gap is forecast, the period between the start of the forecast horizon and the trigger point is effectively a 'warning period' that allows market participants to alleviate shortfalls without the imposition of a reliability obligation.

However, if three years from the period in question a **material** 'gap' continues to exist or a new **material** 'gap' emerges, as a result of a generator giving notice that it intends to close, then the reliability obligation will be set to trigger, and retailers may be expected to demonstrate future compliance. The definition of a **material** 'gap' should be pre-defined and objective so that participants have certainty and transparency about what could result in the reliability obligation on retailers being triggered. Materiality could be determined by the forecast gap as a percentage of maximum demand in a region persisting for a given period of time. The definition of materiality will be defined in consultation with stakeholders.

To manage stakeholder concerns about attaching a regulatory obligation to a forecasting process, it will be important that the trigger for the reliability obligation has some independent checks and balances. An 'independent entity' (for example, the AER or the Reliability Panel) will therefore need to approve a request from AEMO to trigger the reliability obligation on retailers and, if this approval occurs, the trigger will be operative. This additional step is also important given significant stakeholder concerns about relying on forecasts to determine the required level of capacity in the market.

4.5 Step 4: Liable entities

The reliability requirement is designed to incentivise retailers and customers to support, through their contracting, investment in resources that maintain the long-term reliability of the power system.

Retailers, in aggregate, should be willing to help manage the long-term reliability of the power system on behalf of their residential and small-to-medium enterprise customers because they are confident in their future demand for electricity.

However, as acknowledged by some stakeholders, there are a range of very large customers in Australia whose future demand for electricity is unknown and is unknowable to electricity retailers. Without a long-term contract from these customers, retailers (in aggregate) may be unwilling to help support the long-term reliability of the power system on behalf of these customers without charging a significant risk premium.

Further, if the reliability obligation is placed only on retailers (on behalf of all their customers) then the majority of the obligation to purchase contracts will be with a

concentrated number of market participants making it more difficult for smaller retailers to compete, negatively impacting the affordability of electricity.

Giving large customers the choice to contribute to the reliability of the power system directly or to contract with a retailer should ensure that the reliability requirement is managed at least cost.

All retailers (large and small) will then be able to compete to manage the reliability requirement on behalf of large customers. This should have significant benefits for competition in the electricity market as detailed in the chapter addressing competition concerns (chapter 5).

The threshold size of a retailer or large customer that would constitute a liable entity under the reliability requirement will be considered during the next round of consultation with stakeholders.

If the reliability obligation is triggered, then all liable entities that have not transferred their obligation to a retailer will need to assess their likely share of system peak demand and secure sufficient contracts to cover this.

One in every ten years, expected system peak demand will be materially higher than the system peak demand experienced one in every two years. To provide a safe harbour within the reliability obligation it may be appropriate to only require liable entities to demonstrate they have sufficient contracts in place to cover their share of the system peak demand that would be expected to occur one in every two years. This will help to prevent the cost of over-contracting. It is likely that the difference between a one in ten-year system peak demand and a one in two-year system peak demand will be most cost-effectively delivered via demand response. The market price cap will ensure that retailers are still incentivised to cover their financial exposure to one in ten-year system peak demand but, in the event AEMO considers there are insufficient resources, that is that a 'gap' still exists, then any additional required resources could be procured via the enhanced RERT/Strategic Reserve detailed in section 4.9.

4.6 Step 5: Qualifying contracts

If the reliability obligation is triggered, liable entities will be required to enter into sufficient contracts for 'dispatchable' capacity (including demand response) to cover their share of system peak demand at the time of the reliability 'gap'. This could be assessed based on the system peak demand that would be expected to occur one in every two years.

Liable entities will need to know what instruments will "qualify" for meeting the reliability obligation. A retailer's management of the financial risks associated with spot market exposures occurs via the use of exchange-traded and over-the-counter (OTC) contracts, as well as various other risk management options. Each retailer uses a different combination of various products to manage the financial risks associated with selling electricity, according to the businesses' risk appetite and financing arrangements.

There are a range of existing contracts, such as cap and swap contracts, that expose the sellers of those contracts to very high prices if generation or demand response is not available when the system needs it. Generally speaking, these types of contracts are only offered if they are underpinned by 'dispatchable' capacity or demand

response, that is capacity that is available to be dispatched when the system needs it. As noted by the ACCC and a range of other stakeholders, it will be important to allow existing contracting instruments to operate much as they do and be capable of addressing any reliability obligation under the Guarantee.

Submissions to the Department of the Treasury's "Implementation of a framework for Australia's G20 over-the-counter derivatives commitments" highlight the largely physical nature of electricity contract markets that are primarily used to hedge physical market risk rather than for speculation.¹³

However, there are some products retailers buy to manage their financial exposure to the spot market that have no relationship to the physical supply of electricity. Weather derivatives are a good example. These derivatives are usually sold by financial market participants who are willing to take a bet on weather outcomes in various cities and countries. Like an insurance product, these products only need to pay out when a weather event occurs or doesn't occur, and the products generally have no relationship to the electricity market itself. It may therefore be appropriate to exclude some products from qualifying under a reliability obligation. The specific types of contracts that will not qualify will be considered during the next round of consultation.

To help manage significant stakeholder concerns about the liquidity and transparency of contract markets and the level of concentration in the electricity market more broadly, only those contracts bought from centrally cleared trading platforms and/or reported to centralised trade repositories (exchange traded or over-the counter) will qualify. The introduction of centrally cleared trading platforms and/or centralised trade repositories for over-the-counter products will also help to bring the electricity sector more in line with the changes made to other over-the-counter markets after the Global Financial Crisis. Vertically integrated retailers will not be able to use their own generation to comply (unless purchased via a centrally cleared trading platform and/or reported to centralised trade repositories). Further detail on this is provided in the chapter addressing competition concerns (chapter 5). Large customers who are subject to the reliability requirement will be able to use existing contracts to comply.

To further support competitive market outcomes and support the optionality preferred by some stakeholders, AEMO will conduct a voluntary 'book-build' to help match buyers of contracts with new capacity coming into the market. Contracts secured through the 'book-build' will qualify for compliance under a reliability obligation.

The 'book-build' would be voluntary but could incentivise the delivery of new investment into the market. The 'book-build' will create new bilateral contracts, such as over-the-counter swaps and caps, that will provide extra certainty of revenue to support new investment in required resources. This could also deliver additional liquidity to the market.

The 'book-build' will provide new suppliers with the opportunity to sell contracts for the duration of any reliability gap and afford retailers and market customers the opportunity to buy new contracts in a potentially tight contract market.

If the reliability obligation is triggered, AEMO will invite interested parties to lodge an expression of interest to participate in the 'book-build'. The 'book-build' will be conducted by inviting sellers to make offers to sell new contracts for the duration of the gap and for buyers to make offers to buy new contracts. AEMO will aim to clear the

¹³ Australian Treasury Corporations (Derivatives) Determination 2013

market by matching buyers and sellers in a way that delivers the maximum closure of the gap.

If a reliability gap continues to persist then AEMO will have the option to re-run the 'book-build' again two years before the reliability gap is forecast to occur.

As recommended by the Finkel Review, the AEMC is currently considering how to best facilitate more demand response in the wholesale electricity market as part of the Reliability Frameworks Review. The ESB will consider the development of this mechanism as part of its considerations for the Guarantee and ensure that any products developed would qualify under a reliability obligation.

The development of demand response products that qualify under the reliability obligation will be central to ensuring the reliability requirement of the Guarantee is met at least-cost.

4.7 Step 6: Procurer of last resort

One year from the forecast reliability 'gap', AEMO will again review its forecast. If the reliability standard is now forecast to be met there is no further action including any compliance action for liable entities.

However, if a sufficient 'gap' persists then AEMO will procure the remaining necessary resources via an enhanced RERT/Strategic Reserve. This could include the use of reverse auctions to ensure efficient outcomes and may require contracting over multiple years if a **material**, enduring gap still remains.

It is necessary for AEMO to perform the function of procurer of last resort, to give confidence to governments and AEMO that any reliability 'gap' will be resolved to support the long-term reliability of the electricity system. The procurer of last resort function is an important safety net that will ensure sufficient investment in dispatchable resources (generation and demand response) in the event the market fails to deliver this.

Some submissions commented on how long it would take to build capacity with one stakeholder suggesting that any asset would take at least 10 months to develop, but that different types of generation or demand response take different timeframes to build and install. Larger-scale facilities may take much longer to develop and build. The volume of capacity that is required in the market and the time available to secure those resources matter.

In all cases, AEMO will work with relevant state governments and other market bodies on an ongoing basis to ensure the nature of any reliability 'gap' is well understood along with the pipeline of potential projects to resolve the reliability 'gap'. If, at any time, AEMO and/or a relevant state government feels that the specific circumstances in a particular jurisdiction dictate that prudent action is required to ensure the ongoing reliability of the electricity system, then either AEMO or the relevant state government can make a rule change request that could be processed via a six week, expedited process. The rule change could enable AEMO to commence its procurer of last resort function earlier than one year before the forecast reliability gap given the extenuating circumstances in that jurisdiction at that time. This rule change request would be considered on an expedited basis (within six weeks) on the grounds that it would be urgent within the meaning of the National Electricity Law, that is, the rule is necessary to avoid an imminent threat to the reliability of the electricity system. It is not the

intention of the Guarantee for AEMO to become the default procurer of capacity for the NEM.

In addition to this procurer of last resort function, AEMO will also have short- and medium-notice RERT available to meet any unexpected gaps that may arise closer to the period in question.

The AEMC is currently considering two rule changes submitted by AEMO on 1) reinstating the long-notice RERT; and 2) enhancing the existing RERT. The reinstatement of long-notice RERT is proposed to be undertaken on an urgent basis. Given the more extensive nature of the rule change proposing the enhanced RERT, any decision on it cannot be done on an urgent basis and will need to be developed in parallel with the development of the Guarantee.

Like the short- and medium-notice RERT, any resources procured via an enhanced RERT/Strategic Reserve will be for supply 'outside of the market' to avoid distorting the operation of the electricity market. This means that the resources contracted under this process must not otherwise be available in the wholesale or ancillary services market operated by AEMO.

Liabe entities will be required to disclose their contract positions to the AER at the point that AEMO commences its procurer of last resort function. However, any assessment of compliance with the reliability obligation will be done ex-post¹⁴.

4.8 Step 7: Compliance

The Guarantee has been designed as a safety net to give confidence to governments that sufficient dispatchable resources will continue to be available to ensure the reliability of the NEM. As such, the reliability requirement is only translated into an obligation on retailers if a **material** reliability 'gap' persists and it is verified by an independent entity. Similarly, and in response to stakeholder concerns, compliance with the reliability obligation has been designed to be as light-handed as possible to minimise cost to liable entities.

If AEMO had to procure resources to meet the forecast reliability 'gap' via the enhanced RERT/Strategic Reserve but actual system peak demand was less than would be expected to occur one in every two years then the costs of the enhanced RERT/Strategic Reserve will be socialised across all customers in that region.

However, if AEMO had to procure resources to meet the forecast reliability 'gap' via the enhanced RERT/Strategic Reserve **and** actual system peak demand exceeded that which would be expected to occur one in every two years then the AER will assess compliance with the reliability obligation.

In this event, the AER will, using data from the relevant period/s, determine each liable entities' share of system peak demand. The AER will then review the contract positions of all liable entities to assess whether they had adequate enduring contracts in place to meet their share of system peak demand. As a safe harbour provision, their share of system peak demand could be assessed based on the system peak demand that would be expected to occur one in every two years. As noted above, contract positions

¹⁴ During the detailed consultation phase the ESB would like to further understand the circumstances where updating contract positions may be required.

will be disclosed to the AER at the point AEMO begins its 'procurer of last resort' function.

The compliance framework will be developed in consultation with stakeholders and will provide guidance on the types of information that will need to be reported to the regulator and the form in which that information is to be reported.

4.9 Step 8: Penalties

Penalties will be assigned to retailers that are assessed to have fallen short of their reliability obligation. These penalties will include at least some of the cost of procuring necessary resources via an enhanced RERT/Strategic Reserve.

The reliability requirement does not lend itself to an explicit graduated compliance framework, as with the emissions reduction requirement. Therefore, non-compliance needs to be discouraged through a financial penalty.

The ESB has a preference for allocating (efficient) costs over exacting penalties because penalties are inefficient unless they correct for an externality or market failure. In addition, since compliance is undertaken on an ex post basis, penalties will be based on observed costs. It is expected that at least some of the cost of the RERT will be imposed as penalties.

It will be important to make sure that in any penalty regime, the AER has sufficient discretion to administer the penalties. A two-stage approach to compliance will be undertaken:

- In the first stage, the AER's assessment would evaluate whether market customers contracted to a level consistent with their share of system load over the forecast gap period. This assessment would identify the extent to which retailers have fallen short of the reliability requirement for the purposes of allocating the costs on a relatively formulaic basis.
- In the second stage, the AER would retain its ability to apply its usual suite of enforcement options. These enforcement options would likely only be used for more significant or repeated failures to comply with the reliability obligation.

4.10 Other considerations

4.10.2 Emissions-intensive trade exposed businesses

To ensure appropriate measures are being taken to encourage generators to make their capacity available to the market and ensure that appropriate action has been taken to secure electricity supply, it is necessary for the Guarantee to cover all customer load.

Due to the nature of their businesses, many EITEs typically have long-term electricity contracts. Therefore, it is expected the reliability requirement of the Guarantee will have a low impact on EITE contracting practices but will provide an additional incentive for EITEs to contract to meet their demand during peak periods.

For example, if EITEs were exempt and an EITE business chose to contract with a portfolio of renewable generators, there may not be sufficient dispatchable capacity to meet demand during times when renewable output is low and demand is high. Unless this EITE business had in place demand response or other dispatchable generation contracted either directly or via retailer, they would not be able to guarantee they had sufficient supply during peak demand.

4.10.4 Jurisdictional considerations

The ACT sits within the NSW region of the wholesale electricity market. Therefore, the reliability requirement would apply in respect of NSW, with ACT retailers required to comply with the requirement if it is triggered for the NSW region.

In Tasmania, there is a Tasmanian Wholesale Contract Regulatory Framework, which sets out the rules surrounding the provision of Tasmanian electricity derivatives by Hydro Tasmania to other electricity market participants. Hydro Tasmania can also offer unregulated contracts to counter-parties beyond this. It is expected that these contracts would qualify for compliance under a reliability obligation.

5 The Guarantee: impact on affordability and competition

5.1 Affordability

A well-designed Guarantee can contribute towards resolving all three aspects of the 'policy trilemma' – maintain reliability, lower emissions in line with international commitments, and improve affordability. The prior two chapters focused on reliability and emissions; this chapter discusses affordability and the importance of competitive markets to support affordability.

The Guarantee can lower wholesale prices and, as a result, retail electricity prices. The ESB's November 2017 advice suggested that the Guarantee would reduce residential electricity bills electricity prices by an average of \$120 a year over the 2020-2030 period compared to BAU. The Guarantee works to lower prices in four key ways:

1. By providing an integrated energy and emissions reduction policy, the Guarantee lowers the risk premium on investment in new renewable and non-renewable generation capacity. The ESB's November 2017 advice noted that a lower risk profile for new generation capacity, due to the presence of the Guarantee, contributed slightly less than half of the fall in wholesale prices under the Guarantee compared to business-as-usual (BAU).¹⁵
2. The Guarantee is likely to result in an increase in the proportion of generation capacity contracted (and therefore reduce the proportion that is uncontracted). This is likely to reduce both the level and volatility of spot prices due to a combination of more competitive spot market bidding and the risk reduction from having more capacity contracted. The ESB's November 2017 report noted that increased contracting under the Guarantee contributed more than half of the fall in wholesale prices under the Guarantee compared to BAU and more than offset any increase in contract prices as a result of an increased demand for contracts.¹⁶
3. The Guarantee will incentivise investment in low cost dispatchable resources, which may include intermittent renewables 'firming up' their capacity, for example by investing in storage. This will enable renewable generators to supply firm-capacity contracts such as swaps and caps and compete with existing dispatchable capacity, increasing contract supply and liquidity and lowering contract prices. As noted in the ESB's November 2017 advice, the ability to earn certificate revenues under the RET, which allows eligible generators to recoup more than two-thirds of their overall costs, has meant that most intermittent generators have not had to consider 'firming up' their capacity to date.
4. The technology-neutral nature of the Guarantee's reliability requirement means both demand- and supply-side resources can be used. By allowing demand-side resources to compete with the generation sector, the Guarantee is expected to

¹⁵ As noted in the ESB's November report, the implementation of the Guarantee was expected to result in a 3 per cent decrease in the weighted-average cost of capital of all generation technologies, compared to BAU. This resulted in wholesale spot prices in 2030 being 14 per cent lower than BAU.

¹⁶ More competitive spot market bidding resulted in wholesale spot prices in 2030 being 16 per cent lower than BAU. Combined with the effects of a lower risk premium, the Guarantee was modelled to result in wholesale spot prices in 2030 being 30 per cent lower than BAU.

reduce both the level and volatility of spot prices, thereby reducing contract prices and in turn retail prices.

5.2 Competition in the NEM

In 2017, the Finkel Review acknowledged concerns about wholesale market competition and increased retail and wholesale market concentration. The review noted the ACCC's inquiry into retail electricity prices and the AER's increased powers and responsibilities in ensuring effective competition in the wholesale market. The ACCC will be considering the issues of market concentration in preparing its final report to be delivered in June 2018.

Almost all stakeholder submissions recognised that competition cannot be undermined through the design of the Guarantee. This was a particular concern for smaller retailers, but also the ACCC.

In general, the greater the extent of competition in the retail and generation sectors, the more likely consumers are to benefit from all three objectives of the Guarantee – maintain reliability, reduce emissions in line with our international commitments and improve affordability. The greater the extent of competition in the generation sector the lower the cost, in the form of lower wholesale spot and contract prices, to retailers of complying with the Guarantee. In addition, the greater the extent of retail sector competition the greater the extent to which the savings to retailers, from competition in generation sector, are passed through to consumers.

The existence of vertical integration in all NEM regions suggests vertical integration has, for some retailers, been more cost-effective than external contracting. However, it is important that the Guarantee not be designed in such a way that vertical integration is the only viable option for achieving compliance.

A well-designed Guarantee should enhance the viability of external contracting, compared to vertical integration, as a means of achieving compliance with the Guarantee's dual requirements. This would strengthen retail sector competition by placing standalone retailers on a more competitive footing with their vertically-integrated rivals.

The ESB's November advice provided measures of the extent of vertical integration in South Australia; the extent of vertical integration in the other NEM regions are provided in below.

In light of substantial feedback from a range of stakeholders including the ACCC, the Guarantee has been specifically designed to ensure it does not undermine but rather enhances the liquidity, transparency and level of competition in the retail and wholesale electricity markets.

The design of the reliability and emissions reduction requirements presented in the preceding chapters should support the liquidity, transparency and competitiveness of the NEM in the following key ways:

- Compliance with the emissions reduction requirement will be facilitated via the reallocation of emissions in a compliance registry. This will address the key concern of many stakeholders that the emissions reduction requirement would require the physical linking of contracts to their emissions source making contracts more bespoke and reducing contract market liquidity.

The use of the compliance registry will enable retailers to continue to enter into financial contracts to hedge their position in the spot market and manage any obligations they may have under the reliability requirement of the Guarantee. Retailers will then be able to use their existing contracts, or enter into new ones, to obtain the right to assign physical generation and emissions for the purpose of the emissions reduction requirement. This can be done in any way the retailer deems appropriate, based on their current contract arrangements.

- The controlling corporation approach will be adopted under the emissions reduction requirement. This will mean that any retailer that also owns generation capacity will automatically have the emissions associated with that generation capacity allocated to them. For some larger, vertically integrated retailers this will mean that they will need to contract with other generators or smaller retailers to ensure they can achieve the required emissions reduction target for their customer load.
- Limits will be applied to the carrying forward of overachievement under the emissions reduction requirement to ensure that there is sufficient opportunity for all retailers to secure adequate contracts to meet the emissions reduction trajectory for their customer load. Without sufficient limits, the carrying forward of overachievement could present a significant risk to effective competition and so a legal requirement will also be in place to ensure that retailers do not unreasonably withhold any overachievement where it is allowed.
- Only contracts bought from centrally cleared trading platforms and/or reported to centralised trade repositories (exchange traded or over-the counter) will qualify under the reliability requirement of the Guarantee. Vertically integrated retailers will not be able to use their own generation to comply (unless purchased via a centrally cleared trading platform and/or reported to centralised trade repositories). Significant concerns were raised by a range of stakeholders about the dominance of vertically integrated participants and the potential for this to be further entrenched by the reliability requirement. Mandating a centrally coordinated approach, while still contingent on a reliability obligation being triggered, will bring increased liquidity to the contract market as all generation will be required to be traded through a centralised trading platform and/or reported to centralised trade repositories. This change will also significantly increase the transparency of the cost of wholesale electricity.
- A voluntary AEMO book-build could enhance wholesale market competition by allowing smaller retailers to band together and bring new resources to market. Several submissions advocated for central coordination and/or an AEMO book-build to assist smaller retailers.
- Large customers will have the choice to contribute to the reliability of the power system directly or to contract with a retailer to manage this on their behalf. This should ensure that the reliability requirement is managed at least cost and provide all retailers (large and small) with the ability to compete to manage the reliability requirement on behalf of large customers. This should have significant benefits for competition in the electricity market. A small retailer that is able to win the right to manage the reliability requirement for a few large customers should be able to build a contract book and support their broader participation in the retail market.

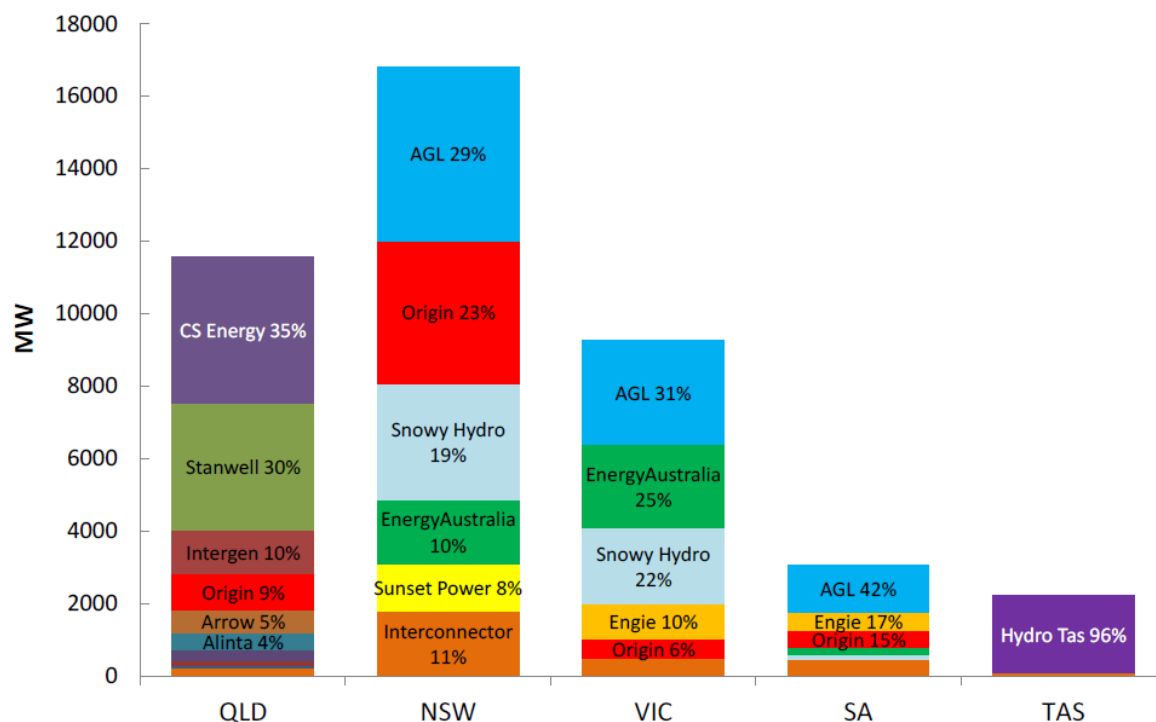
The Guarantee could also enhance competition in the generation sector provided the new generation or demand-side capacity that is incentivised under the Guarantee does not exacerbate concentration in the generation sector.

5.3 The extent of market concentration in the NEM

Market share is one indicator, amongst many, of the potential existence of market power. This section presents some standard market share-based indicators, for generation and retail sectors. This section draws on the evidence presented in the ESB’s November 2017 advice.¹⁷

Generation sector

The below image shows market shares by generation capacity installed¹⁸. In each NEM region the combined market shares of the two or three most significant generators exceeds 70 per cent on both capacity and dispatched energy measures. Tasmania-excluded¹⁹, South Australia’s generation sector has the highest degree of concentration, with the largest generation business (AGL Energy) having a larger market share (42 per cent) than the largest generator in any other NEM region.



Source: Figure 1.20 in AER, *State of the energy market 2017*, May 2017

As noted by the ACCC, generation sector concentration has increased over time.²⁰ For example, in 2011–12 Queensland consolidated some of its state-owned generation and in 2012 AGL acquired full ownership of Loy Yang A in Victoria. More recently,

¹⁷ See Chapter 6 of ESB, *The National Energy Guarantee*, Advice to the Commonwealth Government, 20 November 2017.

¹⁸ Figure is based on capacity rather than output, it is likely to overstate the market share of businesses that have mostly peaking generators (such as Origin in Queensland and Victoria), or fuel-constrained hydro plants (such as Snowy Hydro), who may have a lot of generation capacity but typically only run it for short bursts at peak times.

¹⁹ In Tasmania, Hydro Tasmania is effectively the only generator, but Tasmania has access to mainland generation through the Basslink interconnector.

²⁰ See Chapter 3 of ACCC, *Retail Electricity Pricing Inquiry*, Preliminary report, 22 September 2017.

concentration has been exacerbated by the closure of a number of key facilities. In particular, in 2015-16 Alinta exited SA when it retired its coal-fired power stations and Engie's share of the Victorian market was significantly reduced in 2016-17 when it closed its Hazelwood power station.

In some NEM regions, a single generation business accounted for more than 30 or 40 per cent of dispatched energy in 2016-17. AGL, in particular, accounted for over 40 per cent in each of NSW and SA, and over 30 per cent in Victoria. In Queensland, the state-owned CS Energy and Stanwell Corporation facilities each account for over 30 per cent of electricity generated.

Retail sector

As noted in the ESB's November 2017 advice, SA's generation sector is not only highly concentrated; it is also highly vertically integrated. The largest three generation businesses (AGL, Origin, and ENGIE) have a combined retail market share of 80 per cent. Five businesses (the previous three plus Snowy Hydro and EnergyAustralia) supply all of the dispatchable generation capacity in SA, and also comprise more than 90 per cent of its retail market.

This differentiates SA from those NEM regions, like Queensland, which have a similar degree of generation sector concentration (see the above image) but a lower degree of vertical integration. The largest retailer in Queensland (Origin) had a retail market share of one-third (at December 2017), but a generation market share of only 9 per cent (see above image). The largest Queensland generator (CS Energy), with a market share of 35 per cent is not a retailer.

Across the NEM, the 'Big 3' (AGL, Origin, and EnergyAustralia) supply around 70 per cent of retail electricity customers and almost half of generation capacity.

Vertically-integrated electricity businesses provide a natural hedge for each side of the business and can allow the 'gentailer' to mitigate the impact of market volatility. While vertical integration per se is not of concern, high levels of vertical integration limit contract market liquidity, which could place standalone retailers (and standalone generators) at a competitive disadvantage to their vertically-integrated rivals who are less dependent on 'external' contracts.

As noted in the ESB's November advice, SA has the smallest and least liquid market for 'firm' contracts such as caps and swaps, of the four NEM regions (NSW, Victoria, Queensland and SA) in which contracts are actively traded. This reflects a combination of:

- a higher degree of vertical integration in SA than in the other three NEM regions
- SA having the smallest loads of these four NEM regions
- a higher penetration of non-dispatchable generation in SA than in the other NEM regions. Due to the combination of the intermittent nature of these generators' output and the sizeable certificate revenue available to them under the RET, these generators supply PPAs, but not swaps or caps. Therefore, the entry of these generators, coupled with the closure of dispatchable generators such as Northern which do sell caps and swaps, has decreased the liquidity of the firm contracts market in SA.

The ACCC notes that its final retail electricity prices report will further explore the impact of vertical integration, combined with high levels of generation sector concentration, on wholesale prices.²¹

²¹ Section 3.1.1 of ACCC, *Retail Electricity Pricing Inquiry*, Preliminary report, 22 September 2017.

6 Governance of the Guarantee

Stable and effective implementation of the Guarantee will provide certainty for market participants about its operation and allow for long term investment decisions to be made in the electricity sector.

While the Guarantee could be implemented in various ways, the ESB's preferred option is for COAG Energy Council agreement with implementation through existing governance arrangements for the NEM. The majority of the Guarantee would be implemented through amendments to the Australian Energy Market Agreement (AEMA), the National Electricity Law (NEL) and the National Electricity Rules (Rules).

Embedding the Guarantee into the broader energy governance framework would allow the mechanism to be fully integrated with the broader energy rules. This would maximise consistency between the reliability and emissions reduction requirements, reducing complexity and compliance costs for market participants. Some submissions explicitly recognised the benefits of this approach, and it does not appear that any stakeholder disagreed with this approach overall.

6.1 Implementation through NEM governance arrangements

Amendments to the NEL, after being agreed by the COAG Energy Council in accordance with the AEMA, would be implemented by South Australia and automatically applied in each of the other jurisdictions.

The necessary changes to the Rules could be made either by the Australian Energy Market Commission (AEMC) or by the South Australian energy minister.

The NEL and Rules would be amended to:

- translate the emissions target and reliability requirement into retailer obligations, and
- establish the compliance and enforcement framework.

After the initial package of Rules changes were made, the AEMC would be the rule-maker in accordance with its current functions. It would be able to accept and assess rule change requests from any entity relating to the portion of the Guarantee mechanism that is contained in the Rules, following well-understood rule making processes set out in the NEL. To the extent submissions comment on governance issues, embedding the mechanism in the Rules was preferred with the NEL being reserved for high-level matters only.²²

This will give participants clarity in relation to how and when revisions to the mechanisms will occur, recognising that the design of the mechanism is already flexible to changing market dynamics. Certainty that the policy will last, along with a mechanistic and known approach to any updates, would increase the investor confidence and certainty needed in the electricity sector where the assets are long-lived, and the planning horizons are lengthy.

²² Australian Energy Council submission on consultation paper, p.2.

6.2 Relevant Commonwealth legislation

As discussed above, the Guarantee would be implemented primarily through amendments to the NEL after agreement by the COAG Energy Council.

The Commonwealth Government would set the electricity emissions target as discussed in chapter 3. Some amendments to existing Commonwealth legislation may also be required. These changes would relate primarily to the emissions reduction requirement, including emissions reporting and information gathering powers, and could require technical amendments to the following Commonwealth laws:

- *National Greenhouse and Energy Reporting Act 2007*
- *Renewable Energy (Electricity) Act 2000*
- *Australian National Registry of Emissions Units Act 2011*
- *Clean Energy Regulator Act 2011*
- *Competition and Consumer Act 2010.*

A small number of stakeholders considered that the CER should have a role in relation to the registry used to track compliance with the emissions reduction requirement, and potentially should enforce the emissions reduction requirement, given the CER's current role in relation to the RET and the ANREU.²³ However, the ESB considers that this approach would be undesirable as it would reduce the integration of the emissions reduction requirement with the energy market governance framework: key aspects of the mechanics of the scheme would be in Commonwealth legislation. This would make it more difficult to make incremental improvements to the mechanics of the emissions reduction requirement, as currently occurs with the energy market rules (and will occur with the reliability requirement, which will be part of the Rules).

6.3 Summary of key steps and issues

An outline of the key steps and considerations involved in implementing this approach is provided below.

Topic	Approach
Policy position and intergovernmental agreements	Commonwealth policy position to set out how the emissions target will be implemented through the retailer emissions reduction requirement in the NEM jurisdictions
	AEMA to be amended to reflect: <ul style="list-style-type: none"> • the inclusion of the retailer emissions reduction requirement; and • additional roles for the AEMC in rule making and the AER in enforcement and compliance (to the extent specific additional roles are necessary).
	Jurisdictions to agree changes to the NEL to implement the Guarantee.
	Consideration will need to be given to a number of matters, including: <ul style="list-style-type: none"> • AEMC obligation to have regard to national energy objectives and objectives for the Guarantee • use and disclosure of confidential information.

²³ See for example the submissions of AGL (p. 9), Infigen (p. 9), Tim Kelly (p. 17).

Topic	Approach
Instrument establishing the electricity emissions target	The Commonwealth Government will set the electricity emissions target.
Changes to associated legislation (Cth)	Changes to existing Commonwealth laws and regulations may be required, as outlined above, in relation to emissions reporting and other issues associated with the emissions reduction requirement.
Legislation – implementation of scheme for the NEM jurisdictions	<p>Amendments to the NEL to be legislated by South Australia and applied in each of the other NEM jurisdictions.</p> <p>The new provisions of the NEL would include key implementation features of the Guarantee, including:</p> <ul style="list-style-type: none"> • Key obligations on participants, referencing the Commonwealth legislation • Conferral of additional functions (to extent required) on agencies and institutions that will have enforcement and rule-making roles, being the AER and AEMC with respect to the Guarantee • Governance arrangements including: <ul style="list-style-type: none"> ○ review processes ○ powers of agencies with respect to information gathering and confidential information, dispute resolution ○ penalties, enforcement and appeal mechanisms ○ reporting requirements.
Commencement – initial rules	Initial rules to be made by the SA Minister on advice of the ESB/AEMC, or by the AEMC

A Abbreviations and defined terms

ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
ACCU	Australian Carbon Credit Unit
AEMA	Australian Energy Market Agreement
AEMC or Commission	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ANREU	Australian National Registry of Emission Units
ARENA	Australian Renewable Energy Agency
ASX	Australian Stock Exchange
CEFC	Clean Energy Finance Corporation
CER	Clean Energy Regulator
COAG	Council of Australian Governments
EITE	Emissions-intensive trade-exposed
ERF	Emissions reduction fund of the Commonwealth Government
ESB	Energy Security Board
ESCOSA	Essential Services Commission of South Australia
FCAS	Frequency Control Ancillary Services
GRO	Generator reliability obligation
Guarantee	National energy guarantee
LGC	Large-scale Generation Certificate under the RET
LRMC	Long-run marginal cost
MWh	Megawatt hour
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
NGERS	National Greenhouse and Energy Reporting Scheme
OTC	Over the counter
PPA	Power purchasing agreement
RET	National large-scale renewable energy target currently in place under the <i>Renewable Energy (Electricity) Act 2000</i> (Cth)
Rules	National Electricity Rules
SRMC	Short-run marginal cost
tCO ₂ -e	Metric tonnes of carbon dioxide equivalent
TNSP	Transmission Network Service Provider

B State renewable schemes

New South Wales

In NSW no additional renewable target commitments have been made beyond the existing RET. There has however been a recent increase in approvals that is attributable to the NSW Government increasing its efforts to improve energy price affordability.

There is currently an estimated 1,133 MW of wind and solar projects expected to be commissioned over the next 18mths. These projects are largely backed by EnergyAustralia, AGL and the ACT Government.

ACT

The ACT Government established the Large-scale Feed-in-Tariff (FiT) Scheme in 2011. The scheme is intended to ensure that the ACT is supplied from 100% renewables by 2020.

The ACT has released 4 tranches of projects with the cost ranging from \$73 to \$186 per MWh for a variety of solar and wind generation in a variety of states that has or will commission between 2014 and 2019. The FiT payments are 20-year Contract for Difference agreements based on the prevailing spot price. The risk of spot price variation in NSW and between NSW and the regions where the generation resides, lies with ACT customers. Each of the projects may surrender its entitlement without repercussion (for example, if they can get a better price).

Victoria

In 2016 Victoria established a policy to implement the Victorian Renewable Energy Target (VRET). The VRET is legislated to achieve a 25 percent target by 2020 and a 40 percent target by 2025. The VRET does not legislate an obligation on retailers.

The VRET legislates renewable capacity target in 2017 and 2019 for each target respectively. The capacity target for 2020 was set at 6,341 MW and includes all existing renewable power stations. Approximately 4,500 MW of new renewables will need to be built by 2025 to meet the state target.

The Government's ability to meet the VRET is supported by the Victorian Renewable Energy Auction Scheme (VREAS). The Victorian Government is currently in the process of assessing bids for the 2017 auction which is targeting 650 MW with 100 MW reserved for solar. The VREAS operates similarly to the ACT FiT for large scale renewables using a 'contract for difference' swap. Results of the 2017 VREAS are expected in Q2 2018.

VREAS pricing is expected to be in the mid \$50's per MWh and will be predominately wind. Similar to the ACT scheme, the risk of electricity spot and LGC price variations reside with the Victorian Government.

Approximately 1,700 MW of committed or probable projects are under development. Commercial and Industrial customer support for these projects has been considerable (e.g. Telstra, ANZ, Coca-Cola, Uni of Melbourne, Melbourne Trams, City of Melbourne, RMIT, and many others). Origin's Stockyard Hill is also significant.

Following the completion of 2017 VREAS there will be 2,350 MW of committed or probable projects in the pipeline, which will exceed the Government's expectations for needing 1,500 MW to meet the 2020 target.

Queensland

In 2016 following advice from its Renewable Energy Expert Panel, the Government announced its policy target for the Queensland Renewable Energy Target (QRET) of 50% renewables by 2030. To meet the QRET approximately 5500 MW of new renewables need to be built by 2030.

The QRET is also supported using reverse auctions. In 2016 the Government held the Solar 150 reverse auction to support projects applying for ARENA Large Scale Solar funding. Under this Auction the Government entered into 'Contract for Difference' swaps that fixed the price of energy and LGC's to de-risk these projects. Similar to Victoria and the ACT, the risk of electricity and LGC price variations reside with the Government. The Queensland Government's ownership of retail and generation somewhat mitigates this risk.

In 2017 the Queensland Government began its second Reverse Auction process for 400 MW (incl 100 MW battery). In the EOI phase the auction received 115 proposals offering over 9,000 MW wind, solar and biomass and nearly 6,000 MW of energy storage. Successful projects are expected to be announced mid-2018.

It is envisaged that the QRET is also likely to be further supported by the establishment of CleanCo, a Government owned low emissions generator that was flagged during the election as supporting investment in 1000 MW of renewable generation in Queensland.

Approximately 2,100 MW of Solar and Wind projects are committed or probable in Queensland. Following the outcome of the 2017 reverse auction process there will be 2,500 MW of committed or probable projects in the pipeline, meaning the Government will be almost half way to meeting its 2030 commitment. CleanCo's further contribution and the role of further auctions remains unclear but more detail is expected during the first half of 2018.

South Australia

Renewable generation in South Australia currently supplies approximately 50% of the SA energy consumption. There is currently 815 MW of wind and solar projects that are committed and probable.

Tasmania

The Tasmanian Government has made no additional commitment beyond the current RET. However, it continues to actively support the development of another Tasmania/Victoria interconnect which would allow for further expansion of wind generation and to a lesser extent biomass in Tasmania.

There are currently 250 MW of wind projects that are committed and probable.

Summary

Jurisdiction	Target	Reverse Auction	Legislated Target	Retailer Obligation	Voluntary LGC Acquittal
Australian Capital Territory	100% by 2020	Yes	Yes	Yes	Yes
Victoria	40% by 2025	Yes – partial scheme	Yes – aspirational	No	Post 2020 auctions
Queensland	50% by 2030	Yes – partial	No – aspirational	No	Unclear

South Australia	50% by 2025	No	No	No	No
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