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Committee Secretary
Department of the Senate
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By email: fairdinkumpower.sen@aph.gov.au

Dear Committee Secretary

AEMC submission to the Select Committee into Fair Dinkum Power

The Australian Energy Market Commission (AEMC or Commission) welcomes the opportunity to make a submission to the Select Committee into Fair Dinkum Power. A secure, reliable and affordable energy supply is an important input into the Australian economy, affecting our nation's competitiveness. High energy prices have a direct impact on many parts of our economy, particularly retail and small business. Recognising this, the AEMC is very focussed on lowest cost solutions, bearing in mind the more costs you put into the system, the more burden there is on consumers.

The energy debate is currently suffering from a focus on short-term issues and reactive policy responses. Such a focus can be detrimental and can result in a patchwork of policies that distract us from the key long-term challenges facing the energy sector as it transitions.

To address these challenges we need the policy focus from legislators and governments to shift toward regulatory frameworks that will support new investment in the energy sector. Investments in the energy sector are capital intensive, take many years to plan and build and are therefore long-term in nature. To support such investments, we require policy settings that are reliable and flexible in adapting as the energy sector transitions.

Consumers are driving change

Consumer choices drive change by influencing the type and timing of energy sector investment and the range of products and services available to customers. We are seeing consumers generate and store their own electricity through distributed energy resources such as rooftop solar PV and battery storage. The technology revolution is offering new opportunities and benefits for customers to take control of how they buy, sell and use energy. Customers who shop around for a deal to suit their needs can get better price outcomes than those who stick with the same provider. Rooftop solar PV costs are decreasing, with payback periods now a compelling value proposition. Batteries for households and vehicles are emerging as a future option to empower customers to manage their energy use.

Over time, this should allow for greater utilisation of the existing stock of generation and network capacity, lowering average costs for all consumers. The increasing ability of customers to generate and manage their energy use will reduce reliance on the grid, reduce peak demand and, in turn, reduce network costs.

There are also challenges. Ageing generators are retiring and being replaced by new technologies that have different characteristics. An expanded transmission network will be needed to connect new wind and solar farms in more dispersed locations. Increased penetration of distributed energy resources like rooftop solar PV, smart home systems and batteries mean it is harder to predict the shape of demand for energy over the course of a day, and also harder to control frequency and voltage in the grid. Our changing weather patterns also place extra demand on the power system.

Some of these changes will require additional investment in the energy sector so that new technologies can be integrated and utilised, and the power system can continue to be managed securely. This will create additional cost pressures in the short to medium term. Policy stability and predictability are important prerequisites for the investment that will be required in the sector over the coming decades.

An energy sector that delivers what customers want and need

Delivering the energy outcomes that consumers want and need requires a well-designed and effective energy sector. Those participating in the energy sector need to have the right information, incentives and regulations to be able to organise themselves and deliver what is required, when it is required, and at the lowest price.

Through their choices energy consumers contribute to, and strengthen, the sector's ability to deliver reliable and affordable energy over the long term. Since the national electricity market was established, reforms to support consumers in using their choices to shape the energy sector have been rolled out incrementally and continuously as new information and technology has become available. We are now seeing consumers embrace a new relationship with the grid where they consume, produce and store energy to maximise benefits to themselves and, if implemented efficiently, the broader community.

Today's energy consumers can choose:

- their energy supplier, terms and conditions including the price
- when to consume or not consume power
- whether to generate and store their own power
- whether to sell their energy and energy services back to the grid.

Energy consumers exercise their choices more and more frequently. While consumers often make choices that maximise their own utility, these choices can also contribute to the efficient operation of the power system and the delivery of energy services more generally.

For example, we are seeing consumers providing 'demand response' by turning off or reducing power use at very high demand times. This can help keep costs down by avoiding unnecessary investment in peaking generation that is only used for a few days a year.

At the same time:

- We recognise that not all consumers can or want to be active participants. The energy sector needs to provide a fair deal for all consumers.
- The power system must be operated in a safe, secure and reliable manner. Carefully designed market and regulatory frameworks need to be in place to support this.

The Commission's work seeks to balance these various objectives.

Submission overview

The Commission has structured its submission around the following six themes that contribute to the delivery of reliable power at the lowest possible cost. These are:

1. The ability to choose energy supplier and deal.
2. Appropriate consumer protections.
3. Enough power in the right place at the right time.
4. A stable system where all technical requirements are maintained.
5. A grid that efficiently transports power from where it's made to where it is needed.
6. The ability to easily buy, sell and transport gas to where it's needed – as gas is a key fuel for electricity generation.

For each theme or outcome, we have:

- summarised the current key trends
- outlined recent actions taken by the AEMC
- outlines further AEMC actions committed or underway
- highlighted what governments can do – in some cases, what only governments can do – to help.

Background

The Australian Energy Market Commission's (AEMC or Commission) role is to make and amend the rules that underpin the energy system and market in a manner consistent with the long-term interests of consumers. We also advise governments on how to develop flexible and resilient markets that benefit consumers over time. Our objective is to deliver effective and efficient rules to promote efficient investment in and efficient use of energy services with respect to safety, security, reliability and price. The rules we make and the advice we provide aim to set the foundations and incentives for a market structure that drives industry to deliver what consumers value in a sustainable manner, over the long term.

The Commission is one of three energy market bodies that carry out the day to day operation, regulation and evolution of the energy sector.

- The **Australian Energy Market Commission** makes and amends the rules that underpin energy sector activity and provides advice to government on energy sector design.
- The **Australian Energy Market Operator** runs the physical systems balancing supply and demand for energy in real time, as well as running the financial market that supports this.
- The **Australian Energy Regulator** polices the system and oversees the economic regulation of the monopoly network sector.

Both individually, and collectively through the Energy Security Board, the market bodies are working collaboratively to create an energy sector that can meet consumer needs as they evolve over time.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Anne Pearson', written in a cursive style.

Anne Pearson
Chief Executive

SUBMISSION TO SELECT COMMITTEE INTO FAIR DINKUM POWER

WHAT CONSUMERS WANT AND NEED FROM THE ENERGY SECTOR

The energy sector is continually changing driven by consumer preferences, improvements in technology and government policy.

To support this change, the national electricity objective (NEO) was agreed when the national electricity market was set up as a way of focussing all reform activities on what really mattered; the long term interests of consumers. Reforms to the national electricity market have been focussed on putting customers at the centre of the power system and the market so that their choices about how to buy, use and, more recently, sell power is what drives other investment in the sector.

In our experience to date, facilitating consumer choice through markets offers the most efficient and lowest cost way of determining what technologies and services work best for consumers; and shepherding change in that direction.

The Commission supports this by making and amending the energy rules to adapt the energy market design as the world changes. We have a unique system in Australia where anyone; any company, government, advocacy group or individual person can propose a change to the rules and that change will be considered on its merits against the national energy objectives.

There are a number of key elements of the power system and its supporting market and regulatory arrangements that need to be in place, so consumers are empowered to play a more significant role in the electricity market. These are set out in our submission below.

The continuous evolution of the rules should be seen as part of a broader picture of reform with distinct and important roles for each of the energy market bodies, the Energy Security Board and, importantly, governments at a state and federal level through the COAG Energy Council. The Commission is working through Energy Security Board and COAG Energy Council processes to make sure that reforms are developed and implemented in a coordinated way.

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THE ABILITY TO CHOOSE AN ENERGY SUPPLIER AND DEAL

Recent trends

Consumers should be able to access energy at a reasonable price whether they are active participants or not, and be supported to take control of their energy use and bills should they wish to.

The consumer-driven transformation of the electricity sector is accelerating. There is continued growth in rooftop solar PV systems and emerging growth of batteries for use in homes and vehicles. This innovation has been driven by:

- a consumer response to relatively high retail prices
- the development of new and increasingly cost-effective technologies
- government policies to promote low-emissions technologies.

But retailers have made the change harder than it should be. A lack of trust and confusion are the key challenges to delivering a better deal for energy consumers. Many consumers don't understand their bills because of opaque pricing and complex offers. But energy shoppers are more motivated and better informed than they ever have been. Now is the opportunity for retailers to start rebuilding trust and confidence to make it easier for consumers to get a better deal. A number of energy businesses have worked together to develop the Energy Charter which sets out their commitment to energy consumers. We are beginning to see new entrant retailers differentiate around trust, new technologies and transparent provision of information.

Competition in the retail energy market continues to evolve. There are 33 electricity retail brands across the NEM-based jurisdictions. The three largest retailers (Origin Energy, AGL and EnergyAustralia) maintain dominant positions in each jurisdiction. However, there are signs that a number of other electricity retailers – particularly tier two retailers with generation assets – are strengthening their competitive positions. Switching rates have increased in response to the recent price increases and consumers that are motivated to seek a better deal can make significant savings. There is increasing evidence that price dispersion is assisting customers who are most prone to financial vulnerability.

While the level of product and service innovation by traditional retailers remains limited, there are indications that these retailers are starting to reconsider their value proposition to consumers. Smaller retailers are driving innovation and value-add products and services competition into the market. New providers are starting to emerge. These providers use technology to capture value in the market and share this value between the retailer and customer.

While all states and territories in the national electricity market except Victoria have implemented the national energy customer framework, there continue to be jurisdictional differences. While similar to national arrangements, Victoria its own instead has state-based arrangements. These regulatory differences create barriers to new participants – particularly smaller ones with innovative products and services.

Action taken by the AEMC to improve competition and consumer choice

New rules made by the AEMC soon after competitive retail markets were established have laid the foundations for competition to develop over time; supporting choice and innovation. This has included rules making it easier to:

- choose and switch retailers
- access and understand consumption data
- receive and respond to price signals.

Two key reforms, which rolled out in 2017, are:

Cost-reflective pricing – As a result of the AEMC's distribution pricing rules, the prices paid by households and businesses will better reflect the different ways they use electricity and the costs of providing it to them. The rules are designed to give consumers the option of reducing their peak demand to save money or continuing to use electricity at those times when the value they place on that electricity use outweighs the higher costs. In the long-term, this reform will reduce total average costs for all consumers by improving capacity utilisation.

Competition in metering – The AEMC's competition in metering reforms removed the networks' effective metering monopoly – giving consumers more opportunities to access a wider range of electricity services. The information and services available through advanced metering can make it quicker for consumers to switch retailers, allow them to decide how often they want to be billed and provide them with better information about how they can change their electricity use to save money. Consumers can also benefit from more accurate meter reads.

These reforms underpin an energy system where engaged and better informed energy consumers have greater access to new products and services such as solar, storage, electric vehicles and smarter consumption management.

In recent years the Commission has made further changes to support competition, innovation and choice. This includes:

- Requiring energy retailers to tell customers about any price increases before they happen, and provide information on how to shop around for a better deal.
- Requiring energy retailers to notify their electricity and gas customers when benefits in their contract, such as a discount, are about to end or change.
- Creating a competitive market for 'behind the meter' batteries and other distributed energy resources so network businesses don't have a monopoly on providing innovative energy solutions to consumers.

The retail energy market will continue to evolve in the coming years as consumers change preferences in how they manage their energy use and technology improves.

Further AEMC actions committed or underway

Competition is underpinning solid consumer choices and starting to facilitate innovation in the products and services being made available. However, there is considerable scope to further improve customer experiences and outcomes in the retail energy market.

The AEMC has work underway to:

- Improve the customer transfer process in line with recommendation 8 and 9 of the ACCC's Retail Electricity Pricing Inquiry, in cooperation with the Australian Energy Market Operator.
- Work with the ACCC on the consumer data right for energy so consumers can more easily access their consumption data which they can then use to inform their energy purchase and usage decisions.
- Provide advice on the overall performance of retail energy markets. This work is done annually through the AEMC's Retail Energy Competition Review. This year's review will also include a focus on how the retail market is responding to the uptake of battery technology.
- Recommend a package of law and rule changes to the COAG Energy Council to provide the growing numbers of customers in private embedded networks with the same protections as other energy customers including the ability to choose their energy supplier.

Actions for government

There are a number of key actions that only governments can take to support competition and choice for energy consumers.

- Governments could play a greater role in educating consumers about the choices they have to take control over their power bills.
- Governments could recommit to the national framework by harmonising regulatory arrangements across the jurisdictions to reduce barriers to entry for new innovative, but smaller, retailers. For some jurisdictions this would involve removing a small number of derogations. For the Victorian Government it could involve aligning its energy retail arrangements with all other national electricity market states under the national energy customer framework.
- Governments, through the COAG Energy Council, could develop a reference price that allows consumers to make easy and meaningful comparisons of energy offers.
- Governments could make their expectations of industry clear and hold them to account with reference to the newly established industry energy charter, as not all bad behaviour can be solved using regulatory approaches.

APPROPRIATE CONSUMER PROTECTIONS

Recent trends

A strong consumer protections framework is an important prerequisite to all Australians, no matter how knowledgeable or engaged, accessing a fair power deal. Consumer protections, effectively enforced, enhance the trust that consumers have in the energy sector by providing information, dispute resolution channels and minimum product and service standards.

The national energy customer framework was originally developed for a world in which consumers are supplied by a retailer and connected to the national grid. However, many consumers now receive energy or energy services from an increasingly diverse range of entities that are to some extent not captured by the framework. Some examples of alternative arrangements include:

- Consumers who invest in distributed energy resources such as rooftop solar PV or batteries. These consumers may have one supplier to provide the technology, another for grid-supplied energy, another to coordinate interactions with the grid and so on. They are unlikely to have the same protections for each of those services as customers of traditional grid-supplied electricity.
- Consumers in private embedded power networks such as apartment buildings, shopping centres, retirement villages and caravan parks. These consumers do not have equal access to consumer protections or choice.
- Consumers who have stand-alone power systems, which are electricity supply arrangements that are not physically connected to the national grid. These systems are becoming an increasingly viable option for consumers, particularly in more remote areas where the cost of supplying electricity from the grid is high. Protections for these consumers vary in their comprehensiveness between jurisdictions.

Another ongoing challenge relates to concession schemes that are designed to support the most vulnerable consumers with financial assistance to pay their bills. These schemes are jurisdiction-specific and differ in both design and implementation across jurisdictions. Many could be more appropriately targeted and take into account the specific challenges vulnerable customers have in accessing many of the technologies that are empowering other energy customers.

Small businesses have been significantly affected by the recent increases in energy prices. These businesses tend to pay more per unit of energy and consume energy in considerably higher levels than residential consumers, but do not have the same hardship or payment plan protections available to them.

Establishing consumer protections that are effective and appropriate as the nature and provision of energy services change will be an ongoing task.

Action taken by the AEMC to improve consumer protections

The main types of protection provided by the national energy customer framework are related to universal access, information, rights, consent, minimum standards, billing, tariffs and payment, disconnections, hardship and dispute resolution. In recent years the Commission has reformed certain parts of the customer protections framework in response to rule change requests.

This includes:

- Introducing maximum timeframes for meter installations that retailers have to comply to when providing consumers with new smart meters.
- Strengthening protections for customers in hardship by placing new obligations on retailers to implement effective hardship policies to help customers who are having difficulty paying their bills. This rule enables the Australian Energy Regulator to more effectively monitor the performance of retailers and penalise breaches.
- Making retailers accept meter reads provided by customers who think their estimated electricity or gas bill is wrong.
- Requiring energy retailers to tell customers about any price increases before they happen, and provide information on how to shop around for a better deal.
- Requiring energy retailers to notify their electricity and gas customers when benefits in their contract, such as a discount, are about to end or change.
- Banning retailers from offering energy deals deliberately designed to confuse customers with high base rates, making so-called discounts appear bigger than they actually are.
- Strengthening protections for customers that have a person requiring life support equipment residing at their premises.

Further AEMC actions committed or underway

Consumers are at the core of what the AEMC does. The Commission is focussed on lowest cost solutions, bearing in mind the more costs that are put into a system, the more burden there is on consumers. Because of this consumer protections are an important component of our energy sector.

The AEMC has work underway to:

- Review consumer protections in the national energy consumer framework, especially in relation to new energy services such as demand response.
- Assess how retailers support customers in financial difficulty, including support options retailers provide commercially, and how these operate with required hardship provisions. We will benchmark and identify best practices.
- Recommend a package of law and rule changes to the COAG Energy Council to provide the growing numbers of customers in private embedded networks with the same protections as other energy customers.
- Recommend new regulatory arrangements to allow stand-alone power systems to be used where it is economically efficient to do so, while maintaining appropriate consumer protections and service standards.

Actions for government

There are a number of key actions that only governments can take so that the appropriate consumer protections are in place for all energy consumers.

- Governments could recommit to the national framework by harmonising consumer protections across jurisdictions. For some jurisdictions this would involve removing a small number of derogations.
- Governments could review their individual concessions schemes, with a view to aligning application across the NEM and reducing complexity. Consideration could also be given to the specific challenges vulnerable customers face in accessing new technology that could help them manage their energy use and costs.
- The COAG Energy Council should endorse AEMC recommendations and make necessary changes to electricity and energy retail laws to provide the growing numbers of customers in private embedded networks the same protections as other energy customers.
- The COAG Energy Council should endorse AEMC recommendations and make necessary changes to energy laws to allow stand-alone power systems to be used where it is economically efficient to do so, while maintaining appropriate consumer protections and service standards.
- Governments should monitor outcomes under the energy charter, noting the charter sets out minimum expectations for the energy industry.

THE RIGHT INVESTMENT IN THE RIGHT PLACE AT THE RIGHT TIME

Recent trends

A reliable power system is one that has enough generation, demand response and network capacity to supply customers with the energy they demand to a very high degree of confidence.

This requires:

- well-functioning electricity spot and contract markets that provide clear price signals
- accurate and regular forecasts and notices from the system operator, AEMO
- policy certainty from governments.

Together, this gives market participants incentives and information in order to invest in and supply generation and demand response when and where it is needed.

Recent events, such as load shedding incidents over the last two summers and the closure of generators, have led to a greater focus on reliability. However, only 0.02 per cent of customer power outages are because there wasn't enough generation available, with the rest overwhelmingly due to problems with local poles and wires that transport power. While we have enough capacity right now, poor investor confidence is impacting the electricity system's ability to remain reliable over the medium to long-term.

The generation mix is moving from a system supported mostly by large predictable generators to a system with a greater number of smaller variable generators. Consumers are now better-equipped than ever to manage and control their energy use and contribute to reliability and this capability will continue to improve in the future as technology advances. Increasing amounts of consumer-connected distributed energy resources like rooftop solar PV and batteries are being installed as a result.

The system is also being exposed to high temperature peaks and peakier demand. The supply demand balance is tighter, suggesting that in the absence of new investment in dispatchable generation, reliability issues in the medium to longer term may emerge

In addition, market arrangements are evolving to provide signals for investment in fast response technologies such as batteries, new generation gas peaker plants, hydro and demand response.

These market and technological trends mean that future generation will need to be sufficiently flexible to compliment the growing proportion of variable renewable energy generation and meet the changing shape of residual demand.

This transformation is also occurring against a backdrop of uncertainty over a nationally consistent long-term mechanism to reduce emissions in the electricity sector. Attempts to integrate energy and emission reduction policy in the national electricity market by using mechanisms that link the physical needs of the system to financial incentives have not, to date, been successful.

Action taken by the AEMC to maintain a reliable system as it transforms

The existing reliability framework provides information and incentivises market participants to invest enough generation and demand response to deliver reliable supply to consumers when and where it is needed. The AEMC has made a number of recent changes to improve the information and incentives that underpin reliable supply. These changes include:

- Changing the settlement period for the electricity spot price from 30 minutes to five minutes to help get the electricity wholesale market ready for new technologies that enable the power system to operate in a more dynamic way. This change is due to start in 2021.
- Requiring large electricity generators to provide at least three years' notice before closing so market participants can respond by building adequate replacement capacity.
- Making the AER responsible for calculating and updating values of customer reliability on a regular basis. These values are used to develop reliability standards for networks as well as for the wholesale market.
- Reinstating the long notice reliability and emergency reserve trader (RERT) scheme to allow AEMO to procure emergency reserves, which include generation and demand response capacity, nine months ahead of a projected reserve shortfall.
- Improving the transparency and consistency of information AEMO provides to signal whether or not electricity supply is projected to meet demand in the medium-term.
- Updating the framework under which AEMO can declare a lack of reserves (LOR), which signal to the market that market reserves for supply are running low. LORs are used to seek a market response in response to the forecast shortfall before emergency reserves can be used.
- Reviewing, through the Reliability Panel, the reliability standard and settings in the national electricity market. The standard and settings support efficient generation and operational decisions and provide an important 'price envelope' protecting market participants from exposure to excessive high prices. These are essential to maintaining the integrity of the market and are reviewed at least every four years.
- Enabling more competition in the provision of transmission connections, while maintaining clear accountability for the safety, security and reliability of the transmission network. We have also placed new obligations on transmission businesses to adopt a more consistent, transparent and coordinated approach when planning their networks.

Further AEMC actions committed or underway

We are continuing our work to support reliable outcomes for consumers at lowest cost, including facilitating clear price signals and more transparent information so decisions made by market participants, the operator, regulators and policy makers are better informed. This includes:

- Enhancing the reliability and emergency reserve trader (RERT) framework – the national energy market’s emergency reserve mechanism. The RERT allows AEMO to intervene and buy additional reserves over and above the reserves the market makes available.
- Considering the introduction of a new mechanism to facilitate more wholesale demand response in the national electricity market.
- Working with AEMO on the trials it will undertake to inform changes to regulatory frameworks and operational processes so virtual power plants (VPPs) can play a bigger role in the energy market. In Australia grid-connected VPPs are focussed on aggregating rooftop solar PV and battery storage.
- Considering four rule requests to improve processes related to AEMO’s interventions in the market, such as the way generators and demand response providers are compensated after a direction from AEMO, to help maintain system security or reliability.
- Considering a rule request to allow developers of new generation projects to register with AEMO to get access to key technical information such as network modelling data on a confidential basis.
- Considering a rule request to enhance publicly available information about new generation projects.
- Considering a rule request to provide an AEMO-operated platform to enable market participants to contract for electricity in the week leading up to its day of dispatch. Along with other measures, this short term forward market could help enable more demand response.
- Considering a rule request to reduce the threshold for registration as a generator from 30 MW to 5 MW. This would effectively require all large generating systems to be registered with AEMO, unless AEMO grants an exemption on a case-by-case basis.
- Reviewing the performance of the national electricity market in terms of security, reliability and safety over the 2017-2018 period through the Reliability Panel’s annual review. Among other things, this review helps governments, policy makers and market bodies monitor the performance of the power system, and identify the likely need for improvements to the various measures available for delivering security, reliability and safety.
- Working collaboratively with ARENA, AEMO, AER and other agencies on actions to maximise the value of distributed energy resources, such as rooftop solar PV and battery storage, and consider how to best integrate these into the grid so they can be used to improve reliability and reduce costs.

Actions for government

There are a number of key actions that only governments can take to address fundamental structural change in the power system.

- Governments should support the retailer reliability obligation (RRO). The RRO would put a legally binding obligation on retailers to contract with generators and demand response providers underpinning investment in the type of technology the power system needs to stay secure and reliable.

- Governments should introduce a nationally agreed mechanism for the electricity sector that reduces emissions in a manner that supports system security and reliability. This means that investments made to reduce emissions in the power system should also have financial incentives to provide energy services at times when consumers and the power system need it.
- More generally, government policies and mechanisms to support investment in particular technologies need to complement the physical needs of the power system and the financial incentives of market participants so consumers receive a secure, reliable and affordable power supply.

A STABLE AND SECURE SYSTEM WHERE ALL TECHNICAL REQUIREMENTS ARE MAINTAINED

Recent trends

The generation mix in Australia is shifting as newer types of electricity generation, such as wind and solar, connect and conventional forms of electricity generation, such as coal, retire. The demand side is also changing with customers becoming increasingly engaged in energy markets through the uptake of new technologies and services, such as rooftop solar PV, storage and demand response.

Reliable, affordable electricity can only be delivered to consumers if the power system is secure; that is, when the technical parameters such as voltage and frequency are maintained within defined limits and the power system can withstand faults.

Power system security is managed by AEMC by balancing electricity supply and demand in real time. Imbalances can lead to variations in frequency or voltage and, if left uncontrolled, can cause widespread blackouts. AEMO keeps the system in balance by forecasting the expected demand and issuing dispatch instructions to generators to meet that demand.

It is becoming harder for AEMO to manage power system security as the generation mix changes. There is an increased potential for imbalances between electricity demand and supply due to:

- **increased variability and unpredictability of supply and demand.** This can be due to less predictable demand patterns as the amount of distributed energy resources increases as well as the gradual shift toward more variable sources of electricity generation and the complexities in predicting this variability.
- **changing frequency control capability.** Historically, large numbers of synchronous generators in the national electricity market provided inertia and other frequency control services that helped manage power system security by either resisting faults and/or injecting or withdrawing power so the balance could be restored after a minor change. These generators are starting to retire and are being replaced by new generation technologies that do not provide inertia and currently have limited ability or limited incentives to provide other frequency control services. New technologies, particularly fast responders, could have the capability to play an important role in helping maintain power system frequency.
- **decreasing system strength** as traditional synchronous generators retire and are replaced by increasing numbers of non-synchronous generators. This makes it harder to maintain voltage within operational limits, particularly during minimum demand periods. Increasingly AEMO is having to intervene in the market to manage the operation of the system, particularly to maintain minimum levels of system strength.

We must continue to evolve the regulatory framework to:

- provide incentives to encourage investment in the system security services we need, particularly as technologies develop that enable innovative solutions

- remove barriers that may hinder or prevent new technologies such as batteries or demand response from providing system security services.

Action taken by the AEMC to keep the system secure as it transforms

The Commission has introduced a range of new obligations and tools to address the immediate system security needs and help manage the changing system. The changes are aimed at creating a stronger system, resisting frequency changes, better frequency control and facilitating transformation. They include:

- Requiring generators and networks to provide more detailed information about how their equipment performs so AEMO and networks have the right data to efficiently plan and operate the system.
- Making networks provide minimum levels of inertia and system strength, and requiring new generators to pay for remedial action if they impact system stability.
- Introducing new emergency frequency control schemes or 'last line of defence' mechanisms designed to protect against a major blackout if there are sudden and unexpected changes in system frequency.
- Establishing a register of distributed energy resources, to give network businesses and AEMO visibility of where these resources are connected to help in planning and operating the power system as it transforms.
- Introducing significant changes to technical performance standards for generators seeking to connect to the national electricity grid, and to the process for negotiating those standards. The changes establish a flexible approach to setting standards that enables targeted, least-cost ways of connecting new generators. The rule also amends a number of the standards themselves, to help keep the system secure in a lower-cost, more efficient way, rather than having to intervene in the market.
- Reviewing, through the Reliability Panel, the annual performance of the market with regards to the security, reliability and safety of the national electricity market, to identify the need for improvements.

Further AEMC actions committed or underway

Currently the AEMC is continuing to make changes to the market and regulatory frameworks to meet the challenges in maintaining a secure system arising from, and harnessing the opportunities presented by, the changing generating mix. This includes:

- Working with AEMO on short-term changes to manage frequency deterioration in the national electricity market, including making sure generators provide frequency control responses where feasible.
- Working with AEMO and the AER on designing new, coordinated and lowest cost ways to deliver frequency control services over the medium to long-term.
- Reviewing the existing frequency operating standard and making changes where appropriate to maintain a secure power system as the generation mix changes.
- Responding to a request from AEMO to declare a protected event to manage the risk of loss of transmission elements causing generation disconnection when

destructive wind conditions are forecast in South Australia. Declaring a protected event allows AEMO to incur the costs of managing the system at all times to limit the consequences of a low probability but high consequence system security event. Considering four rule requests to improve processes related to AEMO's interventions in the market, such as the way generators and demand response providers are compensated after a direction from AEMO, to help maintain system security or reliability.

- Reviewing the performance of the national electricity market in terms of security, reliability and safety over the 2017-2018 period through the Reliability Panel's annual review. Among other things, this review helps governments, policy makers and market bodies monitor the performance of the power system, and identify the likely need for improvements to the various measures available for delivering security, reliability and safety.
- Considering new rule requests to improve information transparency around frequency control performance and existing frequency control markets.
- Working collaboratively with ARENA, AEMO, AER and other agencies on actions to maximise the value of distributed energy resources, such as rooftop solar PV and battery storage, and consider how to best integrate these into the grid so they can be used to improve reliability and reduce costs.

Actions for government

There are a number of key actions that only governments can take to address the structural change in the power system.

- Governments should introduce a nationally agreed mechanism for the electricity sector that reduces emissions in a manner that supports system security and reliability. This means that investments made to reduce emissions in the power system should also have financial incentives to provide energy services at times when consumers and the power system need it.
- More generally, government policies and mechanisms to support investment in particular technologies need to complement the physical needs of the power system and the financial incentives of market participants so consumers receive a secure, reliable and affordable power supply.

A GRID THAT EFFICIENTLY TRANSPORTS POWER FROM WHERE IT'S MADE TO WHERE IT'S NEEDED

Recent trends

Electricity networks, like water services and rail services, are considered to be a natural monopoly. The Australian Energy Regulator (AER) sets the maximum revenues that electricity network businesses can charge for providing network services using a regulatory approach based on business efficiency – including incentives to innovate and to improve operations. This approach is designed so consumers don't pay higher network charges than necessary for the provision of network services.

There is a significant amount of generation capacity that is seeking to connect to the **high voltage transmission network**. Private sector investors are planning generation where transmission has limited or no capacity for the generation to connect to the power system, which limits these generators ability to access the wholesale market and creates congestion resulting in increased costs for consumers.

AEMO's Integrated System Plan forecasts the overall transmission system requirements to connect these new generators over the next 20 years. Transmission networks can be very expensive to build – running into tens of millions of dollars. Once built, consumers pay for these networks for decades, irrespective of whether they are used efficiently. If we gold plate the transmission networks, consumers pay too much. But if we don't build enough, that also results in costs for consumers if they can't get access to the cheapest electricity generation. That's why it's essential to deliver the right amount of new transmission infrastructure to provide electricity to consumers at the lowest cost.

At the **low voltage distribution level**, evolving consumer preferences and technological developments are changing the way network services are delivered. The last decade saw a significant increase in the uptake of new technologies such as rooftop solar PV, battery storage and 'smart' energy management systems.

These technologies enable consumers to be more engaged in how and when they use energy. Consumers can better manage and monitor their consumptions, and alter their behaviour in response to price signals. Many consumers have also become power producers. In the future, consumers will be able to use their solar, batteries and smart appliances to contribute to strengthening the power system to which they are connected.

The primary function of grids in the future will likely still be to provide safe, secure and reliable transportation of electricity to consumers. However, the grid of the future is likely to become a platform that enables a broad range of technologies and business models – managing multi-directional energy flows both to and from consumers.

To achieve this, networks will face new technical and operational challenges, and may need to invest differently to maintain power quality and reliability and to operate the network within safe limits. For example, instead of investing in additional assets, such as new poles and wires, network businesses may instead access distributed generation, storage devices or harness a greater range of demand response.

New technologies also present opportunities for more efficient grid operation. For example, stand-alone power systems, where there is an electricity supply arrangement that is not physically connected to the national grid, are becoming an increasingly viable

option for consumers, particularly in more remote areas where the cost of supplying electricity from the grid is high.

The regulatory framework is designed to be flexible enough to manage such changes. However, it must continue to adapt so that it remains appropriate for this evolving role. Networks are likely to remain monopoly service providers in the foreseeable future. For the provision of network services their revenue will continue to be regulated and any investment will continue to be subject to cost-benefit assessment.

Action taken by the AEMC to support efficient investment in the grid

Networks are the single largest contributor of costs in the power system.

As a result of the AEMC's distribution pricing rules, the prices paid by households and businesses better reflect the different ways they use electricity and the costs of providing it to them.

The AEMC has also made a number of recent changes to energy rules to support the efficient transport of electricity from where it's made to where it's used. This includes:

- Introducing a demand management incentive scheme that encourages network businesses to use innovative solutions to deliver network services. Over the long-term, the scheme will promote more efficient investment in network services which will flow through to consumers as lower network prices.
- Enabling more competition in the provision of transmission connections, while maintaining clear accountability for the safety, security and reliability of the transmission network. We have also placed new obligations on transmission businesses to adopt a more consistent, transparent and coordinated approach when planning their networks.
- Establishing a new register of 'smart' distributed energy resources which will include information about what resources are connected where, and how they perform in different scenarios. This will improve visibility and contribute to better decisions about how to efficiently integrate DER into the grid.
- Making the AER responsible for establishing values of customer reliability which are used to develop reliability standards in networks and wholesale markets. Knowing the value customers place on having reliable electricity goes to the heart of making sure consumers don't pay more than necessary.
- Facilitating a competitive market in behind the meter batteries and other distributed energy resources by limiting distribution network businesses' ability to own and control these assets.
- Requiring network businesses to provide better information on opportunities to adopt alternatives to 'poles and wires' investment to help reveal new opportunities for expanded embedded generation, demand response and other technologies.
- Increasing the transparency of electricity network service provider decisions to retire and replace network assets and extending the regulatory investment test obligations to consider non-network alternatives so that those obligations also apply to decisions on asset replacements.

Further AEMC actions committed or underway

The **high voltage transmission framework** needs to be fit for purpose and be able to deliver outcomes in a timely and flexible way to accommodate this change, and serve the long-term interests of consumers. The Commission has made a series of recommendations and is now working to make regulatory changes to support these recommendations, including:

- Working with the Energy Security Board to integrate the Integrated System Plan (ISP) into our regulatory frameworks by directly linking investment decisions by transmission businesses to the ISP.
- Streamlining the RIT-T process – the cost benefit test used by the AER to assess new transmission investments by removing duplication from the process.
- Managing congestion so the lowest cost power can get to consumers. This involves implementing phased reforms to change how generators access and use the network, starting with dynamic regional pricing.
- Allowing generators to pay for transmission infrastructure in exchange for access to it – which means generators can influence and have control over transmission planning decisions, leading to better coordination of generation and transmission investment. This also ensures generators, rather than consumers, are allocated the risk of underutilisation of the network.
- Facilitating renewable energy zones through generators' funding of transmission infrastructure.
- Streamlining the connection of large-scale storage systems by creating a new registration category to support seamless integration.

At the **low voltage distribution level** our regulatory frameworks are flexible enough to facilitate change; however, it is important to continue to monitor developments as the role of networks change to manage a future with high levels of distributed energy resources. The AEMC currently has work underway to:

- Introducing specific 'regulatory sandbox' arrangements – a framework within which participants can trial innovative business models, products and services in the market under relaxed regulatory requirements at a smaller scale, on a time-limited basis and with appropriate safeguards in place.
- Investigating possible alternative ways of assessing network expenditure and remuneration to better align incentives for capital and operating expenditure.
- Recommending new mechanisms to enable distribution businesses to provide stand-alone power systems to their existing customers where it is economically efficient, for example in remote locations, while maintaining appropriate consumer protections and service standards.
- Working collaboratively with ARENA, AEMO, AER and other agencies on actions to maximise the value of distributed energy resources, such as rooftop solar PV and battery storage, and consider how to best integrate these into the grid so they can be used to improve reliability and reduce costs.

Actions for government

There are a number of key actions that only governments can take to support efficient investment in the grid.

- The COAG Energy Council should endorse AEMC recommendations and make necessary changes to electricity and energy retail laws to provide the growing numbers of customers in private embedded networks with the same protections as other energy customers.
- The COAG Energy Council should endorse AEMC recommendations and make necessary changes to energy laws to allow stand-alone power systems to be used where it is economically efficient to do so, while maintaining appropriate consumer protections and service standards.
- The COAG Energy Council should continue to support the continued uptake of cost reflective tariffs so that prices paid by households and businesses will better reflect the ways they use electricity and the costs of providing it.
- Governments should continue to support the roll out of smart meters to allow consumers to take advantage of new technologies and manage their energy usage and costs.

THE ABILITY TO EASILY BUY, SELL AND TRANSPORT GAS TO WHERE IT'S NEEDED

Recent trends

The east coast gas market is an interconnected system that links all of Australia's eastern and southern states and territories. Since December 2018 it also includes the Northern Territory with the commissioning of the northern gas pipeline linking to the Northern Territory and Queensland.

The development of Queensland's LNG export industry has transformed the eastern Australian gas markets, tripling east-coast gas demand. By the end of 2018 around 61 per cent of eastern Australian gas production was being exported as LNG. This has had flow-on effects for the level and variability of gas flows and wholesale prices in the domestic market.

Prices in the eastern domestic market have risen to align more closely with international gas prices. This has also had an impact on the electricity market, which became more reliant on gas-powered generation following the closure of several coal fired generators between 2014 and 2017, with around 29 per cent of domestic demand for Australian gas being for power generation.

The increase in gas prices in recent years makes it more important than ever for gas and gas transportation markets to be functioning effectively.

Action taken by the AEMC to make it easier to buy and sell gas

Broadly, actions taken by the AEMC to date have focussed on improving:

- gas commodity markets
- gas transportation arrangements, including the regulation of gas pipelines and the way in which access to gas transport is traded between users
- the information required to support gas commodity and transportation capacity markets.

Recent AEMC recommendations to gas market operation have been focussed on making it easier and cheaper to move gas around the market to where it is needed and valued most by consumers. This includes:

- Recommending concentrating wholesale gas trading at two hubs; a northern hub in Queensland and a southern hub in Victoria, the key points of demand and supply on the east coast. This is complimented by a work done by both the AEMC and the Gas Market Reform Group to apply a common start time of 6am (AEST) to gas markets on the east coast.
- Recommending the COAG Energy Council establish a Gas Market Reform Group to improve access to pipeline capacity by introducing day ahead auctions for unused capacity, improving capacity trading platforms to facilitate short-term gas trading and developing standard products and information on all trades.
- Increasing the amount and frequency of data reported on the Natural Gas Bulletin Board to enable market participants to make more informed production,

consumption, trading and investment decisions and introducing greater data accuracy requirements and stronger compliance framework.

- Formally tracking and reporting to the COAG Energy Council on the growth in liquidity in wholesale gas and pipeline trading markets to provide regular and consistent information to underpin future reforms.

Further AEMC actions committed or underway

The AEMC is making further changes to both the way in which pipelines are regulated to help gas pipeline users negotiate lower prices and better deals, and the way in which gas is traded.

The AEMC has work underway to reform the gas market, including:

- Expediting changes to the way gas pipelines are regulated to help gas pipeline users negotiate lower prices and better deals.
- Considering a rule request that seeks to exempt certain LNG facilities in the Northern Territory from providing information to the Natural Gas Bulletin Board as these facilities currently engage in only very limited trade with the domestic gas market.
- More closely aligning the market arrangements across the east coast and improving the ability of market participants to manage risk by:
 - Considering a rule request that seeks to improve the allocation and trading of pipeline capacity right in the Victorian declared wholesale gas market.
 - Considering a rule request that seeks to establish a forward trading exchange which will make it easier for buyers and sellers in the Victorian declared wholesale gas market to trade gas and lock in a future price.
 - Considering a rule request that seeks to introduce a clean and simple wholesale gas price in the Victorian declared wholesale gas market.

Actions for government

There are a number of key actions that only governments can take to improve outcomes for gas consumers.

- Governments could improve market outcomes by addressing possible issues with the supply side of the market. In this context, the AEMC welcomes the COAG Energy Council's Gas Supply Strategy, as well as various other initiatives that will generally complement the reforms to wholesale gas trading and pipeline arrangements.
- The COAG Energy Council should progress its review of the coverage test for determining which gas pipelines are subject to regulation. This is important as there is a risk under the current test that some pipelines with the ability to set monopoly prices may not be subject to a sufficiently strong form of regulation, while other pipelines may be subject to too strong a form of regulation, creating direct and indirect costs ultimately borne by consumers.
- The COAG Energy Council should progress the national hydrogen strategy, including considering what changes to the National Gas Laws and National Gas

Rules may be required to enable the use of existing gas pipelines for the transport of hydrogen. Hydrogen is a potential zero emissions fuel source that may be a viable alternative for natural gas in the medium term.

- The COAG Energy Council could progress a recommendation made by the AEMC to progress changes to the national gas law on matters including dispute resolution between pipeline service providers and pipeline users.