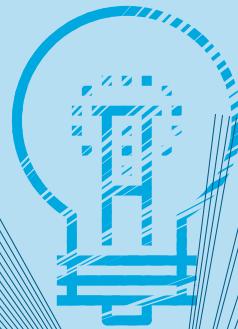


Australian Energy Market Commission

MAKING MARKET TRANSFORMATION WORK

OVERVIEW 2016-2017





JOHN PIERCE
CHAIRMAN



Building a better energy system

The changing mix in generation sources means we have to manage the power system differently and evolve the market. There is no silver bullet. There are many options we could take. But we need to understand how different solutions would interact with the rest of the system, affecting prices, reliability and security. Decisions made today will affect national economic development for decades to come. The AEMC is changing the energy market design so it can deliver more reliable, secure capacity and help keep bills affordable.

Transformation of the energy sector is being driven by consumer choices made possible by smarter technologies, micro generation, rooftop solar, storage, and the move to large-scale renewables. Emerging consumer benefits from this energy revolution are very real – but at risk – because of cost pressures coming from the wholesale generation sector.

Older coal-fired generators are retiring and more large-scale renewable generators have connected. This changing generation mix impacts the price and availability of electricity. While investments under the Renewable Energy Target have increased the level of installed megawatts, there are times when the overall mix cannot deliver enough hours of electricity, or enough security services, at the right time to meet consumer demand. Meeting consumer demand with a new mix of technologies requires price signals to guide private sector investment. In the national electricity market, these price signals come from the spot price and the forward contract price. These signals, if allowed to function, will deliver commercial investment in a combination of technologies that can deliver secure, reliable and low emissions power to consumers at the lowest price.

In these circumstances it's critical that there are emissions reduction mechanisms in place that allow price signals to work within the national electricity market.

This means putting all technologies on a level playing field and letting prices do two things – inform investors

of what's needed to fill capacity gaps, and encourage the hedging contract market to underpin necessary investment.

We are working with the COAG Energy Council, the Energy Security Board, the Australian Energy Market Operator and the Australian Energy Regulator on implementing recommendations made by the Independent Review into the Future Security of the National Electricity Market. We have an extensive work program underway which is consistent with the Finkel blueprint.

Our work program is focused on four key areas: to promote system security and reliability, provide analysis on integrating government emissions reduction and energy policy, reform market arrangements so gas can be bought and sold more efficiently, and develop the new competitive energy services market with demand management opportunities to expand consumer choices and help manage energy bills.

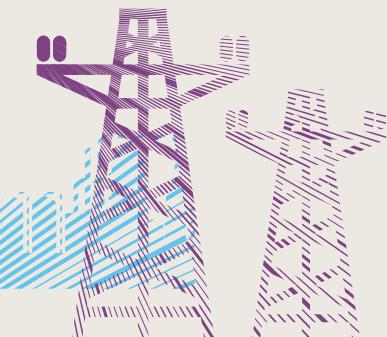
We are working more closely with stakeholders and other market bodies to evolve the Commission's way of working in more timely ways. Over the past year we have operated differently to increase collaboration, combining work on related reviews and rules, and involving more stakeholder working groups to help inform our thinking.



KEEPING THE LIGHTS ON



Changing the energy market design



INTEGRATING EMISSIONS POLICY

Above all we want a secure and reliable energy system that keeps prices as low as possible for consumers. The way electricity supply and demand interacts is changing because the technical features of new generation technologies like wind and solar are different. The Commission is working with AEMO and the AER to build a stronger power system. Synchronous generators like coal, biomass, gas and hydro operate with large spinning turbines that maintain constant frequency and voltage, keeping the system stable. They inherently produce inertia, the energy momentum that lets the system ride through sudden disturbances. Currently, non-synchronous generators like wind or solar have no or low inertia. Power systems with lots of non-synchronous generation are weak. They have less time to recover from sudden equipment failures before frequency collapses and widespread blackouts happen.

An effective emissions reduction policy that supports contract market liquidity is vital for a vibrant, innovative retail energy sector which can deliver benefits to consumers.

Energy and emissions reduction policies have different objectives and need to be developed so efficiency trade-offs and costs are well understood. Environmental policies that are appropriately designed and integrated can achieve their objectives while minimising costs faced by consumers in energy markets.

A well-integrated emissions reduction policy is: **technology neutral** to allow for the greatest number of technology options in the market to increase competition between generation sources and minimise costs;

A range of options are available to provide the additional services required to strengthen the system. The AEMC is establishing new approaches to keeping frequency within the secure band – to enable more inertia services, smarter emergency control schemes and new standards for minimum network system strength.

Our security and reliability work is developing new frameworks to keep the power system as strong as possible as it transforms. Many technical options are emerging in today's electricity sector and we want to encourage further innovation – rewarding the most efficient technologies over time. Energy markets are not static and there will be different challenges in different places tomorrow. The changes that need to be made centre on the physics of energy supply, transmission and meeting consumer demand.

flexible enough to adapt to whatever supply and demand conditions the future might bring; designed to be **sustainable** so investors in all kinds of generation are confident that policy objectives can be met.

The contract market is the direct link between matching the financial incentives for generation assets investment with the physical needs of the system. Any mechanism for emissions reduction must enhance the role of the contract market to maintain reliability and security in the power system.



BUILDING BETTER GAS MARKETS



Changing the energy market design



GIVING CONSUMERS MORE CHOICES

Gas market challenges make it more important than ever for the COAG Energy Council to achieve its vision of a liquid wholesale gas market, with an efficient and transparent reference price for gas. In 2016 the energy ministers agreed to our proposals that will concentrate wholesale gas trading at two key hubs, make unused pipeline capacity readily available across the entire east coast, and provide more information about prices and gas availability. These reforms are now being implemented. We have answered Victoria's request for advice on next steps to reform the east coast market with recommendations to make it easier to buy and sell gas in Victoria and to trade gas between states. This should

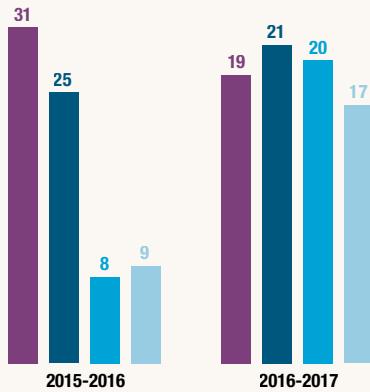
help lower transaction costs, improve market transparency and support greater competition in the Victorian market. We have recommended a staged approach to reforming the Victorian gas market. The first stage announced in July will go a long way to achieving a more liquid gas market and harmonisation with other gas markets across the east coast of Australia. In time, more substantial reforms could be implemented to allow for continuous trading of gas and explicit, tradable capacity rights.

Implemented in full the reforms have the potential to increase Australia's GDP by \$8.7 billion in net present value terms by 2040 through improved viability of gas-using industries and flow-on benefits to employment and tax revenues.

Our power of choice reforms are focused on consumer information and cost-reflective prices so consumers can choose products and services that are right for them facilitating innovation so the market can open up to new metering and technology options; and poles and wires reform so the way we pay for power can keep pace with modern lifestyles. These three areas of change are key as distribution network services are transformed by consumers who are buying and selling power. We also have a vision for a new competitive distribution market which enables consumers to get the most value out of their rooftop solar panels, batteries, electric vehicles and smart household appliances like refrigerators and dishwashers, which can respond to short-term

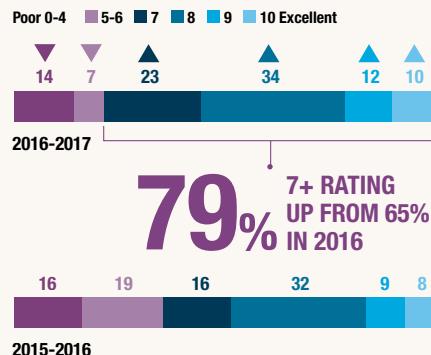
changes in price signals. Distributed energy resources are becoming smarter and cheaper and we expect to see uptake accelerate. That's why we need to put consumers in charge of their own decisions, giving them the means to optimise the value of household or business energy investments. This work will help consumers reduce electricity bills, help electricity networks manage peaks in demand, increase competition in the wholesale electricity market by exporting locally produced power and also provide services like frequency control that help keep the system secure.

RULE CHANGES, REVIEWS AND ADVICE STARTED AND COMPLETED



▼ Rule changes initiated
▲ Rule changes completed
▼ Reviews and advice started
▲ Reviews and advice completed

OVERALL RATINGS OF AEMC'S APPROACH TO CONSULTATION



POWER SYSTEM SECURITY AND RELIABILITY



PROJECT LANDSCAPE

WORK PROGRAM 2016-2017

Making market transformation work for consumers is about two things. Keeping the lights on and gas flowing, and delivering necessary market changes at least cost to consumers. We are focused on creating mechanisms to encourage sound investment decisions, and allow consumers, big and small, to see the costs and benefits of various energy choices.



REDESIGNING THE EAST COAST GAS MARKET

INTEGRATING ENERGY AND EMISSIONS REDUCTION POLICY



67
PROJECTS

88
EMPLOYEES

89%
OF RULE CHANGES INITIATED WITHIN 4 MONTHS

PROMOTING COMPETITIVE ENERGY SERVICES



33%
OF RULES COMPLETED WITHOUT EXTENSION AFTER INITIATION

KEEPING THE LIGHTS ON AS THE SECTOR TRANSFORMS

- Our power system security review developed a reform package to guard against technical failures that lead to cascading blackouts. It started in July 2016 before South Australia's system black event:
System security market frameworks review Jun 17
- Emergency frequency control schemes are being delivered to manage the power system as non-synchronous generation like wind and solar replaces old synchronous power stations which are due to close in the years ahead: *New rules for emergency frequency control schemes Mar 17; Managing rate of change of frequency Sep 17; Managing fault levels Sep 17*
- We are reviewing options to support reliability in the new-look power system which has more variable, intermittent generation and growing demand-side innovation. Reliability is about having enough energy and network capacity to meet consumer demand:
Reliability frameworks review underway
- New forms of frequency control to stabilise the system are being considered by this review, including how to integrate faster frequency control services offered by new technologies into regulatory and market arrangements: *Frequency frameworks review underway*
- Review of the reliability standard is conducted every four years. The AEMC Reliability Panel reviews the national electricity market's reliability standard and settings which are an important signal for investment. Under this review the Panel takes changes in market arrangements into account to ensure the standard and settings continue to meet the requirements of market participants and customers: *Reliability standard and settings review 2018 underway*
- Expanding demand response as a tool to boost power security is an outcome of this new rule which created a new category of market participant who can negotiate and aggregate with energy users to increase competition for ancillary services:
Demand response mechanism and ancillary services unbundling Nov 16

POWER SYSTEM SECURITY AND RELIABILITY



- Making it easier for generators to connect to the grid is a key focus of our work program. About 30 to 50 large-scale generators may seek to connect to the network by 2020. We have established a comprehensive transmission connection and planning framework which could lead to savings of \$100 million in the next three years. New rules provide more choice, control and certainty for connecting parties:
Transmission connection and planning arrangements May 17
- Raising the bar for generator performance. Generators are long lived assets and new assets connecting today have to meet the power system's needs in the future. Work has started on proposed new rules aimed at raising the bar for the performance of new generators to help keep the system safe and secure. This work was recommended by the Finkel Review and consultation will be conducted throughout late 2017:
Generator technical performance standards underway

PROVIDING INDEPENDENT ANALYSIS OF POLICY OPTIONS

- Options to reduce emissions at lowest cost were provided to the COAG Energy Council. We considered alternative ways to reduce electricity emissions including: a market-based emissions intensity target requiring generators with emissions over a target to buy credits from those below, an expanded large-scale renewable energy target, and government-regulated coal power station closure. The emissions intensity target delivered best results for consumers on price, security and certainty: *Integration of energy and emissions reduction policy Dec 16*
- Balancing emissions, lower prices, and system stability were addressed in our submission to the Finkel review. International evidence suggests emissions reduction policy needs to support effective competition in the power system. Otherwise consumers bear the costs of investment risk and ongoing government intervention: *Submission to independent review on the future security of the national electricity market Mar 17*
- Challenges faced by coal-fired power station closures were explored by another of our submissions to government this year. This submission explored the consequences of uncertainty with respect to Commonwealth and state emissions reduction policies: *Submission to inquiry into retirement of coal fired power stations Nov 16*
- Joint advice with the Climate Change Authority was released at the request of the Commonwealth Minister for Environment and Energy. This advice was geared towards integration of energy and emissions reduction policies to provide greater investment certainty and help keep electricity prices as low as possible while enhancing power system security: *Towards the next generation Jun 17*

INTEGRATING ENERGY AND EMISSIONS REDUCTION POLICY



REDESIGNING THE EAST COAST GAS MARKET



MAKING IT EASIER TO BUY AND SELL GAS

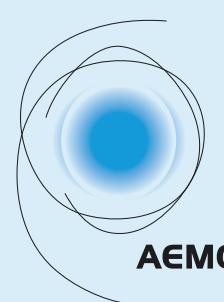
- Our roadmap to fulfil the ministers' vision for an integrated east coast gas market has been agreed by the COAG Energy Council. These reforms will help improve access to gas which is one significant way to help keep electricity prices as low as possible for consumers: *East coast wholesale gas market and pipeline frameworks review Jul 16*
- Victorian gas market reforms will make it easier to trade gas between states. Victoria's southern gas hub is a pivotal wholesale trading centre on the east coast. It was the focus for the next gas reform step. Our proposals are to lower barriers to entry and streamline trading to support greater competition. This would add to electricity reliability as gas generators would have better access to supplies across the whole market: *Declared wholesale gas market review Jul 17*
- New rules are being made to integrate east coast markets. Different gas trading areas across the east coast currently operate with different gas day start times as a result of legacy pipeline arrangements. These differences impose a cost on the increasingly integrated system and we made a new rule to prepare for the integrated gas market. It will harmonise the start of the gas day across the eastern seaboard from 2021: *Gas day harmonisation Feb 17*
- The review of gas pipeline regulation is addressing concerns that consumers may be paying more than necessary for gas pipeline services. It is also considering the rules for access negotiation and dispute resolution between pipeline service providers and customers: *Review into the scope of economic regulation of covered pipelines underway*
- More information to aid transparency. The gas bulletin board managed by the Australian Energy Market Operator provides gas system and market information to inform decisions about trading, investment, and use of gas. Our draft rule would increase the amount and frequency of data on the board along with greater accuracy requirements and a stronger compliance framework: *Improvements to natural gas bulletin board draft determination Jul 17*
- The framework for networks to provide off-grid alternatives which might be cheaper for remote customers is under consideration. Electricity supplies that are not physically connected to the national system typically include a combination of solar PV, energy storage and small-scale diesel or gas generators: *Alternatives to grid-supplied network services draft determination Sep 17*



PROMOTING COMPETITIVE ENERGY SERVICES

GIVING CONSUMERS MORE WAYS TO CONTROL ENERGY USE

- **Helping consumers get more value from distributed energy resources.** The projected uptake of rooftop solar, battery storage, electric vehicles and other technologies within the grid presents great opportunities for consumers. Part of the AEMC's technology work program is a distribution market model project which explores how consumers can get more value from distributed energy resources like rooftop solar, batteries and energy saving appliances: *Distribution market model draft report Jun 17*
- **The Prime Minister's direction for more transparency in retail controls** produced actions including this proposed rule to require retailers to notify customers before their energy discounts end and help families get the best power deal. This rule is being expedited: *Notification of end of fixed benefit period due to be final by Nov 17*
- **New deals for embedded network customers** in private electricity systems like shopping centres, retirement villages, caravan parks and residential developments are being considered in this review. Embedded networks are using technologies such as distributed generation and storage which bring opportunities for innovation and new risks for consumers: *Embedded networks review consultation paper Apr 17*
- **Removing barriers to consumer choice.** A year ago our report on integrating energy storage highlighted the need to review the rules so they don't prevent efficient investment and competition in storage services. We are now consulting on rule requests seeking to redraw the line between what is economically regulated and what's contestable: *Contestability of energy services demand response and network support, draft determination Aug 17*
- **Aligning market dispatch and settlement.** As the market transforms there is an important role for fast response generation and services. We are in the final stage of consultation on changing the electricity spot price from 30 to five minutes to signal the value to consumers of fast response technologies such as aggregating distributed storage, and rapid demand response, which are needed to support intermittent wind and solar generation: *Five minute settlement draft determination Sep 17*
- **Using demand response to produce network savings** is increasingly important as technological change makes alternatives to traditional investments in poles and wires more viable. We made a rule to help providers of non-network solutions including demand response to identify investment opportunities in the grid by improving transparency of retirement and replacement decisions by electricity network service providers: *Replacement expenditure planning arrangements Jul 17*



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