2016/17 Wholesale Electricity Market Report for the Minister

Discussion Paper

JULY 2017

Economic Regulation Authority
WESTERN AUSTRALIA

Economic Regulation Authority

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1 Introduction

The Economic Regulation Authority is required to provide an annual report to the Minister for Energy on the effectiveness of the Wholesale Electricity Market in meeting the market objectives.[1]

This year's report will cover the 2016/17 financial year. During this period, there has been a change of State Government and a new Minister for Energy appointed. Current uncertainty in the wholesale electricity market (**WEM**) is expected to reduce as the government begins to release its plans for the electricity industry, including the future of the Electricity Market Review (**EMR**), a reform programme initiated by the previous government.

Western Australia is not alone in experiencing a heightened sense of uncertainty in its energy sector. The east coast energy market, despite being characterised by more competitive energy markets, is experiencing increasing energy prices. The latest energy supply outlook report[2] forecasts electricity supply shortfalls under extreme conditions and risks to power system security in some regions. Efforts to address reliability and security concerns in the National Electricity Market have been coordinated into a national reform blueprint. This is the outcome of an 'Independent Review into the Future Security of the National Electricity Market' (commonly known as the Finkel report[3]), published on 9 June 2017. Although specific to the east coast electricity market, the report suggests the Western Australian and Northern Territory governments should consider adopting the recommendations where applicable.[4]

The Economic Regulation Authority (**ERA**) in its 2016/17 WEM Report to the Minister will identify issues that require urgent consideration to support the effective operation of the WEM. Complementing this will be an assessment of transitional changes under way and emerging in the energy sector and the risks these may pose to the effective operation of the WEM. Examples of transitional changes include the introduction of battery technology and more active engagement of consumers in the energy market. This commentary will include the market's ability to mitigate risks, take advantage of new technologies and deliver efficient outcomes.

The ERA will draw on market analysis and stakeholder feedback in forming its conclusions and where appropriate provide recommendations for the Minister.

Further detail on the report scope, reporting requirements, stakeholder engagement and timetable is available in the following sections.

1.1 Reporting requirements

Clause 2.16.12 of the Market Rules requires the ERA's report to the Minister to contain (but is not limited to) the following:

- a summary of the information and data under the clause 2.16.1;

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1 Refer to clause 2.16.11 of the Market Rules

2 AEMO Energy Supply Outlook for Eastern and South-Eastern Australia (June 2017)

3 Refer to the Independent Review into the Future Security of the National Electricity Report

4 Ibid. p29

- the ERA's assessment of the effectiveness of the market, including the effectiveness of the Australian Energy Market Operator (**AEMO**) and System Management in carrying out their functions, with discussion of the following:
    - the Reserve Capacity Market;
    - the market for bilateral contracts for capacity and energy;
    - the Short Term Energy Market (**STEM**);
    - the Balancing Market;
    - the dispatch process;
    - the planning processes;
    - the administration of the market, including the Market Rule change process;
    - ancillary services;
- an assessment of any specific events or behaviours that affected the effectiveness of the market; and
- any recommended measures to increase the effectiveness of the market in meeting the Market Objectives for consideration by the Minister for Energy.

Preliminary market observations from the 2016/17 financial year are outlined in section 4.

This year's WEM Report will also consider the ongoing transformation of the electricity market and how this may influence the effective operation of the WEM. This is outlined in more detail in section 2.

1.2 Stakeholder engagement and invitation to make submissions

The purpose of this discussion paper is to assist interested parties in making submissions on any issues that they consider are influencing the effectiveness of the WEM in meeting the market objectives.[5]

Interested parties are invited to make submissions on the discussion paper by:

4:00 pm (WST) Wednesday 1 September 2017 via the portal on the ERA website.

In addition to seeking formal submissions, the Secretariat is happy to meet with stakeholders to discuss any matters related to this review. The Market Advisory Committee meetings will also be used to periodically update the industry on analysis undertaken during the WEM review and take feedback. The ERA will take into account the views expressed by all stakeholders in the preparation of its final report to the Minister.

[5] The Wholesale Market Objectives are: (i) promoting the economically efficient, safe and reliable production and supply of electricity and electricity related services; (ii) encouraging competition among generators and retailers, including facilitating efficient entry of new competitors; (iii) avoiding discrimination against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or reduce overall greenhouse gas emissions; (iv) minimizing the long-term cost of electricity supplied to customers; and (v) encouraging measures to manage the amount of electricity used and when it is used

CONFIDENTIALITY

Submissions made to the ERA will be treated as in the public domain and placed on the ERA's website unless confidentiality is claimed. If a submission, or part of a submission is made in confidence, the interested party should indicate which part of the submission is confidential and specify, in reasonable detail, why confidentiality is being claimed. Any claim of confidentiality will be considered in accordance with the provisions of section 55 of the *Economic Regulation Authority Act 2003*.

The publication of a submission on the ERA's website shall not be taken as indicating that the ERA has actual or constructive knowledge of the submission contents. In particular, where the submission, in whole or part, contains information of a confidential nature, then no duty of confidence will arise for the ERA.

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1.3 Proposed timeframe

From the publication of this discussion paper, submissions from interested parties are due by 1 September 2017.

The ERA will seek to provide the final 2016/17 WEM Report to the Minister for Energy late November/early December 2017. A public version of the report will be published on the ERA's website, following consultation with the Minister.

2 Approach and focus for the 2016/17 WEM Report for the Minister

In addition to its legislated reporting requirements, the 2016/17 WEM Report for the Minister is an opportunity to undertake market analysis and seek stakeholder feedback to:

- identify problems that are currently influencing the effectiveness of the WEM, drawing from:
    - market reforms currently on hold, that the ERA recommends should be implemented as quickly as possible;
    - interim measures adopted whilst the future of the EMR is unclear;
- consider medium-term transitional changes under way in the WA electricity sector including:
    - the risks represented by transitional changes, interrelationships between different types of change and possible outcomes for the market;
    - if the current WEM design can ameliorate risks and take advantage of any opportunities arising from these transitional changes and deliver efficient outcomes;
    - consider recommendations from the Finkel review to identify which may be appropriate to adopt in WA; and
- illustrate how reforms already undertaken in the electricity sector have influenced the effective operation of the WEM over the review period.

The ERA will seek to present an informed commentary on the WEM, intended to assist the Minister for Energy in preparing and planning for transformational change in WEM over the short to medium term.

1. Based on the approach and focus for the 2016/17 WEM Report to the Minister, are there any other considerations not covered by this discussion paper that are fundamental to an assessment of the effectiveness of the operation of the WEM in meeting market objectives? If so, what are they and why should the ERA address them in its report?

Each of these areas of focus are addressed in more detail in the following sections.

2.1 Areas for immediate focus

In identifying areas for immediate focus, the ERA has considered industry events or announcements that have taken place over the review period (both in WA and in the National Electricity Market), implications arising from the pause in the market reform programme[6] and recommendations from previous WEM reports. From this initial analysis,

[6] Prior to the last State Election in March 2017, the Government assumed a 'caretaker' role during which time efforts are made to ensure no decisions are taken that would bind an incoming government or limit its freedom of action. Guidelines are issued by the Department of Premier and Cabinet covering decision-making during the caretaker period. Refer to Department of Premier and Cabinet – State General Election 2017 – Caretaker Conventions

the ERA suggests the following areas may be negatively influencing the effective operation of the WEM and require the Minister's attention:

- stalled reforms intended to address market effectiveness;
- arrangements to mitigate misuse of market power, in both the energy and capacity markets;
- coordination of the provision of system support services such as network and dispatch support services, after expiry of current arrangements;
- the wider implications of interim network access; and
- arrangements for the planning and coordination of activities to manage the increasing penetration of intermittent generation.

Each of these is addressed separately below.

2.1.1 Energy market reforms

The ERA recommends the implementation of certain market reforms as quickly as possible to support the effective operation of the WEM in meeting market objectives. The final report will explore these reforms in more detail.

Stakeholders have expressed concerns that Synergy has an advantage in being dispatched as a portfolio. Directing Synergy to bid into the market by facility will deliver greater cost transparency as individual facilities bid into the market at their short-run marginal cost. This will mitigate stakeholder and investor concerns and reduce the potential for market power to be exercised by the portfolio.

Similarly, the ERA supports integrating the ancillary service market with the energy market. Within Synergy's portfolio, the boundaries between energy dispatch and ancillary service dispatch are unclear. This limits the ability to precisely measure ancillary service requirements and identify actions to reduce costs. Integrating energy and ancillary markets in combination with facility bidding will increase opportunities for competition, reduce forecast inaccuracies and enable more efficient wholesale price signals. This promotes more economically efficient electricity investment, production and supply and minimises long-term costs to customers.

The ERA supports moving to constrained network access and security-constrained generator dispatch in the SWIS, regardless of any previously proposed move to a national framework. Constrained network access enables Western Power to continue to offer network connections for new generators to enter the wholesale market. Generator interim access is in development and this is addressed in section 2.1.4 below. However, any final network access solution needs to ensure that current barriers to entry are removed and there are no long-term detrimental effects on market competition.

Manual intervention is currently used to manage network congestion as it occurs. The criteria System Management are required to use under the Market Rules to determine which option to select in response to a network constraint, does not always result in the lowest cost solution. The ERA recommends adopting a security-constrained dispatch engine to ensure any network constraints are included when determining what generators to dispatch. This will remove the need for manual intervention and ensure economic dispatch which in turn will minimise long-term costs to customers.

2. Do market participants agree with the selection of market reforms identified by the ERA? If not, what other identified reforms should be considered?

The first stage of the recent market reform process identified several options that were not progressed by the previous government. Overall, 14 recommendations[7] were made, including options to address:

- limited competition by:
  - restructuring or divesting Synergy's generation assets;
  - introducing full retail contestability and enabling the dual retailing of gas and electricity;
  - the payment of concessions and subsidies to relevant customers via all retailers; and
- inefficient price signals by:
  - phasing out the retail subsidy (Tariff Adjustment Payment) currently paid to Synergy;
  - paying the Tariff Equalisation Contribution as an Operating Subsidy;
  - rolling-out advanced meters; and
- regulatory change by:
  - removing regulatory barriers that prevent Western Power substituting stand-alone electricity systems in place of network services in regional areas; and
  - transferring responsibility to the ERA for regulated retail electricity price setting.

With the future of the previous reform programme unclear, this is an opportune time to revisit these recommendations.

3. Should some of the reforms identified above be prioritised? If so, please explain which ones and why.

2.1.2 Market power mitigation

The WEM design incorporates mitigation measures to address market power. These include the Electricity Generation and Retail Corporation Regulations which require Synergy to offer standard energy contracts to buy and sell energy in the future, and set out wholesaling arrangements, business segregation, audit and review. In feedback to the previous WEM report, stakeholders identified Synergy's dominant position in the retail and wholesale electricity markets as being a barrier to effective competition.[8] The ERA's annual

[7] Refer to PUO website: EMR Phase 1

[8] 2015 WEM Report, pp20-21

review of the effectiveness of the regulations is currently under way and the WEM Report will draw on the findings from the review.[9]

The Market Rules also provide guidance on market power in relation to bidding behaviour and how suspected incidents of market power are investigated and penalised.

The ERA is interested in stakeholder views on all the current arrangements for addressing the misuse of market power and how these affect the efficient operation of the WEM. With transitional capacity arrangements and the design of a new capacity auction also under way, the ERA will review the potential for market power misuse in the capacity market.

2.1.2.1 Energy market

The Market Rules contain some retrospective measures for mitigating market power in energy markets. These rules provide for investigation of incidents of market power in trading activity and are usually accompanied by penalty measures if misuse of market power is proven. The ability to enforce compliance in a timely and cost effective manner is an important component of a well-functioning market.

In the Market Rules, clause 7A.2.17 states Market Participants must not bid into the Balancing Market in excess of the 'reasonable expectation of the short-run marginal cost' of generation 'when such behaviour relates to market power'.[10] This places an expectation on generators that their market bids should only seek to cover their variable costs of providing energy into the market per Trading Interval. This is a feature of the dual-market nature of the WEM. Return for fixed cost investment to provide generation capacity is primarily provided through the Reserve Capacity Mechanism.[11]

Market Participants can notify the ERA of any behaviour that reduces the effectiveness of the WEM and the ERA can initiate its own investigations. The ERA will investigate any alleged or potential breach of the Market Rules as prescribed in clauses 2.13.10 or 2.16.9. These investigations are typically costly for both the ERA and the Market Participant and take a long time to complete. There is an element of repetition too as once the ERA has determined non-compliance, the Electricity Review Board is then required to make its own separate assessment.

The ERA is aware of other clauses in the Market Rules that may not deter Market Participants from misusing market power. An example of this is clause 7A.2.19, which outlines how the proceeds from imposing a civil penalty for misuse of market power are distributed in the market.[12] However, the problem of redistributing penalty payments back to the Market Participant found to have misused market power can be addressed through a rule change and so will not be explored in the final report.

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[9] Refer to 2016 EGRC Review: Discussion paper

[10] Market Rules, clause 7A.2.17. Subject to clauses 7A.2.3, 7A.2.9(c) and 7A.3.5, a Market Participant must not, for any Trading Interval, offer prices in its Balancing Submission in excess of the Market Participant's reasonable expectation of the short run marginal cost of generating the relevant electricity by the Balancing Facility, when such behavior relates to market power

[11] Additional returns or infra-marginal rents are also available in the balancing market

[12] Clause 7A.2.19 requires the civil penalty amount should be distributed amongst all Market Participants in relation to their Market Fees. In practice this means that the Market Participant paying a civil penalty for misuse of market power, then the same Market Participant also receives back a proportion of the penalty amount

The EMR also investigated options to address market power in the WEM. In September 2016, the Brattle Report[13] was commissioned to review mechanisms for the mitigation of market power that could be applied in WA. A key finding in the report included providing additional clarity around the definitions of market power and short-run marginal cost.[14]

The ERA is interested in stakeholders' views on market power mitigation measures in the WEM.

4. Do Market Participants consider that the existing arrangements to mitigate and address exercise of market power in the energy markets are sufficient?
    a. If not, what other measures could be introduced and what benefits would these bring?
    b. If current measures are sufficient, would Market Participants benefit from having additional guidance around placing their market bids? What additional information would be useful?

2.1.2.2 Capacity market

The EMR published its 'Position Paper on Reforms to the Reserve Capacity Mechanism' in December 2015.[15] In responding[16] to this paper, the ERA expressed concern that there is scope for misuse of market power in both the transitional changes to the capacity mechanism and also in the proposed reform to introduce a capacity auction as the final Reserve Capacity Mechanism.

The proposed transitional capacity pricing curve, used to calculate an administered Benchmark Reserve Capacity Price, is gazetted[17] as being implemented from 1 October 2017. The slope of the capacity pricing curve progressively steepens from -3.75 for the Capacity Year beginning 1 October 2017 to -7 for the Capacity Year starting 1 October 2023. With a steeper slope, the administered price reduces rapidly in response to excess capacity increases.

The ERA is broadly supportive of a transitional mechanism to remove excess capacity from the market. However, some generators may be incentivised to exercise market power in the short term by withdrawing plant. Such a reduction in available capacity could push the transitional capacity price back up the, now steeper, capacity pricing curve.

The introduction of a capacity auction is a proposed reform and has not received endorsement by government. However, the ERA agrees that a capacity auction is the best mechanism for establishing a market price for capacity.[16] The EMR paper outlining the design and implementation of a future capacity auction explains that capacity markets can be susceptible to exercise of market power given the large, upfront capital cost of building

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[13] Available on the PUO website: Market Power Mitigation Mechanisms for the WEM

[14] The Brattle Group's report recommended changing wording in the current Market Rules from 'when such behavior relates to market power' to 'when the supplier has market power and behaviour pushes prices up above competitive levels', and provision of procedural guidelines for interpretation of SRMC bidding provisions. Ibid, p7

[15] PUO: Position Paper on Reforms to the Reserve Capacity Mechanism

[16] June 2016, ERA Secretariat Submission to the EMR Capacity paper, p4

[17] Government Gazette 31 May 2019 (No.89) Electricity Industry (Commencement of Electricity Industry (Wholesale Electricity Market) Amendment Regulations) Order 2016, pp1697-8

new plant, a 'lumpy' pattern of investment and that a year's worth of capacity is transacted in a single auction.

Market power can be exercised by withholding capacity from an auction, either by keeping a resource operating in energy and ancillary markets but excluding it from a capacity auction or by temporarily or permanently retiring a resource to manipulate prices in the auction. Alternatively, a participant could offer capacity into the market at an inflated, high price to increase the market clearing price. Demand-side exercise of market power can also occur when a capacity buyer procures more capacity than required which can suppress the clearing price.

Market power mitigation measures in a future WA capacity auction are required as the eight largest capacity suppliers comprise 90 per cent of total supply. Of that Synergy has 50 per cent of total supply, or 70 per cent of total supply if contractual relationships with other suppliers are included.[18]

The ERA supports:

- a sloped auction demand curve to reduce capacity price volatility;[19]
- the auction being 'all-in' for capacity providers;
- the addition of a standard exclusion period to deter suppliers from bidding in some auctions and not others, such that if capacity is withdrawn for a particular auction the supplier is excluded from a set number of future capacity auctions; and
- a three-year forward auction period, so more capacity providers, including new entrants, can participate.

5. Do interested parties have concerns around the proposed market power mitigation measures in the transitional capacity pricing arrangements and/or in a future capacity auction?
    a. Are there any situations where such measures will be ineffective and if so, why?
    b. What alternative market power mitigation mechanisms could be considered?

2.1.3 System support services

System support services assist System Management in dealing with network constraints. In these situations, a common response is for System Management to constrain a generator on (or off), out-of-balancing merit order. Stakeholders' concerns[20] with this approach identified that the constraint payment mechanism may not adequately compensate Market Participants and can impose significant and unpredictable costs on Market Participants.

Alternative options to constraining generators on and off also exist. System Management can enter into a Dispatch Support Service Contract and Western Power can procure a Network Control Service Contract. The criteria System Management is required to use

[18] Refer to PUO website: Reserve Capacity Auction – Final Design and Implementation, p3

[19] This is caveated by having a zero price crossing point (where the capacity price falls to zero) around 15-20% above the reserve capacity requirement for a small market like the WEM

[20] Refer to 2015 WEM Report, p28

under the Market Rules to determine which option to select in response to a constraint event may not always result in the lowest cost energy supply.

For example on 23 February 2014, the Muja Bus Tie Transformer 2 tripped when the No. 1 transformer was out of service and had been out of service since 2012. These transmission equipment outages presented a risk to power system security and reliability for the Great Southern region. System Management declared the SWIS to be in a High Risk State from 23 February to 28 September 2014. System Management used out-of-merit dispatch to maintain security and reliability in the region (using Vinalco's Muja AB facilities). Out-of-merit constrained-on payments to Vinalco during this period were estimated to be $10.1 million.

During this time, Western Power undertook transmission line works (construction of a new line and upgrade of existing lines) to reduce risk. Western Power completed replacement of its No. 2 transformer on 28 September 2014. System Management returned the SWIS to a Normal Operating State on this date.[21]

In response to this incident, there were differing views on whether out-of-merit dispatch was the appropriate mechanism to deal with the security and reliability problem. A Dispatch Support Service contract was considered by System Management and an Expression of Interest published. However, a contract was not struck on the grounds of price and timing.[22]

In retrospect and assuming an economic case could have been made, it may have been preferable to have a pre-existing contract in place, in anticipation of such a contingency event. Another issue is which party was responsible for putting a contract in place; Western Power or System Management. The security and reliability risks in the above example were caused by Western Power transmission equipment failures, but the cost of mitigation (as a result of out-of-merit dispatch by System Management), were borne by Market Participants and not Western Power.

Unlike other ancillary services, System Management must obtain the approval of the ERA before entering into a contract for dispatch support services. In turn, the ERA reviews whether the contract achieves the lowest practical sustained cost of delivering the service and may undertake public consultation as part of this process. So, whilst the dispatch support service contract is cost efficient, the overall economic efficiency of using this type of contract against other alternatives is less clear.

Requirements for these system support type services are developed on a case-by-case basis and there is currently one contract in place. The contracted service is dispatch support from Synergy facilities to be dispatched outside of the preferred order in the Geraldton and Kalgoorlie areas for transmission outage requirements.[23] The contract is due to expire on 1 July 2018.

[21] Refer to 9 October 2014 Muja Industry Update Presentation

[22] The procurement process to source a dispatch support service was lengthy, when an operational solution was required immediately and prices quoted in response to the EOI were high and unlikely to deliver a saving compared to constrained off payments

[23] System Management Ancillary Services Report 2016, pp17-18

In April 2016, the former Minister for Energy committed Synergy to reduce its generation capacity and on 5 May 2017, the new Minister for Energy announced[24] Synergy's nominated capacity reduction of 436 MW by September 2018.

In reviewing the Synergy plant identified for closure, the ERA is concerned that five of the facilities earmarked for closure currently provide dispatch support services in the North Country[25] and Kalgoorlie load areas.[26] Western Power, in its latest Annual Planning Report, comments that no significant fault level limitations exist in the North Country Load Area at present. However, Western Power also adds that numerous renewable generation connection enquiries exist and it expects fault levels to increase with commissioning of new generation.[27] Depending on the type of new generation connecting in the North Country Load Area, dispatch support services may be able to be provided by one or more of these plants.

With the expiry of the current dispatch support service contract and the closure of some plant that have been providing these services to date, the potential need to contract replacement system support services is not clear nor is the mechanism for ensuring that the most economically efficient solution for managing the network constraint is identified and actioned.

6. What risks can be identified with the removal of power stations from the network that currently provide dispatch support services?
7. More generally, what changes are necessary to deliver economically efficient outcomes in determining when and how support service contracts should be procured?

2.1.4 Interim access solution

The Market Rules assume unconstrained network access. However, some generators are currently connected on a partially constrained basis under run-back schemes. These arrangements trigger when real-time line overload is detected and a signal is sent back to a connected generator to run down, effectively constraining the generator's output. Line overload can occur at times of peak load or in situations of high localised generation dispatch. Limiting line load is necessary to maintain power system reliability and security.

As noted earlier, the future of the reform process is currently unclear. A selection of reforms concerned the ongoing regulation[28] of electricity network access in WA, including adoption of constrained network access as is present in the National Electricity Market.

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[24] Ministerial media statement, 5 May 2017, 'Synergy to reduce electricity generation cap by 2018'

[25] The North Country Load Area extends from Pinjar and Muchea to Kalbarri at the northern extremity of the Western Power network, the load area extends inward approximately 150 km into the northern wheatbelt.

[26] These facilities are the Mungarra gas turbine units 1, 2 and 3 (113MW) and the West Kalgoorlie gas turbine units 2 and 3 (62MW)

[27] Western Power 2015/16 Annual Planning Report, p41

[28] The EMR process had produced Bills describing key legislative changes to allow Western Power to commence its regulatory process under the National Electricity Rules from December 2016 and for the determination by the Australian Energy Regulator to apply from 1 July 2018. However, the Bills were not passed prior to the government entering caretaker mode on 1 February 2017. Therefore, Western Power's next Access Arrangement will be regulated under the Electricity Networks Access Code 2004 by the ERA.

Western Power has advised that it is currently progressing a large group of network access applications for new generators. In the absence of the intended reforms and without an alternative option, Western Power expects that these new connections would increase the number and materiality of binding constraints. Consequently, Western Power, AEMO and the PUO are progressing Generator Interim Access (**GIA**) to connect generators in 2018/19. Details were presented at the AEMO WA Generators Forum in April 2017.[29]

GIA will be applicable to new generators registered in the WEM with an output of 10MW or more and new generators will access the network on a constrained basis. The new generator will enter into a Network Control Service contract with Western Power to manage remuneration when its output is constrained. GIA will allow AEMO to constrain new generators outside of the normal balancing merit order to maintain system security. Generators dispatched under Network Control Service contracts do not receive constrained-off payments.

Whilst the ERA acknowledges the need for an interim network access, it is concerned that implementing GIA could pose other problems. In normal circumstances, new entrants increase the competitive pressure in a market, providing all players are subject to a level playing field. In electricity markets with economically efficient dispatch processes, this means more generators competing to be dispatched with downward pressure on balancing prices.

Whilst interim network access is in place, a level playing will not exist as some generators will have unconstrained access and some generators will have constrained access. To achieve economically efficient dispatch, the bid stack positions are ranked by cost for each trading interval. If new entrants are constrained off and if they are also low cost generators, their bids will not appear in the stack so undermining the potential for economically efficient dispatch. This market inefficiency may be outweighed by the network constraints and costs that would result if an interim network access solution were not developed, e.g. more run back schemes or reduced availability of large-scale renewable energy certificates. However, market inefficiency may be acceptable in the short-term if the interim solution exists for a limited period, as has been indicated.

Should a partially constrained and partially unconstrained, or a 'two-tier' network access arrangement eventuate as the final network access solution, then this requires extensive attention and deliberation. As well as having the potential to limit market competition in the WEM, a partially constrained network may also present a barrier to new generators seeking to enter the wholesale market. There may be a lack of incentives for investors to support new generation if there is uncertainty around the future likelihood of the generator being dispatched and providing a revenue stream. The latest WA Electricity Statement of Opportunities (**ESOO**) is indicating a shortfall in capacity in the 2021/22 Capacity Year.[30] If interim network access or a partially constrained network access arrangement still exists at this point, then this may present a barrier to entry for new generation.

8. What concerns, if any, do stakeholders have with the interim network access solution (GIA) currently in development?
9. What are the risks of having a partially constrained network if it becomes the final network access solution?

[29] Refer to AEMO website: WA Generator Forum (April 2017) – meeting pack

[30] AEMO 2017 WA Electricity Statement of Opportunities, p2

At present, network access is retained by the market participant after plant closure. The ERA is interested in hearing stakeholder views of the treatment of network access once a facility has been closed. This is pertinent given the recent announcement of Synergy facilities set to close by September 2018.

10. In a scenario of increasing network constraints, the ERA is interested in hearing stakeholders' views on what happens to the currently unconstrained network access once facilities close?
    a. Should this unconstrained access become available to other generators or new generators in the network once the plants close? If so, how should this be valued and offered to market?
    b. Alternatively, if access rights are retained by a Market Participant what issues does this present for other stakeholders?

2.1.5 Planning for increased levels of intermittent generation in the WEM

In identifying areas for immediate focus by the Minister, the ERA has reflected on the issues in the National Electricity Market and how they relate to the WEM. A clear priority for the national market is system security and reliability. This is in response to an increasing level of intermittent generation and consideration of recommendations coming from the Finkel review on how power system security and reliability should be coordinated and planned going forward.

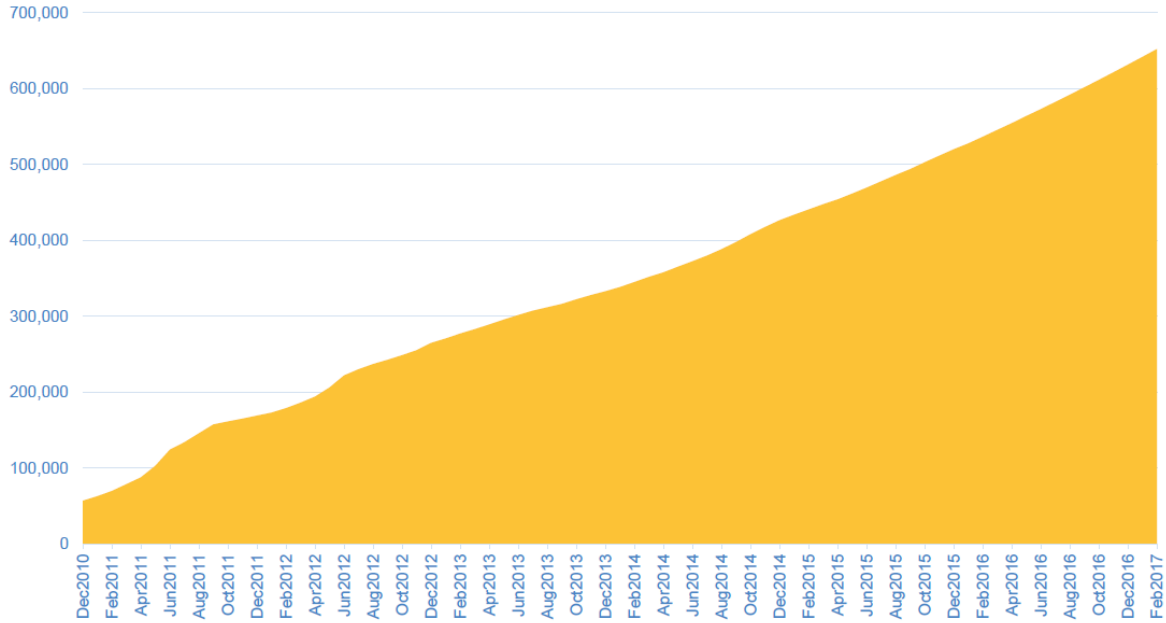
The penetration of intermittent generation in WA is not at sufficient levels to create the frequency control and supply security problems experienced in some parts of the National Electricity Market. However, the ERA is concerned with how the WEM prepares itself for an increasing level of intermittent generation and the challenges this will bring.

In addition, the ERA would like to explore the wider planning and coordination arrangements required to manage the transitional changes identified in section 2.2 below.

More intermittent generation is and will be entering the WEM. The latest ESOO states that total installed capacity of rooftop PV in the SWIS was 671MW at the end of February 2017 and the observed strong growth, approx. 100MW per year, is expected to continue.[31] The growth in rooftop solar, prepared by AEMO is reproduced in Figure 1 below.

[31] WA 2017 Electricity Statement of Opportunities, p32

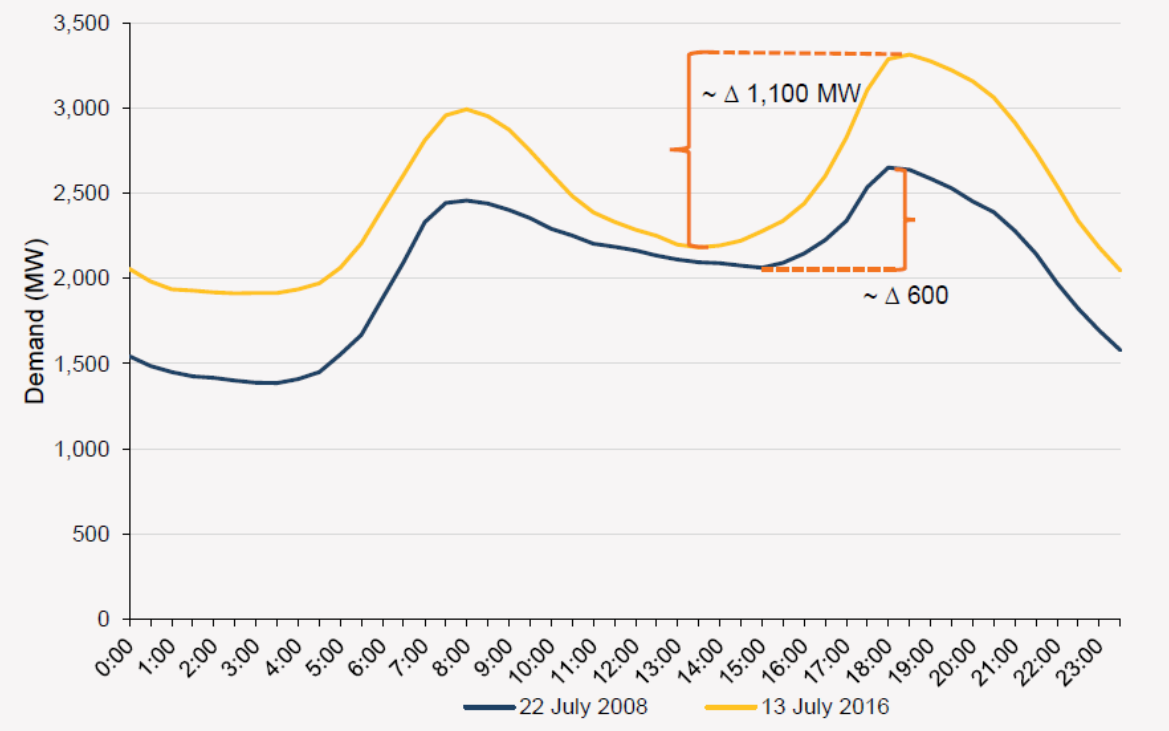
Figure 1: Installed rooftop solar PV capacity in WA (kW)



Source: AEMO

The WA ESOO also highlights the effect of increased rooftop PV generation on winter peak demand. Two distinct peaks have emerged, one in the morning reflecting higher demand as consumers prepare for the day ahead and one in the evening as they arrive home. There is a dip between these two peaks which coincides with maximum output from rooftop solar. This is known as the 'duck curve', see Figure 2 below.

Figure 2: Winter daily demand profiles for selected days[32]



Source: AEMO

The increase in output from wind generation can be seen in Figure 3 below as the demand profile moves up the y-axis over time. The downturn in wind output over the middle of the day is also illustrated.

The contribution of wind generation to overall electricity sent out in WA is still small.[33] In the ESOO, AEMO comments[34] that reducing load during the middle of the day may result in increased generation costs for the WEM, driven by:

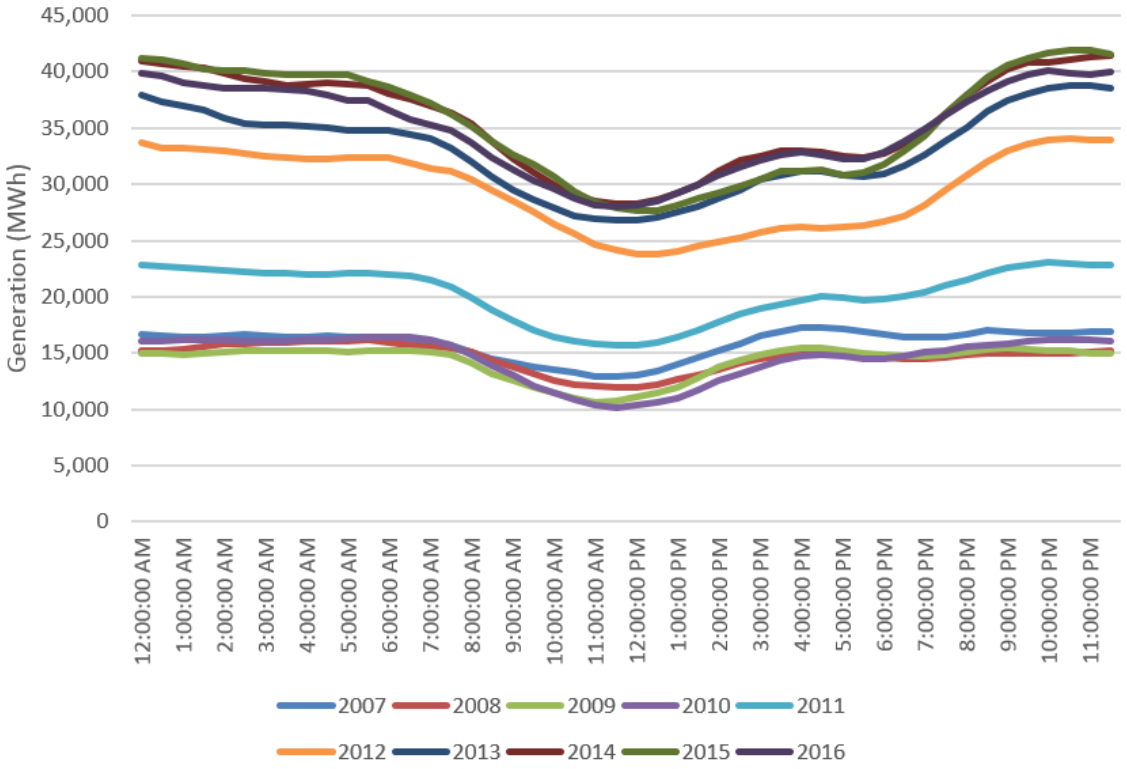
- gas peaking plant starting and stopping during the day; and
- the dispatch of fast-response gas peaking generation outside of the balancing merit order to service a sharper ramp-up of evening demand.

[32] The days chosen by AEMO were 22 July 2008 and 13 July 2016 as these were sunny days when rooftop PV generation would have been relatively high.

[33] Calculated as 8% of total energy generated in 2015/16 Capacity Year.

[34] WA 2017 Electricity Statement of Opportunities, p33

Figure 3: Average wind generation by time of day



Source: ERA analysis

In addition, low load around midday can result in synchronous generation being scaled back, as non-scheduled generation produces electricity. Consequently, the inertial level in the system falls.

Another problem is the intermittency of some renewable generation makes it difficult to forecast demand, particularly when installed behind the meter, e.g. rooftop PV. System Management's ability to manage frequency control is therefore dependent upon:

- accurate forecasting of supply and demand that comprises a greater and increasing proportion of intermittent generation; and
- the presence of adequate ancillary service provision in the market.

Organisations in the National Electricity Market have been active in this area, researching and preparing for the system security challenges presented by increasing levels of intermittent generation in power systems. The significance of this work was brought into focus by the South Australian Blackout in September 2016.[35] Programmes of work by the Australian Energy Market Commission (**AEMC**), AEMO and Energy Networks Australia are under way in this area and are summarised in the box below.

[35] AEMO Final Report March 2017: Black System South Australia 28 September 2017

The AEMC is progressing rule changes in the NEM for new intermittent generators to provide alternatives to traditional inertia such as Fast Frequency Response,[36] changes to power system fault levels[37] and more flexibility for AEMO to establish emergency frequency control schemes. [38]

The AEMC is currently considering[39] how the distribution market model needs to change in response to increasing levels of consumer-led distributed energy resources such as solar PV systems and battery storage. The AEMC notes that if operated effectively distributed resources are also capable of providing technical capability in the provision of services to the network operator to manage congestion or provide frequency control ancillary service to the market operator.

AEMO is working through its Future Power System Security[40] programme to understand when and where frequency control challenges will arise, reviewing the frequency setting for under frequency load shedding equipment to ensure the equipment is effective in emergency situations and developing requirements for data and analysis of distributed energy resources;

The Energy Networks Association has been working since 2015 on the development of an electricity network transformation roadmap.[41] This seeks to guide the structured development of networks through to 2027 against a balanced scorecard framework that seeks to align outcomes across lower bills, fairness and incentives, safe, reliable and secure and the transition to clean energy.

All of the above work programmes were considered as part of the Finkel review. Whilst it supported the changes under way, the report recommended that a whole-of-system planning approach should be adopted[42] to provide whole-of-system oversight for energy security and reliability.

The ERA interested in stakeholders' views on what planning and coordination arrangements need to be established now in order to effectively manage the increasing penetration of renewables in WA and ensure the effective operation of the WEM.

11. In response to an increasing level of intermittent generation, what planning and coordination arrangements need to be established or strengthened to ensure all aspects of effective WEM operation are considered; including policy, operational efficiency, market development and customer engagement and protection?

[36] FFR is a rapid injection of power or relief of loading that helps arrest the decline of system frequency during system events.

[37] AEMC Rule change ERC0211: Managing power system fault levels

[38] AEMC Rule change ERC0214: Managing the Rate of Change of Power System Frequency

[39] AEMC Draft Report: Distribution Market Model

[40] The last progress report was published in August 2016.

[41] Energy Network Transformation Roadmap: Final Report

2.2 Transitional change in the WEM

The Australian energy sector is in a period of transition, driven by changes in both demand and supply-side factors. Energy customers are adopting emergent technologies to better manage their energy costs including self-generation, battery storage and energy management systems. Government policy and regulations are driving toward a lower emissions economy resulting in increasing penetration of renewable and distributed generation. On the supply side, greater intermittency from renewables is increasing the need for system support services at the same time as excess capacity is exiting the market and investment in baseload generation, which typically provides system support, is stalled. These combined pressures present in the market as increasing and more volatile wholesale energy prices, rising retail prices, policy uncertainty reducing investment incentives and increasing risk to the security and reliability of the energy systems.

In the 2016/17 Report to the Minister, as well as identifying areas for immediate focus, the ERA will include a section that seeks to substantiate the main changes that are either under way or expected to emerge in the next few years in the WEM. Future market changes and challenges will present a number of potential risks, opportunities and complex interrelationships between different areas of change. The ERA will consider the ability of the current market design to respond to and accommodate change, ameliorate risk, identify opportunities and deliver efficient market outcomes. If the current market design is a limiting factor through the transition period then the effectiveness of the WEM in meeting Market Objectives will likely deteriorate over time.

The ERA has engaged The Lantau Group to assist with this contribution to the Minister's Report. For each of the key changes identified, the ERA will consider:

- **What is causing the change**, for example is the change driven by a government policy initiative or are imperfect market signals driving customers' behaviour?
- **What effects will the change have**, e.g. will the change create value in the market as a whole or are costs being shifted between different customer groups?
- **Options for promoting value creation and managing value transfer**, e.g. is there a market failure and what market correction options are available? Is immediate action necessary or can it wait and are there any relevant insights from other markets facing similar experiences?

Initial analysis by the ERA has identified the following as changes either under way in the WA electricity sector or likely to appear shortly:

- emergence of new technology, e.g. battery storage;
- increased penetration of renewables, supported by growth in financial options, e.g. solar leasing and solar power procurement agreements;
- improvements in energy efficiency, e.g. availability of technologies for improved energy efficiency, residential home energy management systems, smart devices and smart meter data and commercial energy audits and building design and controls;
- reduced energy consumption from both residential and commercial customers;
- active engagement of energy customers in the energy market, also referred to a 'prosumers', e.g. aggregation of distributed generation, emerging block-chain products enabling future energy trading between customers;

- reduction in capacity and changes to the reserve capacity mechanism, e.g. removal of generation plant from the market, exit of demand-side management, potential introduction of a capacity auction, an amended method for calculating the administered Benchmark Reserve Capacity Price and customer responses to peak to manage their Individual Reserve Capacity Requirement exposure;
- contraction of the electricity network, particularly at the edge of the grid, and network constraints flowing from increases in intermittent distributed generation;
- tariff reforms, e.g. price signals and smart metering;
- new entrants, e.g. entry of AGL and Origin into the WA retail gas market, could anticipate the entry of additional new entrants into the electricity retail sector in anticipation of Full Retail Contestability;
- east coast gas, e.g. consideration of, albeit indirect, east coast gas supply issues on the levels and volatility of gas prices in the WA energy market, particularly if WA supplies are sourced for east coast markets via pipelines or LNG shipments; and
- increasing market complexity, e.g. emergence of new technology and new business models, network evolution and policy integration posing challenges for existing regulatory frameworks and wholesale market operations.

The Lantau Group will assist the ERA in assessing the risks associated with some or all of the key changes identified above and the likely consequences, intended or not, on market attributes such as reliability and security, pricing levels and volatility and investment incentives.

The way in which changes influence one another is complex. Some transitional changes can be expected to be self-regulating as the change will trigger a response that limits the extent of any problem. Other changes could be inflationary and expand existing problems, or create new ones, and further increase any existing distortions or costs. The analysis of transitional changes will seek to identify priorities and first-order interrelationships and feedback loops. If the first-order feedback loops are influenced by inefficient, incomplete or distorted signals, then all subsequent interrelationships will also be effected.

12. Which of the changes emerging in the WA electricity sector represent the greatest opportunity or threat to the effective operation of the WEM in meeting the Market Objectives? Please explain why.

The remainder of this section in the final WEM Report will assess the extent to which the market design is able to ameliorate any risks arising from changes, take full advantage of opportunities presented by new technologies and deliver efficient outcomes. Of particular interest here is how the activities of policy makers, regulators and market operators need to be planned and coordinated in support of effective market decision-making.

In the National Electricity Market, the Finkel Report identified the lack of coordination between market organisations as problematic and proposed another body, the Energy Security Board be established with oversight of all system security and reliability activities.

The recommendations proposed by the Report and their potential for their application in WA will be considered in more detail in the final report. However, the ERA is interested in stakeholder views on whether WA should establish its own version of the Eastern States Energy Security Board and if so, which organisations should be represented.

13. The ERA is interested in stakeholder views on arrangements for oversight and/or coordination of planning and market development in the WEM.

3 Benefits from recent market reforms

Most of the recent market reforms have addressed problems in institutional arrangements and excess generation capacity. These are considered separately below.

3.1.1 Institutional arrangement reforms

Previous WEM Reports identified potential conflicts of interest in:

- the dual role of the Independent Market Operator (**IMO**) as both market operator and having responsibility for managing the rule change process;[43] and
- System Management being part of Western Power, with a recommendation for more robust organisational ring-fencing for greater transparency and independence.[44]

Institutional arrangement reforms were introduced by the EMR late in 2015 and through 2016 to deliver general efficiency benefits, these are listed below.

Table 1: Institutional arrangement reforms

Effective date	Actual reform
30 November 2015	Transferring market operation functions to AEMO
1 July 2016	Transferring System Management functions to AEMO
1 July 2016	Transferring compliance and enforcement monitoring activities to the ERA
Formal operation 3 April 2017	Establishing a separate Rule Change Panel

As part of its annual WEM Report to the Minister, the ERA is required to review the effectiveness of the above institutions.[45] Whilst none of the reforms have been active for very long, the main developments are captured below.

AEMO and System Management

Since taking responsibility for operation of the WEM, AEMO has established its Market Reform Programme and corresponding stakeholder forums for consultation and working groups to help progress changes.[46] AEMO is also undertaking changes to Market Procedures during 2017 to reflect recent amendments to the WEM Rules.[47]

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[43] Refer to 2014 WEM Report, p3

[44] Refer to 2008 WEM Report, p79

[45] Refer to Market Rules, clause 2.16.10

[46] Refer to AEMO's website for more information on its industry forums and working groups.

[47] Refer to AEMO's website for more information on its Procedural Change Committee.

AEMO is currently bringing the System Management function in-house and will shortly undergo a physical move to locate all functions in a single, new location.

Compliance and Enforcement

The ERA established its new Compliance and Enforcement functions from 1 July 2016, after transfer of the function from the IMO.

The WEM Rules require the ERA to investigate any alleged breaches of the rules. These investigations generally concern market operations, e.g. data provision requirements, generator dispatch non-compliance, generator outage and availability requirements and bidding process requirements.

The ERA is also required to monitor AEMO's compliance. On 3 May 2017, the ERA presented its first annual report on AEMO's compliance to the Minister, which included investigations carried out for the eight months to 28 February 2017. Also planned is a programme of targeted compliance reviews to be carried out over the 2017/18 financial year.

Rule Change Panel

The new Rule Change Panel (**RCP**) has only been in operation as a separate decision-making body for just over three months. In this time, the RCP:

- has established procedures to manage new rule change proposals;
- is considering how it will manage the 10 in-progress rule change proposals it inherited; and
- has scheduled and is facilitating Market Advisory Committee meetings through 2017.

14. Are there any concerns that the ERA should consider when it assesses the effectiveness of:
    a. AEMO (including in its capacity as System Management) in carrying out its functions under the Regulations, the Market Rules and Market Procedures?
    b. The Rule Change and Procedure change process?
    c. The compliance monitoring and enforcement measures in the Market Rules and Regulations?

3.1.2 Limiting excess capacity

The efficiency of the current Reserve Capacity Mechanism and the cost to the market of having excess capacity in the WEM has been a recurrent theme of past WEM Reports and a key work stream in the EMR. Reforms in this area have:

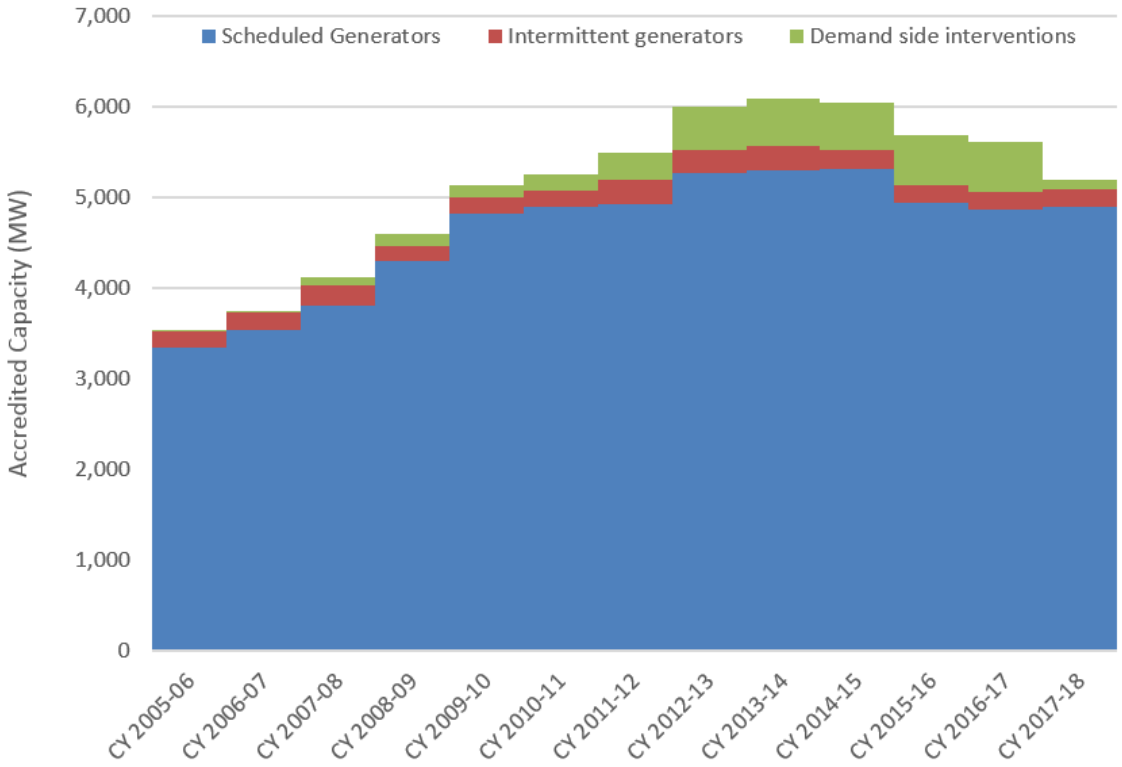
- standardised availability requirements between conventional generators and providers of demand-side response;
- changed how providers of demand response are paid for capacity; and
- introduced transitional arrangements for a steeper pricing curve to apply in the period prior to the introduction of a possible capacity auction.

Changes in these areas are being progressively adopted into the Market Rules from 1 June 2016 to 1 October 2017. Consequently, most of the reforms to address excess generation capacity have been in operation for less than 12 months.

The ERA is required to discuss the Reserve Capacity Market in assessing the effectiveness of the WEM, with reference to the capacity available through Balancing from Balancing Facilities, Dispatchable Loads and Demand-Side Programmes and the performance of Market Participants with Reserve Capacity Obligations in meeting their obligations.[48]

The effect of reforms on total capacity is illustrated in Figure 4 below.

Figure 4: Reduction in excess capacity



Source: ERA analysis

Overall accredited capacity has reduced from a peak in 2013/14 of 6,087MW to 5,194MW in the 2017/18 capacity year, an overall reduction of 893MW. Accredited demand-side capacity reduced from a peak of 640MW in the 2016/17 capacity year to 186MW in the 2017/18 capacity year, a reduction of 454MW.

The number of accredited demand-side management sites or projects has reduced from 28 projects with a combined capacity of 640MW to seven projects with a combined capacity of 88MW. Of the thirteen accredited providers in 2016/17, only Wesfarmers Kleenheat (one project of 24MW) and Synergy (six projects of 64MW capacity) remain.[49]

[48] Market Rules, clauses 2.16.12(b)i and 2.16.2(i) and (l)

[49] AEMO, (2017) Capacity-Credits-since-market-start-up-to-2017-18.xlsx, workbook, available from AEMO's website at http://aemo.com.au/-

The introduction of an auction process to replace an administered price for capacity is still a proposed reform. This is addressed in more detail in section 2.1.2.2.

15. Although reforms to address excess generation capacity have not been in operation for long, do Market Participants see this as improving the effectiveness of the market? If so, how is this demonstrated?
16. Are there any concerns stakeholders have that the ERA should consider when it assesses the effectiveness of the Reserve Capacity Mechanism?

/media/Files/Electricity/WEM/Reserve_Capacity_Mechanism/Assignment/2016/Capacity-Credits-since-market-start-up-to-2017-18.xlsx

4 Preliminary market observations

The Market Rules require the ERA to consider specific data and analysis as part of its monitoring of the effectiveness of the market. The WEM Report for the Minister is required to include a summary of this information and data as well as the ERA's assessment of the effectiveness of the market and the effectiveness of AEMO and System Management in carrying out their functions as outlined in section 1.1. This summary will be provided in the final report.

To inform submissions from interested parties in response to this discussion paper, the ERA has identified some preliminary market observations.

There is a trend toward higher and more volatile energy prices over the second half of the 2016 calendar year and this trend is observed in both the STEM[50] and the Balancing Market,[51] predominantly at peak periods.

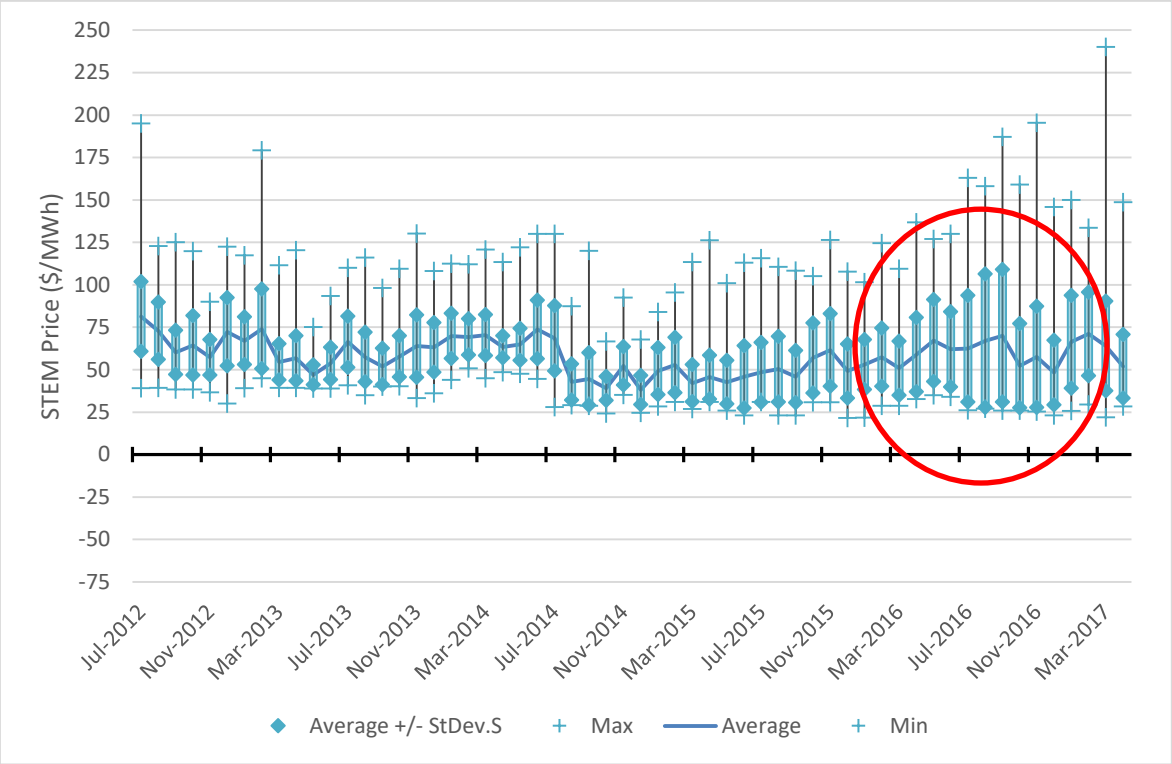
The higher and more volatile energy prices in each market are best illustrated with reference to two figures below.

The STEM chart (Figure 5) shows information on average monthly STEM prices from July 2012 to April 2017. For each month, the chart shows the average price, one standard deviation either side of the mean and the maximum and minimum prices in each month.

[50] The STEM is a day-ahead market where market participants can trade energy around their bilateral positions and expected load or generation. It allows participants to lock in a price one day ahead rather than be exposed to the real-time balancing price. Market participants (both generators and retailers) can submit offers to sell energy to the STEM, or bids to buy energy from the STEM. Generators may choose to buy energy from the market if the STEM price is lower than its marginal cost of generation. Alternatively, generators may choose to sell energy in excess of any bilateral contracts. Similarly, retailers may use the STEM to trade out imbalances between bilateral contract positions and expected demand. STEM trades make up around three per cent of total energy generated.

[51] Since July 2012, all energy has been dispatched through the balancing market. Participants pay or receive the difference between the quantities they traded bilaterally or in the STEM and their actual generation or load (e.g. their net contract position). The balancing market requires submission of balancing offers (price and quantity pairs) for all generators, apart from those on an approved planned outage or forced outage. Prices offered into Balancing must by participants be within the price caps and must not exceed their 'reasonable expectation of the short-run marginal cost' when they have market power. The balancing offer submissions are used to develop the balancing merit order, which is used to determine which facilities are dispatched by System Management.

Figure 5: STEM Monthly peak average, standard deviation, max and minimum prices

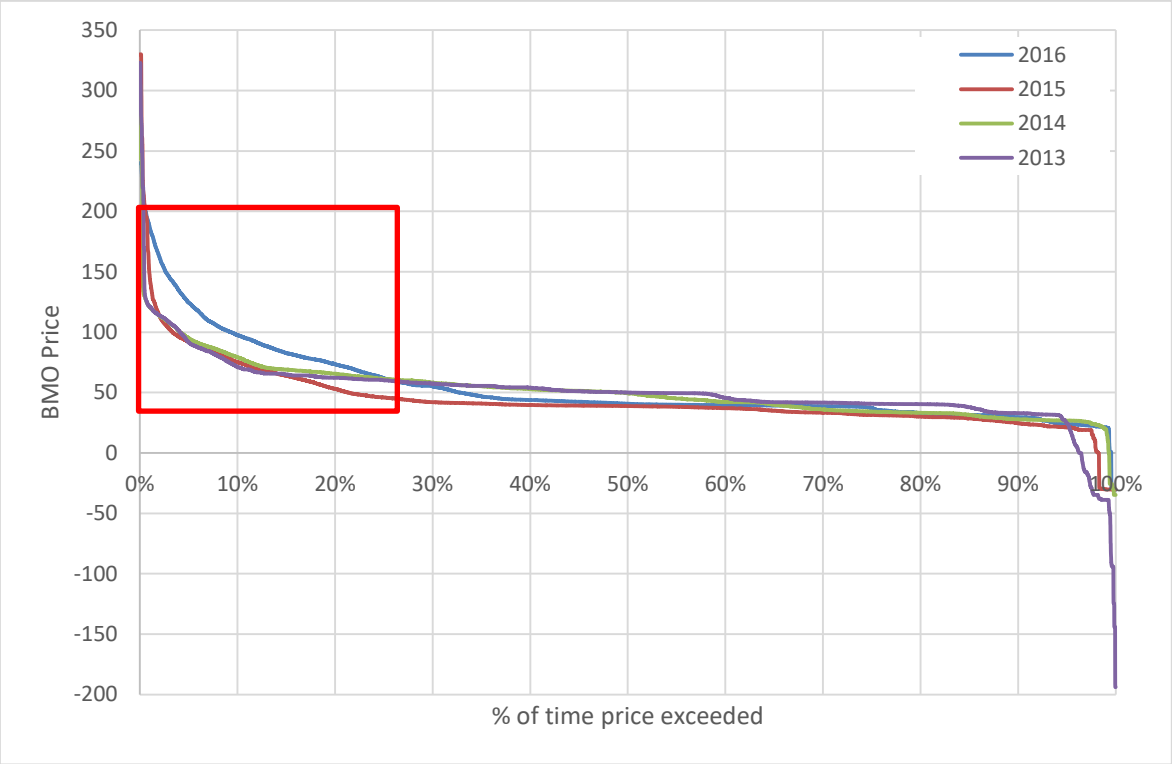


Source: ERA analysis of market data

Circled in red on the above chart is a period of increasing price volatility over the second half of the 2016 calendar year and continuing into the beginning of the 2017 calendar year. The increase in standard deviation reflects increased volatility in STEM peak prices.

An alternative way of observing this increased price volatility in the balancing market is to consider the price duration curve. Figure 6 below shows the amount of time (expressed as a percentage) that the balancing price exceeded a certain level. For example, on the left-hand side of the chart, the balancing price exceeded maximum levels for only small percentages of time. On the extreme right-hand side of the chart, balancing prices exceeded the lowest balancing price most of the time. In the centre of the chart, balancing prices predominantly hover around $50/MWh.

Figure 6: Balancing market price duration curve



Source: ERA analysis of market data

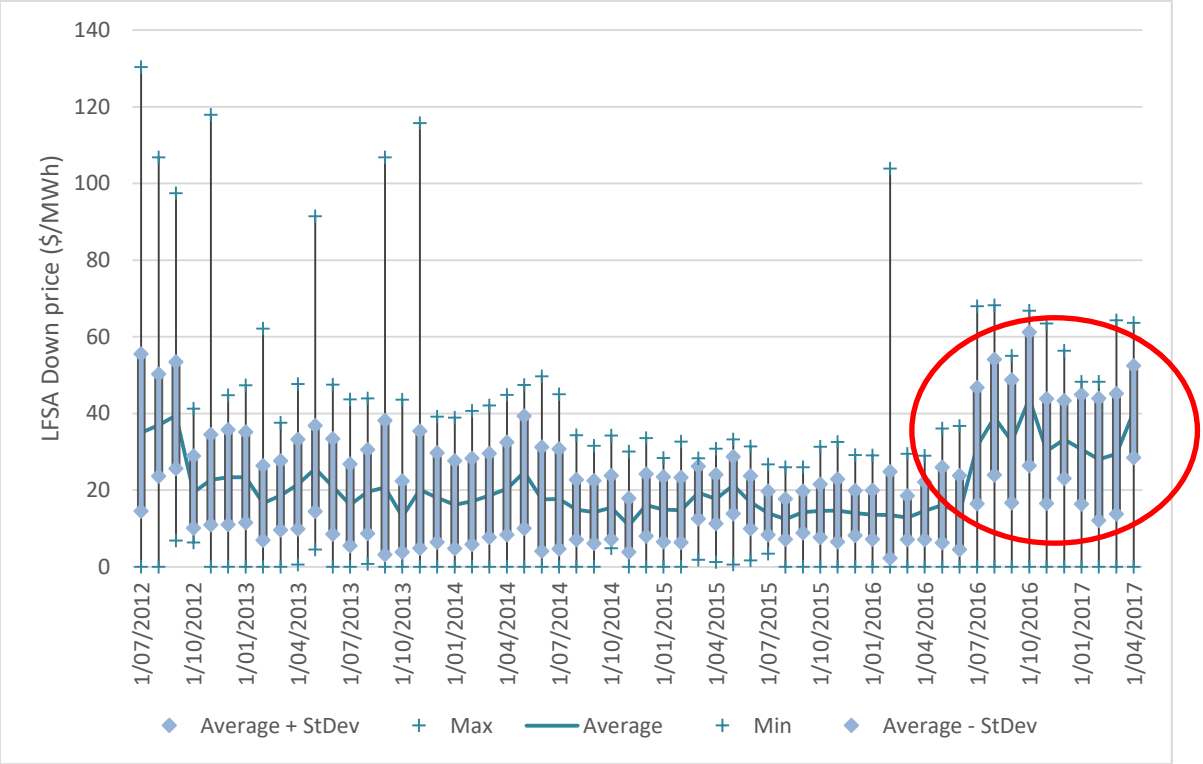
In the balancing market price duration curve above, there is a clear deviation between the 2016 curve and the curves for the three previous years, as marked by the red rectangle. In 2016, the balancing price is higher than in all previous years for a greater percentage of the time, confirming much higher volatility in balancing prices in 2016, than was observed in previous years.

Further investigation illustrates that total generation has remained fairly stable (a variation of less than three per cent) and the price paid for it has increased with the total energy value increasing by 25 per cent. Comparing average energy values demonstrates that 2016 balancing market average prices are above those observed when carbon pricing was in place.[52]

The ERA also considered whether the price increases and volatility extended into the Load Following Ancillary Service (**LFAS**) prices. It does and is more pronounced in LFAS lower prices as can be seen in Figure 7 below.

[52] The Carbon Tax Repeal legislation passed on 17 July 2014.

Figure 7: Monthly average LFAS lower prices



Source: ERA analysis of market data

As can be seen in the red circle above, there was a step change in LFAS Down prices in July 2016 and prices have remained at an elevated level. The current level of LFAS Down prices is approximately $10/MWh (or 50%) higher than it was under the carbon pricing scheme. Furthermore, the standard deviation shows a much greater spread of prices, indicating increased price volatility, than was present in the previous two years when LFAS Down prices were fairly stable.

17. The ERA is interested in stakeholder feedback on their understanding of what caused the observed volatility in peak STEM prices, peak balancing prices and LFAS lower prices over the end of 2016 and beginning of 2017?
    a. What, if any effect did this price volatility have on stakeholders; and
    b. Does this impede the effective operation of the WEM? If so, how?

Appendix: Key points from the 2015 WEM Report

The ERA provided its 2015 WEM Report[53] to the Minister in December 2016 and published a public version of that report on its website in January 2017.

The 2015 report covered the period from 1 July 2014 to 30 June 2016. The longer timeframe allowed the WEM Report to acknowledge developments in and announcements emanating from the EMR that was also under way over the period. This meant that the 2015 WEM Report could focus primarily on operational matters and on identifying any existing or emerging issues which were not being dealt with as part of the planned EMR reforms. The last WEM report compiled its findings under five headings:

- barriers to competition;
- market governance;
- reserve capacity mechanism;
- energy markets; and
- ancillary services.

The findings in each of these areas are summarised below.

The lack of competition observed in the generation and wholesale contract market over the review period arose from Synergy controlling around three quarters of total generation. This also hindered development of a competitive retail sector, as retailers needed access to fixed price energy contracts to manage the risk of short-term volatility in wholesale electricity spot prices. The ERA recommended reducing the Standard Product spread to incentivise Synergy not to overprice its sell products and so set a competitive benchmark for other wholesale contracts. The ERA also supported removing the different rules applying to Synergy, such as Synergy's ability to bid as a portfolio rather than by facility, to reduce stakeholder and investor concerns that Synergy has an advantage in how it is dispatched. Reforms to network access and regulation included adopting the national framework for network regulation to ensure all generators have constrained connection. The ERA recommended that constrained network access and security-constrained generator dispatch could be adopted in the SWIS regardless of a move to the national framework. Then network connections to new generators can continue to be offered by Western Power which will remove many of the current barriers to entry.

The previous WEM report considered that further market governance reforms were necessary. Firstly, the ERA identified the duplication of non-compliance investigations by itself and the Electricity Review Board as not being cost effective and extending the time needed for investigation. Secondly, the ERA proposed that energy markets, to be well functioning, require continual oversight to ensure timely debate that leads to policy change and market refinements on an ongoing, rather than sporadic, basis.

The report recommended reforms to the reserve capacity mechanism to improve signalling for capacity to enter or exit the market. In the absence of effective competition in the capacity market, customer protections are still required, particularly when capacity is allocated through a capacity auction. It also recommended measures to mitigate the risk of AEMO over-forecasting demand, which can also contribute to excess capacity. The main

[53] The 2015 WEM Report to the Minister is on the ERA's website

recommendation was to provide stakeholders with an opportunity to challenge forecasts and their underlying assumptions.

The report identified an increase in the level and volatility of energy prices coinciding with base load outages and plant retirement. Planned changes to the reserve capacity mechanism should deliver commercial incentives that improve the availability of capacity. However, the relationship between planned outages and prices was identified as an area of continued interest. The ERA also supported reforms to energy and ancillary service markets as these incorporate improvements identified in previous ERA reports. Proposed changes included an integrated market for energy and ancillary services and adopting security constrained dispatch and requiring Synergy move to facility bidding.

The 2015 WEM report noted that the criteria System Management is required to use when dealing with forced network outages do not always minimise costs. Therefore, the ERA recommended that further consideration be given to the most efficient way to procure network support requirements and how system security costs are allocated.