Wholesale electricity market performance monitoring

Draft 2018 focus

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AUSTRALIAN ENERGY REGULATOR

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Introduction

Electricity markets in Australia are transforming. Technological change, as well as climate change policy, is encouraging a shift to smaller, more distributed generation. A higher penetration of intermittent generators is changing how the power system needs to be managed. Households and businesses are using electricity differently. Demand response is occurring more frequently, and wholesale electricity prices have increased.

In the context of these changes, ensuring consumers, industry and government have access to relevant and timely information on the performance of the wholesale electricity market is now more important than ever.

Amendments to the National Electricity Law (NEL) mean that for the first time the AER has the power to undertake regular, comprehensive, longer term assessments of the structure and performance of wholesale electricity markets. We will provide our first comprehensive report on the performance of Australia's wholesale electricity markets to the Council of Australian Governments Energy Council (COAG EC) in December 2018.

We will report on whether:

- there is effective competition in the wholesale market or there are features of the market that may be detrimental to effective competition
- there are features of the market that may compromise the efficient functioning of the market.

About this document

This *2018 Focus* provides the context of the wholesale markets we are monitoring for the 2018 performance report. It briefly describes current market conditions and examines issues that have emerged in recent years. In future reports, we expect the wholesale markets will evolve and the issues we focus on will change. As well as identifying areas of focus, this document also outlines the specific metrics we will prioritise in our 2018 performance report. We expect some of the tools and measures we use to monitor and analyse the wholesale markets will evolve over time as we develop our approaches and refine our techniques. We may also adapt the metrics we use in response to the issues we identify or as new issues arise.

To provide certainty around our general monitoring approach, the *2018 Focus* will sit alongside a high-level statement of approach. This second document will be enduring in nature and we do not expect to update it from report to report. Together, these two documents allow us to respond to market changes and emerging issues, while providing clarity around our general monitoring approach.

Current market conditions

The transformation of the Australian energy sector has largely been driven by technological change bringing down the cost of new technologies. Government policies are encouraging a different mix of generation, and at the same time, the cost and availability of key fuels for electricity generation, such as coal and gas, have changed. Wholesale electricity markets

are experiencing some unique changes as a result of these drivers. The age of the existing large scale generators in Australia, the lower cost of new technologies, and government policy have resulted in a shift away from large, centralised thermal generators to smaller, distributed resources, many of which are intermittent. Households and businesses are changing the way they use electricity. Advances in metering, batteries and controllable consumption devices mean consumers can take a more active role in their use of energy, and demand response is occurring more frequently.

These changes have impacted wholesale market outcomes. For example:

- New markets have or are emerging, which affect how generators and customers participate in the energy spot markets.
- The types of risks faced by energy businesses are evolving requiring new ways to manage them. At a high level, these risks include policy changes and the shift in the generation mix. These changes are reflected in more variable levels of generation and therefore the possibility of more volatile prices.
- Different elements of energy markets are converging. As coal generators retire, the price of gas is having a greater impact on wholesale electricity prices. Network businesses are seeing more opportunities to be involved in competitive areas of the energy industry, including providing services behind the meter. Vertical integration between generation businesses and retail businesses has increased as companies seek new ways to minimise risk.
- The possible introduction of the national energy guarantee will further affect wholesale market outcomes.

The extent of change in the energy sector and resulting industry structure has caused concern regarding the current and future competitiveness of wholesale electricity markets.

Issues we will monitor and report on in 2018

The NEL provides a broad range of factors we will report on when we examine whether there is effective competition in the wholesale market. We also asked stakeholders to identify matters we should consider. Generally generators were concerned about fuel availability and policy uncertainty, while consumer representatives were concerned with increasing wholesale prices. These concerns were held in conjunction with the need to maintain system security and reliability. In the 2018 performance report, where possible we will provide relevant information to help assess these issues.

Markets we will focus on in 2018

There is a wide range of products and services we could consider in our analysis. In our first full report, we will start by analysing the electricity spot market and financial derivatives contracts, with some consideration of the frequency control ancillary services (FCAS) markets.

Consumer groups submitted we should consider all products, including electricity derivatives. Electricity derivatives are not regulated under the NEL or National Electricity Rules. However, it will be important for us to have regard to the extent to which participants

in the spot market trade in electricity derivative instruments. The degree to which participants hedge risk may affect how they offer capacity in the spot markets, while an illiquid derivatives market may act as a barrier to entry for electricity generators and retailers. We will also consider the impact of the renewable energy target (RET) and the markets for large-scale generation certificates (LGCs). The RET creates financial incentives, through LGCs, to invest in certain technologies, which may have had an impact on efficiency or the effectiveness of competition.

Generally, we will consider the geographic markets at the regional level, while allowing for instances where certain issues may require the National Electricity Market (NEM) to be considered as a whole. How and where market power may arise will depend on a range of factors. Transmission constraints, especially at peak periods, will mean the relevant geographic market may be regional at times.

Our analysis will cover both the short and long term. We will examine 5-minute dispatch bidding, as well as take a longer-term view to capture trends and assess how the market is evolving.

In addition, for the 2018 performance report, we intend to assess the extent to which demand response affects competition and efficiency in the wholesale market.

The framework and tools we will use

The overall framework we will use for our analysis will be the structure-conduct-performance approach. This framework is set out in our statement of approach.[1]

Our monitoring and reporting in 2018 will use a suite of tools, consistent with advice from stakeholders. We will examine the interactions between these tools, rather than relying on any single one to arrive at a particular conclusion.

We have chosen the tools we will use in 2018 because they meet the criteria set out in our statement of approach. These tools:[2]

- provide useful insights
- are robust and reliable
- can be easily understood
- take into account the public information available to us.

These initial measures will provide a base level of analysis that we will build on and develop over time. As our approach develops and data sources expand, we expect we will be able to refine and target these measures further. In the first instance, we will use publicly available information. We may compel confidential information where our analysis of public information indicates an issue.

1 AER, Wholesale electricity market performance monitoring, Statement of approach, p. 11.
2 AER, Wholesale electricity market performance monitoring, Statement of approach, p. 2.

Structure

Our assessment of the effectiveness of competition in the wholesale market will include analysis on the structure of the market. We will examine the factors that may provide a competitive constraint on the behaviour of market participants. Also, we will investigate those that may facilitate the exercise of market power, including market concentration, barriers to entry, and vertical integration between generators and retailers.

We will use the standard tools of competition analysis as well as electricity specific measures, some of which we already publish in our *State of the energy market* reports:

Market share

We will consider how market shares change over time. When reviewing market share data we will be cognisant of the portfolio fuel mix of various participants and how this affects the market structure. We will use the Australian Energy Market Operator's (AEMO) estimate of wind and solar availability during periods of high demand. We will assess market share on the basis on ownership and control, for example through long term power purchase agreements.

Herfindahl-Hirschman Index (HHI)

HHI is a common measure of market concentration, which provides a more complete picture than simple market share. It is calculated by adding the squared market share of each individual firm in the industry. A higher HHI indicates a less competitive market.

Residual Supply Index (RSI)

RSI identifies the amount of time a generator is pivotal to meet demand. It is particularly useful for the assessment of market power in electricity markets as, unlike market concentration measures, it accounts for changes in demand. High demand periods are when market power is more likely to be exercised in the NEM.

Since 2008-09, we have published the RSI in each NEM region for times of peak demand (the highest 2 per cent of demand trading intervals, equal to seven days per year). In 2018 we will look to new ways to analyse and present RSI. For example we could calculate the percentage of time that the largest participant is pivotal across all time periods.

Modified RSI

While RSI identifies whether a generator is able to raise prices, it does not identify whether it is profitable to do so. One way to address this is to adjust the RSI so that instead of calculating whether an entire portfolio is pivotal, we will consider whether a proportion of a generator's portfolio is pivotal. . For example a generator may be less likely to withhold if it needed to withhold more than half of its available capacity to affect the spot price.

Frequency Control Ancillary Services (FCAS)

We will assess market share in the FCAS market using similar measures as for the spot market. As well as monitoring FCAS market shares for the NEM as a whole, we will also spotlight FCAS market shares in South Australia due to South Australia's high reliance on renewables and the fact that it often forms a regional market.

Liquidity of derivatives markets

We will analyse the volume of derivatives products traded on the Australian Securities Exchange (ASX). For example, we will compare spot prices with the forward price.

The availability of public information on derivatives markets is limited, with over-the-counter transactions remaining confidential. As we prepare our approach to these monitoring functions, we are interested in working with industry to develop ways of improving the quality and availability of this information.

Supply-demand balance

We will monitor the extent to which underlying supply and demand conditions are driving market outcomes. We will compare NEM peak demand and forecast demand with generation capacity, both including and excluding non-dispatchable generation. We will refer to the demand and generation capacity outlook reported by AEMO in its *Electricity statement of opportunities* for the NEM. We will also monitor the volatility of demand and examine periods of peak demand.

We will consider the extent to which we can publish information on demand response and how this affects the wholesale market. Demand response refers to the ability of consumers of electricity, including commercial, industrial, and residential, to change the consumption of electricity in response to prices.

Vertical integration

We will consider the extent to which the vertical integration of generators and retailers has created market structures, which may compromise effective competition. Combining retail and wholesale market operations allows generators and retailers to insure internally against price risk in the wholesale market. This reduces the need for these 'gentailers' to hedge their position in derivatives markets.

We will seek to analyse vertical integration on a qualitative and quantitative basis. As part of this assessment, we will separately assess the percentage of generators and retailers who are vertically integrated. We will also consider the share of overall generation capacity owned by gentailers. We may also interview financiers and new entrant retailers to explore the impact of vertical integration on liquidity in the market for hedge contracts.

Barriers to entry

The entry of new firms into a market can provide an important source of competitive constraint on incumbents. If new entrants are able to offer customers an appropriate alternative source of supply at the right time, any attempt by incumbents to exercise market power will be unsustainable since their customers will simply switch to the new entrants. A credible threat of new entry alone may prevent any attempt to exercise market power in the first place. We will therefore assess the height of barriers to entry for all relevant markets. We will also consider barriers to expansion for existing market participants.

The different types of barriers to entry that we will consider include:

- structural barriers due to sunk costs, substantial economies of scale, and access to inputs such as fuel and hedge contracts
- strategic barriers to entry that may arise due to the actions (or threatened actions) of existing participants
- legal or regulatory barriers to entry that either prevent or increase the risk of new entry.

We intend to take a qualitative approach to considering barriers to entry. This is likely to involve surveying or interviewing market participants directly or through an intermediary. This could include both incumbents and potential new entrants. The Australian Energy Market Commission (AEMC) adopts this approach in its *Retail competition reviews*.

Conduct

We will assess the conduct of market participants to determine whether their behaviour is consistent with effective competition and the efficient functioning of the wholesale markets.

In 2018 we will focus our analysis on generator offer and re-bidding behaviour. In particular we will consider the extent generators engage in economic and physical withholding. For example, we will assess the link between high prices and plant capacity use as a possible indicator of physical withholding. We will also collate the findings of our regular review of generator offer and rebidding behaviour and the generators' reported reasons for rebidding.

Our consideration of market power will relate to issues of efficiency or effectiveness of competition in the context of the NEM. We will not examine the illegal misuse of market power which falls under the remit of the Australian Competition and Consumer Commission (ACCC).[3]

Performance

The definition of effective competition in the NEL requires us (among other things) to consider whether prices are determined in the long run by underlying costs. In 2018, we will do this by calculating the Levelised Cost of Electricity (LCOE) and comparing it to the volume weighted annual average spot electricity prices in each region of the NEM and other indicative cost indicators.

The purpose of this comparison will be to provide an indicator for further investigation. Prices sustained above the LCOE of a particular technology could create an expectation for new investment or cessation of price signals. If we do not see either scenario, we would need to undertake further investigation to determine if factors other than price are impeding the effectiveness of competitive outcomes in the market.

The NEL also requires us to assess the efficiency of the market and identify any factors that may be impacting detrimentally on that efficiency. We will consider three common components of efficiency:

3 Competition and Consumer Act 2010, Section 46.

- Productive efficiency – examining inefficiencies from higher cost generation being dispatched in place of lower cost generation.
- Allocative efficiency – determining if the allocation of resources are maximising the net benefit.
- Dynamic efficiency – looking at how innovation and investment decisions are made over time.

In 2018 we intend to take a qualitative approach to identifying and measuring these efficiencies. We will highlight efficiency issues we identify throughout the year as part of our ongoing market monitoring. We will highlight how these issues compromise productive, allocative or dynamic efficiency and whether we consider they are transient or sustained.