

Economic Regulation Authority Secretariat
Submission to the Electricity Market
Review Position Paper: Design
Recommendations for Wholesale Energy
and Ancillary Service Market Reforms

Economic Regulation Authority

WESTERN AUSTRALIA

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Introduction

The Economic Regulation Authority (ERA) Secretariat (**Secretariat**) welcomes the opportunity to comment on the *Position Paper on Design Recommendations for Wholesale Energy and Ancillary Service Market Reforms* (**Position Paper**) in the Wholesale Electricity Market (**WEM**) published by the Public Utilities Office (**PUO**).

The Secretariat frames its response to the Position Paper with reference to the WEM Objectives (**Market Objectives**) as outlined in Rule 1.2 of the *Electricity Industry Act: Electricity Industry (Wholesale Electricity Market) Regulations 2004* (**Market Rules**). Briefly the Market Objectives relate to: the economically efficient supply of electricity; to encourage competition; to avoid discrimination between generation technologies; to minimise the long-run cost of electricity to consumers; and to encourage conservation of the use of electricity.

The Secretariat is supportive of the major reforms proposed in the Position Paper and considers its comments on the proposed reforms as refinements rather than wholesale changes.

The Position Paper's proposed detailed design changes cover many elements of the market. The Secretariat has commented on only those on which it considers it has expertise.

Major Reforms

Security Constrained Dispatch and Facility Bidding by Synergy

The Secretariat supports moving to a constrained network access design, and supporting security-constrained market dispatch, for the South West Interconnected System (**SWIS**). In its 2013 Report to the Minister¹ the ERA noted that the current unconstrained access model does not enhance the performance of the market relative to the Market Objectives because:

- Unconstrained network access does not fully promote economically efficient supply of electricity, as it might promote investment of assets with low utilisation. While the net benefit to the generator connecting must exceed the network augmentation costs of doing so, a constrained access connection might be more efficient for the generator and for the market as a whole;
- New generators must effectively pay for the next network augmentation, creating a disincentive to invest and a barrier to competition; and
- It is not clear that the requirement for unconstrained access minimises the long-term cost of supply, in the sense that the requirement may provide more reliability than consumers are willing to pay for.

¹ ERA (2013), *2013 Wholesale Electricity Market Report to the Minister for Energy*, December 2013, <https://www.erawa.com.au/cproot/12135/2/2013%20Ministers%20Report%20Public%20Version%20Final.PDF>.

The Secretariat notes that a future constrained access model developed by the PUO should still provide sufficient incentives for Western Power to augment the network when it is efficient for it to do so.

Transitioning Synergy to facility bidding is essential for security constrained dispatch to occur. The Secretariat accepts that this may involve additional costs to Synergy. However, this is likely to be outweighed by the benefits of security constrained dispatch and by increased transparency of Synergy's behaviour in the market.

Co-optimisation of Energy and Ancillary Services

The Secretariat supports the co-optimisation of energy and ancillary services and greater competition in ancillary service delivery, as outlined in the ERA's recent Margin Values determination paper². The Secretariat agrees that increasing competition will result in benefits to the market. However, short-term expectations of increased competition in the ancillary services market should be modest given Synergy's large market generation share.

The Secretariat supports the adoption of National Electricity Market (**NEM**) terminology for ancillary services. Additionally, it supports allocating regulating (load following) costs on a causer pays basis, and contingency raise (spinning reserve) services on the full runway method, as recommended in the Position Paper. The Secretariat agrees that, given the large size of spinning reserve costs in the WEM, ancillary services costs should be allocated as closely as possible to those that cause the costs.

The Secretariat also supports the requirement of the Australian Energy Market Operator (**AEMO**) to seek ERA approval prior to entering into a System Restart ancillary services contract, as alignment of contracts and the Cost_LR³ process would be desirable.

Shorter Gate Closure and Shorter Dispatch Cycle

The Secretariat supports moving to a later gate closure than the current two hour window, noting the potential benefits outlined in the Position Paper from increased forecast accuracy from such a reform.

The Secretariat considers that a half hour gate closure is a reasonable compromise to gain the benefits of increased forecast accuracy as detailed in the Position Paper, while avoiding the problems of within Trading Interval rebidding that is considered a problem the National Electricity Market.⁴ The Secretariat considers that re-bidding is not necessary in a market with a Reserve Capacity Mechanism and restrictions on price of electricity that generators may offer into the market⁵.

The Secretariat also notes the potential benefits outlined in the Position Paper of moving to a shorter dispatch cycle in the form of greater forecast accuracy and lower ramping

² ERA (2016), *Determination of the Ancillary Service Margin Peak and Margin Off-Peak parameters for the 2016/17 financial year*, 31 March 2016, https://www.erawa.com.au/cproot/14175/2/Determination%20Paper%20Ancillary%20Service%20Margin%20Peak%20and%20Margin%20Off_Peak%20for%20201617.PDF, p3.

³ The 'L' component of this parameter relates to the load rejection reserve service while the 'R' component relates to the system restart service.

⁴ ROAM Consulting (2014), *Analysis of rebidding activity in the NEM*, 31 March 2014, <http://www.aemc.gov.au/getattachment/387f3a8d-c29c-408f-808c-7cc6a6087d46/Analysis-of-rebidding-activity-in-the-NEM-%E2%80%93-ROAM-C.aspx>.

⁵ See the Market Power Mitigation section below.

deviation. Ramping deviation is the difference between the forecast ramp rate and maximum nominated ramp rate used in current dispatch arrangements, which places additional duty on load following ancillary services.

However, the Secretariat also notes that a greater reduction in ramping deviation could be achieved by specifying the actual required ramp rate of a facility rather than introducing more frequent dispatch and continuing to use a facility's maximum nominated ramp rate. For example, specifying the 'Ideal' ramp rate profile in a Dispatch Instruction for a 30 minute Dispatch Interval would reduce 100 per cent of the ramping deviation in Figure 3.3 of the Position Paper, compared to 80 per cent by specifying the maximum ramp rate under a 5-minute Dispatch Interval.

The Secretariat also notes that a 5-minute Dispatch Interval would increase administrative and Information Technology costs to participants and regulators (in terms of monitoring of market power). Although it is not clear how much of the submission of additional offers and regulatory monitoring of those offers could be automated. Nevertheless, the number of data points will increase by a factor of six.

Retention of the STEM

The Secretariat agrees that the STEM be kept unchanged from its present form. While the day-ahead format accounts for only a small share of total energy traded, it is important to certain segments of the market as shown in Figure 3.5 of the Position Paper. The STEM allows these market segments to establish a day ahead position while avoiding some of the volatility of the Balancing Market.

The Secretariat also notes that the Position Paper does not recommend the centralised creation of other forward markets or derivatives. The Secretariat supports this position, as it has seen no case that there is participant demand for such a market, but that there is some market failure preventing the market from developing.

Other Issues

Australian Energy Market Operator Dispatch Engine

The Secretariat is not familiar with AEMO's National Electricity Market Dispatch Engine (NEMDE), but understands that its adoption would enable the WEM to move to a security-constrained co-optimised dispatch for little or no cost.

Locational Pricing

The Secretariat supports maintaining a single market price at a reference node, due to

- the additional complexity of nodal pricing; and
- potential price volatility at some small volume nodes.

The Secretariat notes that the WEM is a relatively small market compared to those that practice nodal pricing in the United States, and is unlikely to be large enough to support liquid prices at each node.

Management of Line Losses

The Secretariat supports the Position Paper's proposed system for calculating line losses which it understands as:

- AEMO (transmission), in conjunction with Western Power (distribution), is responsible for calculating line losses;
- A market participant may apply for a reassessment of transmission or distribution loss factors applying to its generators or loads; and
- The ERA will process any such applications and conduct an audit of the relevant loss factor calculation.

The Secretariat does not support the alternative option of formal approval of line loss calculations.

Reference Node

The Secretariat agrees that the WEM's reference node should be shifted to a location closer to the WEM's major demand centre in the Perth metropolitan area. It is not aware of any additional costs that might occur as a result of this shift.

Basis for Generating

The Secretariat supports the retention of energy dispatch on a sent-out basis and that this be extended to Synergy's facilities for the reasons given in the Position Paper. The Secretariat considers that the value of electricity contributed by a generator should be net of its own internal consumption. To do otherwise could lead to the situation where a generator with a high internal or auxiliary load would be dispatched more frequently than a similar generator with a lower internal load and so lower net production cost.

Ex-Ante Pricing

The Secretariat supports the Position Paper's proposed shift from ex-post pricing to ex-ante pricing. It agrees that the greater certainty provided by ex-ante pricing will benefit market participants.

Additionally, generation of ex-ante prices will also enable better real-time monitoring of participants' behaviour by regulators.

Constrained-on and Constrained-off Compensation

The Secretariat acknowledges the need for continued constrained-on-out-of-merit compensation in the WEM when required. It also supports reform to the method used to compensate generators who are constrained-on-out-of-merit.

The Secretariat agrees with the conclusion in the Position Paper that the Rules should be amended to allow for the situation where a generator is constrained-on-out-of-merit for long periods of time, so that the Theoretical Energy Schedule (TES)⁶ adjustment does not reduce

⁶ The TES adjustment is specified in Market Rules 6.16A.1 and 6.15.1.

generators' Balancing Payment for multiple Trading Intervals in a row. The Secretariat considers that the TES adjustment makes the task of forming Balancing Market offers unnecessary complex for a generator who is constrained-on-out-of-merit.

The Secretariat supports the publication of data relating to any constrained-on-out-of-merit compensation as outlined in the Position paper.

The Secretariat supports the removal of constrained off compensation as it is unnecessary in a security constrained dispatch market.

Market Power Mitigation

Energy Price Limits

Previously the ERA has expressed in its review of the methodology for setting the MRCP and the Energy Price Limits (**EPLs**) in the WEM that: "The adoption of two upper price limits instead of one recognises that the short term operating costs associated with the two relevant fuel types can be significantly different and the concern that some gas fuelled generators may be able to exercise market power if only one price limit, i.e. the Alternative Maximum STEM Price applied, leading to higher price outcomes than otherwise would occur."⁷

The Secretariat notes that the increased transparency associated with the EMR's reforms reduces the potential for pricing in a way that relates to market power and potentially reduces the need for two separate EPLs. However, the Secretariat still has concerns with the potential exercise of market power under one EPL.

Nevertheless, the Secretariat supports the Position Paper recommendation to review the suitability of a single EPL for the market.

Short-run Marginal Cost Rules

Need

The Secretariat strongly supports the retention of a restriction on offers placed into WEM as included in Rules 6.6.3, 7A.2.17 and 7B.2.15.

There is some argument that, for an energy-only market like the NEM, generators should be able to price above their respective Short-Run Marginal Cost (**SRMC**)⁸ when the opportunity arises to recover their capital costs.⁹

⁷ ERA (2013), *Review of Methodology for setting the Maximum Reserve Capacity Price and the Energy Price Limits in the Wholesale Electricity Market*, 27 September 2013, <https://www.erawa.com.au/cproot/12036/2/Review%20of%20methodology%20for%20setting%20the%20MRCP%20and%20the%20EPLs%20in%20the%20WEM.pdf> , p7.

⁸ A firm's SRMC is the change in a generator's costs associated with a small change in output.

⁹ In practice generators can do this in the NEM, as affirmed in *AGL v ACCC (Australian Gas Light Company v ACCC (No 3) [2003] FCA 1525* (19 December 2003) at [516]).

However, no such argument exists for dual capacity-energy markets like the WEM. The combination of energy and capacity payments will, in normal times, result in the optimal mix of generation with all generators earning normal¹⁰ profits.

All dual energy-capacity markets known to the Secretariat have some sort of rule restricting the offers of participants with market power. For example, PJM's Three Pivotal Supplier (TPS) test, which examines the ability of PJM's nodes to meet demand without each node's largest suppliers, firstly considers whether a participant has market power. If the participant does have market power, then it is restricted to reference or cost-based offers, with a slight margin for error.¹¹

The Secretariat notes that there is generally understood to be an oversupply of generating capacity in the WEM which has been combined with a capacity market design that encouraged too much reserve capacity. This has allowed retailers to purchase energy and capacity at prices that the Secretariat understands may not cover the total cost of producing electricity for many generators.

However, there is no argument for allowing some offers above SRMC related to market power to help generators recover their costs. This is because:

- Reforms to the capacity market¹² should reduce the incentives for capacity that rarely generates to stay in the market and result in, in the long run, a higher capacity price than if the existing arrangements were to continue; and
- If the market returns to a normal profitability situation where a generator without market power could recover its costs, generators with market power could earn substantial excess returns at the expense of customers.

Finally, some generating capacity may have to exit the market if the current oversupply situation persists. However, allowing a participant to exercise its market power would mean that its plant is the most likely to remain, regardless of whether that plant is the most efficient or not. The Market Objectives are supported by having the most efficient plant remain in the market.

Practical Application

The Secretariat notes that for generators with declining costs, the profitability and economic efficiency outcomes of pricing at SRMC are unclear. Additionally, pricing offers into the WEM at SRMC is difficult in practice. The reasons behind this are contained in the Attachment to this submission.

Consequently, in its recent Investigations into Vinalco's Pricing Behaviour the ERA adopted a practical approach that it considers allows generators to recover costs and not be in breach of the WEM's market power mitigation rules.

¹⁰ Normal profit profits compensate firms for their costs, including capital costs, but does not result in excess profits.

¹¹ PJM (2014), *PJM Manual 15: Cost Development Guidelines*, 5 November 2014, <http://www.pjm.com/~media/documents/manuals/m15.ashx> , p2.

¹² As contained in Department of Finance | Public Utilities Office (2016), *Final Report: Reforms to the Reserve Capacity Mechanism*, 7 April 2015, https://www.finance.wa.gov.au/cms/uploadedFiles/Public_Utility_Office/Electricity_Market_Review/Reforms-to-the-Reserve-Capacity-Mechanism-Final-Report.pdf.

In its notice regarding its Investigation into Vinalco's Pricing Behaviour for the period 23 February 2014 to 24 March 2014, the ERA stated¹³:

..., the ERA considers that a generator in Vinalco's situation should be able to recoup its relevant costs incurred in providing the electricity. Due to the economics of electricity generation and the technical definition of SRMC, Vinalco would have incurred short-run losses in providing the relevant electricity if it offered prices at its reasonable expectation of the SRMC.

This is inconsistent with the objectives of the wholesale electricity market. Therefore, Vinalco's price offers above its reasonable expectation of the SRMC might not have been related to any market power it held during the Investigation Period.

Taking this into account, the ERA applied subsequent tests to determine whether Vinalco would have offered the same or higher prices during the First Investigation Period if it did not have market power.

The Secretariat supports the publication of practical guidance by the ERA and AEMO for generators during the implementation phase of the EMR. However, the Secretariat cautions that as yet no market power case has been considered by the Electricity Review Board (ERB)¹⁴ and so any guidance compiled before the Vinalco cases are finalised can only be preliminary.

In the meantime, the Secretariat notes that it has provided some guidance to the market in terms of its two notices on its investigations into Vinalco¹⁵¹⁶ and a speech by the ERA's Chief Economist to the WA Power and Gas Conference on 16 March 2016¹⁷. The ERA's SRMC Paper¹⁸ mentioned in the Position Paper gives some guidance on the calculation of SRMC, but the Secretariat acknowledges that this was a staff research paper and did not necessarily represent a position of the ERA.

Nevertheless, the Secretariat agrees that a publication containing all aspects of how participants' behaviour relating to Market Rules 6.6.3, 7A.2.17 and 7B.2.15 is monitored and enforced would have considerable value for participants.

Process

The Secretariat notes that a market participant might have to deal with up to three separate processes with respect to Market Rule 7A.2.17 as outlined in Market Rule 2.16.9. The market participant might have to:

¹³ ERA (2015), *First Investigation into Vinalco's Pricing Behaviour*, 30 October 2015, <https://www.erawa.com.au/cproot/13938/2/Notice%20-%20First%20Vinalco%20Investigation.pdf>.

¹⁴ Under Market Rule 2.16.9H, potential infractions of the WEM's market power mitigation rules will be determined by the ERB. The ERB has yet to consider the Vinalco investigation.

¹⁵ ERA (2015), *First Investigation into Vinalco's Pricing Behaviour*, 30 October 2015, <https://www.erawa.com.au/cproot/13938/2/Notice%20-%20First%20Vinalco%20Investigation.pdf>.

¹⁶ ERA (2015), *Second Investigation into Vinalco's Pricing Behaviour*, 30 October 2015, <https://www.erawa.com.au/cproot/13939/2/Notice%20-%20Second%20Vinalco%20Investigation.pdf>.

¹⁷ Layman, B.D. (2016), *Market Power Mitigation in the WEM, Speech to the WA Power and Gas Conference*, 16 March 2016, <https://www.erawa.com.au/about-us/speeches-and-presentations>. This speech was given after the publication of the Position Paper.

¹⁸ McHugh, A. (2008), *Portfolio Short Run Marginal Cost of Electricity Supply in Half Hour Trading Intervals: Technical Paper*, 11 January 2008, <https://www.erawa.com.au/cproot/6317/2/20080111%20Short%20Run%20Marginal%20Cost%20-%20Technical%20Paper.pdf>.

- Provide an explanation of its behaviour to the Independent Market Operator (**IMO**, Market Rules 2.16.9B and 2.16.9C);
- Be the subject of an ERA investigation under Market Rule 2.16.9E; and
- Be referred to the ERB under Market Rules 2.16.9G and 2.16.9H.

The Secretariat notes that the current system provides some checks and balances for market participants as both the IMO and ERA must agree before referring any pricing behaviour to the ERB. However, it means that market participants are subject to potentially expensive multiple processes.

The Secretariat notes that the potential consolidation of some ERA and IMO functions gives the opportunity to streamline the process for market participants to at most two processes similar to how a business is treated when investigated under the *Competition and Consumer Act 2010*¹⁹.

The Secretariat notes that, should the current three-step process continue in some form, Market Rule 2.16.9D dictates that the IMO must publish the participant's response to the IMO's request for an explanation of the participant's behaviour on the IMO website.

The Secretariat notes that this places both the IMO and the participant in an awkward position because the IMO cannot publish any detailed description of a participant's alleged behaviour, while the participant cannot refer to confidential data in its response. The Secretariat considers that Market Rule 2.19.9D is unnecessary and should be removed.

¹⁹ Australian Competition Law (2016). *Australian Competition Law Overview*, <http://www.australiancompetitionlaw.org/overview.html>, accessed 27 April 2016.

Appendix: Economic Efficiency and Electricity Generation

The Position Paper does not recommend moving from the current single (linear) price for energy in the Balancing Market.²⁰ The Secretariat notes that this form of pricing has implications for economic efficiency and how generators form their offers into the WEM.

The Secretariat notes that a profit-maximising firm with diminishing returns (increasing costs) will produce at a level where the marginal cost of its last unit of production equals its marginal revenue. The marginal revenue of a price-taking firm operating in a competitive market is equal to the market price. So formally:

$$P = MC$$

Where P is the market price and MC is the firm's marginal cost, often referred to a Short-run Marginal Cost (**SRMC**) in electricity markets.

In most markets, the P=SRMC condition is the profit maximising position and the level of production where economic efficiency²¹ is achieved.

However, for P=SRMC to represent a firm's profit maximisation position and the point of economic efficiency, the firm's SRMC curve must be sloping upwards at the point of production.²² This ensure that a surplus on its infra-marginal production is available to cover its non-variable costs.

In most markets, a firm will produce if its SRMC rises above its Average Variable Cost (**AVC**)²³ and make a full profit if it covers its AVC plus its Average Fixed Costs (**AFCs**).²⁴

In an energy-only electricity market, this is analogous to an unhedged generator offering successive tranches of production into the market at the SRMC of each tranche, and the Balancing Price rising high enough to cover its variable and fixed costs.

In capacity-energy markets like the WEM, a generator's capacity payment covers at least some of each generator's fixed costs, so the Balancing Market only has to rise enough that a price on the last unit of a firm's SRMC covers the part of its fixed costs in excess of the Capacity Price.

However, electricity generation has characteristics that make the normal profit-maximising condition invalid.

²⁰ The separate energy/capacity charge is a form of non-linear pricing, but linear pricing in this context refers to a single energy price.

²¹ Economic efficiency has three components. Technical efficiency refers to using the minimum cost technology to produce certain outputs, allocative efficiency refers to using resources in such a way to produce those outputs most valued by society and dynamic efficiency refers to optimal investment and production decisions being made over time.

²² This is sometimes called the second order condition where the second derivative of a firm's profit function is less than zero.

²³ AVC is defined by VC/Q where VC is total variable cost. The condition that a firm will only produce once its price is greater than or equal to its AVC is called the 'shutdown condition'.

²⁴ A firm's AVC added to its AFC equals its Average Total Costs (**ATCs**), which is its total costs divided by total output. A firm is said to make a normal profit if its revenues exactly match its costs including a return on capital, or a super-normal profit if its revenues exceed its costs.

Firstly, electricity generators frequently have large start-up and shut-down costs. This means that, for a generator not operating, its SRMC during its first trading Interval of operation will be very large, but fall dramatically for operation during subsequent Trading Intervals.

Secondly, thermal power stations have a 'minimum generation' level, below which production is not stable. It is impossible for a generator to increase production by 'one more unit' from zero generation.

Lastly, the Secretariat notes that electricity generators typically become more efficient as they increase production from minimum generation to maximum generation. This is because their average heat rate²⁵ declines as production increases.

Consequently, a generator's variable fuel costs, which are its heat rate times its fuel price, decline as output rises. Given many other variable costs are linear, the actual SRMC of such a generator falls as production increases. This means that offering tranches of output at the SRMC of each tranche does not represent the generator's profit-maximising position.

In practice this means that:

- the generator cannot offer prices exactly at SRMC of each production level because it must offer prices in a monotonically upwards manner (that is each successive tranche bid into the market must be at a higher price to the last), otherwise notionally higher-output tranches will be dispatched first; and
- the generator's SRMC will be less than its AVC across much, possibly all, production levels. That is, strict SRMC pricing can lead to the generator making a loss in the Balancing Market, which is not sustainable in the long term and affects whether optimal investment is achieved.

The ERA considers that if a generator has market power, its offers should be evaluated against the offers that it would have made if it did not have market power.²⁶ Offering a tranche of energy at its AVC is one possible way for such generator operating under linear pricing to recover (at least) its variable costs, provide an outcome as close to economically efficient as possible and still comply with the WEM's market power rules.²⁷ However, this method of forming offers still has problems.

Firstly, it does not represent the economically efficient production from society's point of view, as the generator's AVC is greater than its SRMC, meaning there is still some unmet production that society values more than its marginal cost of production. Economic efficiency is explicitly outlined in the Market Objectives. However, the Secretariat notes that economic efficiency for a market with falling marginal costs is not possible under linear pricing of energy.²⁸

Secondly, the generator's AVC may still decrease as its production rises, reaching its minimum point at its maximum generation. This is a problem if a generator submits a single

²⁵ A generator's heat rate is the fuel used to produce a unit of electricity. The lower the heat rate the more efficient (lower cost) is the plant. Generators' heat rates may also vary as weather (temperature) changes.

²⁶ ERA, (2015), *First Investigation into Vinalco's Pricing Behaviour*, 30 October 2015, <https://www.erawa.com.au/cproot/13938/2/Notice%20-%20First%20Vinalco%20Investigation.pdf>.

²⁷ Layman, B.D. (2016), *Market Power Mitigation in the WEM*, *Speech to the WA Power and Gas Conference*, 16 March 2016, <https://www.erawa.com.au/about-us/speeches-and-presentations>.

²⁸ Wilson, R.B. (1993), *Nonlinear Pricing: Published in Association with the Electric Power Research Institute*, New York, Oxford University Press, Kindle Edition.

tranche costs at its maximum generation, but is the marginal generator and so is only dispatched at a lower output (and higher unit cost). This also means that a generator's offer prices are reliant on its forecast of its output.

The Secretariat notes that many US markets use non-linear pricing in energy markets in the form of separate compensation for start-up costs, no-load costs and energy costs.²⁹ This pricing method aligns the interest of participants with the interests of the market as a whole.

²⁹ Some markets also provide a separate capacity payment like that in the WEM.