WESTERN POWER

SUBMISSION TO THE ELECTRICITY MARKET REVIEW POSITION PAPER: REFORMS TO THE RESERVE CAPACITY MECHANISM

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PURPOSE OF THIS DOCUMENT

The Electricity Market Review (EMR) includes a reform project for Reserve Capacity Mechanism (RCM) aimed at reducing the costs of generation on the South West Interconnected System (SWIS). As part of the ongoing engagement process for Phase 2 of the EMR, the Steering Committee has released a Position Paper on the proposed design of the RCM, this being the '*Position Paper on Reforms to the Reserve Capacity Mechanism*' dated 3 December 2015 (the RCM Position Paper)

The purpose of this document is to provide the EMR Steering Committee with Western Power's response to the content of the RCM Position Paper.

Western Power appreciates the opportunity to provide this submission and would welcome the opportunity to discuss any of these matters in further detail with the EMR Steering Committee or its delegates.

Signed for and on behalf of Western Power

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1. EXECUTIVE SUMMARY

Effective, pragmatic and expedient reform of the RCM will deliver significant long term benefits to Western Power's customers, where the large excess of capacity traded in the Wholesale Electricity Market (WEM) has contributed significantly to recent increases in the retail cost of electricity on the SWIS. Western Power supports the EMR's reform objective of achieving retail cost reflectivity through driving efficiency across each element of the energy supply chain, within which the electricity network plays a critical role in providing safe, reliable and affordable access to electricity.

Therefore, to maximise the potential gains from the RCM's reform, and to avoid any unintended consequences, it is important that the role of the network be accounted for in policy design as both a substitute and complement to generation capacity.

Region specific capacity pricing

Western Power's proposes that regional capacity pricing be introduced to provide incentives to maintain generation on constrained parts of the network, and to reduce the costs of excess capacity on those parts of the network where capacity is well in excess of peak demand. This would ideally occur during any transition period prior to the introduction of a mandatory capacity auction, and be retained after its introduction. A reform principle would therefore be that the quantity of capacity credits assigned to a defined network region reflects the economically efficient level of capacity in that region. If the current capacity price incentives are not changed to reward the retention of plant in network constrained regions with limited generation capacity, there is a risk that the current single region approach to capacity pricing may lead to plant closures in regions where there is a shortage of capacity relative to peak demand.

Peak demand forecast considerations

The EMR *Options Paper* identified that a principle cause of the high electricity generation costs that have been observed in the SWIS since the establishment of the WEM has been that the market operator's centralised peak demand forecasts, which signal investment opportunities, have persistently and materially overestimated actual demand. Western Power notes that the RCM Position Paper does not address this principle cause and that the proposed auction design will likely exacerbate forecast errors, given that it would increase the forecast horizon from about 2.5 years currently to three years: A longer forecast horizon will increase the difficulty of making accurate forecasts, and lower forecast accuracy will result in greater costs to consumers and/or taxpayers than would otherwise be the case.

Western Power supports the 'Reformed WEM' auction design approach proposed in the EMR *Options Paper* which entailed putting in place "*…a staged, or staggered, auction in an attempt to reduce forecasting error and achieve a capacity price that reflects the level of supply compared to the requirement…*" (p. 52). The *Options Paper* envisaged staged auctions of 60 per cent, 30 per cent and 10 percent of capacity accredited in the three respective years prior to the Capacity Year. Western Power advocates the retention of this approach.

Given the historical peak demand forecast errors, Western Power is concerned that there is a risk to the timing of the reform, as currently proposed, due to a reliance on the market operator's most recent forecast to estimate the duration of the transition period that would transpire before a compulsory capacity auction is introduced, i.e. when the RCM Position Paper's concept of 'excess capacity' falls to below six per cent. Sensitivity analysis conducted by Western Power suggests that if average compound annual peak demand growth is 0.4% instead of 0.8% over the forecast period, the auction will not be implemented until beyond 2024-25, even with 595 MW of early capacity retirement. Western Power is concerned that the current approach to the transition period risks the unintended consequence of causing an indefinite delay to the implementation of the reserve capacity auction reform, and supports the establishment of a deadline for introduction of the capacity auction if the auction has not already been triggered by the six per cent 'excess capacity' threshold.

Auction design: supply and demand

Western Power's analysis of the proposed demand curve parameters for the capacity auction suggests that they would result in an extremely inelastic demand curve. Western Power's assessment of the trade-off between the advantages/disadvantages of the proposed demand curve versus those of a zero elasticity (i.e. vertical) demand curve is that a vertical demand curve positioned at the Reserve Capacity Requirement (RCR) should be preferred. The proposed demand curve design would be unnecessarily complex, would introduce further bias towards overcapacity and would not offer any substantial reduction in the impact of market power or price volatility when compared to a vertical demand curve design.

Western Power supports the RCM Position Paper's view that a simple, single-round sealed bid auction format for the WEM is appropriate, with the caveat that a regional pay-as-bid approach be adopted rather than a uniform clearing price for all capacity. Western Power advocates the pay-as-bid approach, as it would minimise the pass-through of capacity costs to retail prices and/or operational subsidies and has market power mitigation advantages.

Demand side management requirements

Western Power generally concurs with the proposed changes to the demand side management (DSM) availability requirements. However, while DSM resources remain as non-balancing facilities, there will continue to be limited practical opportunity to dispatch DSM and treat them as equivalent to generation facilities. In general terms, it would be of benefit for the Steering Committee to give thought to the development of a price-based merit order for capacity dispatch.

2. REFORM OBJECTIVES AND PRINCIPLES

The RCM Position Paper lists the reform objectives and principles that the proposed reforms have been based on and asks for feedback on those objectives/principles. Western Power concurs with all the reform objectives and principles proposed in the RCM Position Paper with the exception of the first principle listed, this being that "The capacity price should reflect the marginal economic value of capacity". Western Power has three broad reasons for questioning the appropriateness of this principle:

1. There will never be a single capacity price, and so the principle cannot possibly be upheld. To elaborate:
   - A significant proportion of capacity is traded through bilateral contracts
   - Bilateral contracts are negotiated between parties over a range of capacity prices

  - Pricing terms in bilateral contracts are typically not observed by State Government agencies and so are beyond their direct influence.
2. There will never be a single marginal economic value of capacity on the network. The marginal economic value of capacity will vary for different regions of the network, particularly under a constrained network model. The current wording of the principle does not appear to capture this fact.
3. Based on standard economic analysis, the efficient level of capacity is that which results in the marginal social benefit of capacity equalling the marginal social cost of supplying it to a particular region of the network. This does not require a unique, uniform capacity price for all capacity traded. The current wording of the principle might be interpreted as a preference for uniform pricing, which Western Power sees as not minimising the capacity costs that are passed on to consumers and/or taxpayers (see Section 5.3 below on pay-as-bid pricing).

For the reasons outlined above, Western Power suggests that it would be appropriate to reword the aforementioned principle as "The quantity of capacity credits assigned to a defined network region should reflect the economically efficient level of capacity in that region".

3. PROPOSED REFORMS TO THE RESERVE CAPACITY MECHANISM

The EMR *Options Pape*r (p. 29) identified four principal causes of the high electricity generation costs that have been observed in the SWIS since the establishment of the Wholesale Electricity Market (WEM):

1. The SWIS has operated as a combined capacity and energy market, as opposed to an energy only market
2. The market operator's centralised peak demand forecasts, which signal investment opportunities, have persistently and materially overestimated actual demand
3. The Reserve Capacity Requirement (RCR) has been set by an excessive reliability standard
4. The RCR has been over-subscribed due to the incentives created by excessive, centrally administered reserve capacity prices.

The principle recommendation of the *Options Paper* was for the SWIS to join the energy-only National Electricity Market (NEM): this would have addressed all four of these principle causes. The decision to retain a capacity market design logically narrows the focus of the reform program to points 2, 3, and 4 above. However, Western Power notes that the RCM Position Paper:

- Does not appear to address principle causes 2 and 3 above
- Indicates that reliability standard (principle cause 3 above) may be subject to further consideration in the reform program (p.4)
- Does not appear to indicate whether or not the issue of forecast error (principle cause 2 above) will be subject to further consideration as part of the reform program.

In other words, the RCM Position Paper focuses only on principle cause 4, principle cause 3 may be addressed in future policy discussions, whereas it is unclear that principle cause 2 will be addressed as part of the reform program.

Western Power is concerned with the lack of focus on principle cause 2 at this stage in the reform program. The RCR is calculated using the 10 per cent probability of exceedance load forecast for maximum demand on the SWIS, with specific allowances for intermittent loads, reserve margins and frequency control. Figure 1 below gives an indication of the extent to which peak demand forecasts have overestimated capacity requirements on the SWIS. Western Power notes that the RCM Position Paper states that demand forecast is a factor "…outside of the Reserve Capacity Mechanism". Western Power is concerned that this statement might be interpreted as an indication that the issue of peak demand forecast bias will not be addressed as part of the reform program; the peak demand forecast is integral to the functioning of the RCM and any reform of the RCM would ideally consider measures which minimise the cost of forecast error. Given the *Options Paper* identified persistent peak demand forecast bias as a principle cause of the observed overcapacity in the market, Western Power submits that addressing this issue will be a prerequisite for any successful reform of the RCM (as assessed against the reform objective/principles).

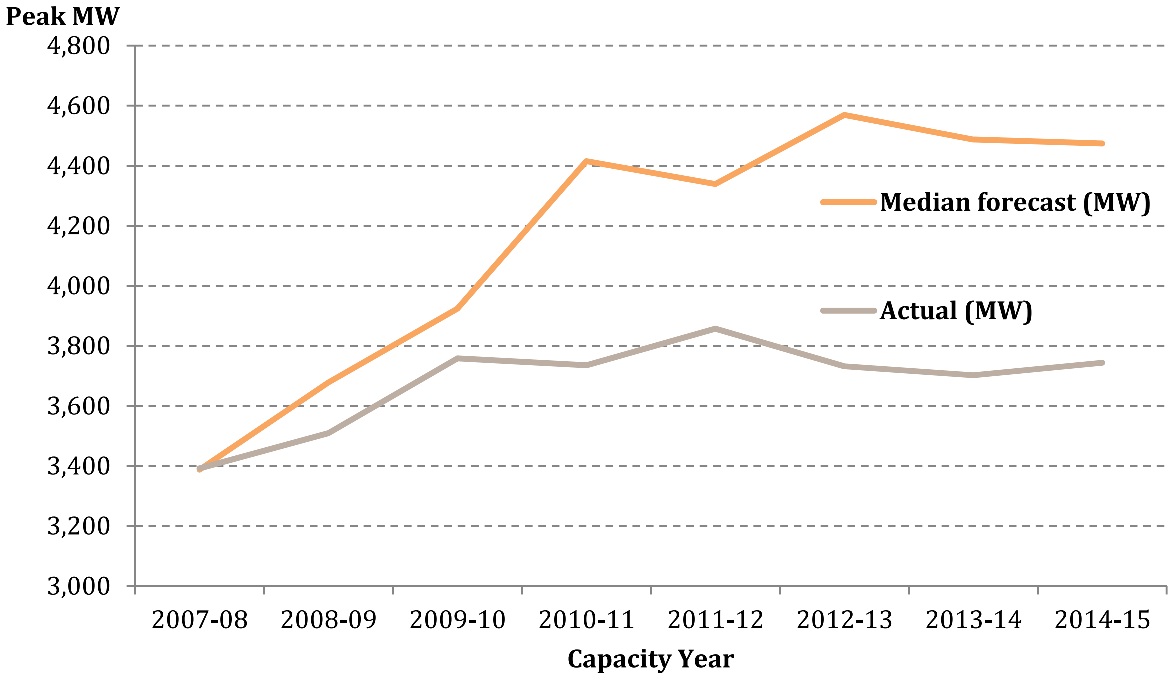

Figure 1 – RCM's three year horizon peak demand forecast versus actuals

Western Power notes that the *Options Paper* recognised the importance of addressing the demand forecast bias issue and proposed solutions to the problem that did not necessarily involve a move to the NEM. These solutions were integral to the proposed RCM reforms outlined in the *Options Paper*. In particular, the *Options Paper* proposed a 'Reformed WEM' option which entailed putting in place "*…a staged, or staggered, auction in an attempt to reduce forecasting error and achieve a capacity price that reflects the level of supply compared to the requirement…*" (p. 52).

More specifically, the *Options Paper* proposed that an auction would be held in each of the three years prior to a capacity year, allowing the market operator to update its forecast with the expectation that the forecast error would be smaller the shorter the forecast horizon. The *Options Paper* reported on modelling conducted to explore this reform option, which assumed that 60 per cent, 30 per cent and 10 percent of capacity would be accredited in the three respective years, with demand side management only participating in the final (one year ahead) auction to the extent it was needed, due to demand side management's shorter lead time compared to greenfield generation projects.

The original staged auctions proposal appeared to be a sensible option and Western Power is concerned that the RCM Position Paper appears to have departed from it. The RCM Position Paper does not appear to advocate a staged auctions approach, and it is unclear why the design concepts proposed in the *Options Paper* have not been retained. The auction design proposed in the RCM Position Paper will likely exacerbate forecast errors, given that it proposes an increase to the forecast horizon from about 2.5 years currently to three years. A longer forecast horizon will increase the difficulty of making accurate forecasts, and lower forecast accuracy will result in greater costs to consumers and/or taxpayers than would otherwise be the case.

4. ISSUES RELATED TO THE DEFINITION OF EXCESS CAPACITY AND THE TIMING OF THE REFORMS

The RCM Position Paper proposes that the introduction of a compulsory auction should not occur until its concept of forecast 'excess capacity' falls to below six percent. In this context, the RCM Position Paper appears to use the term 'excess capacity' to refer to capacity above the RCR. Western Power is of the view that such a definition will be inappropriate whenever the RCR is set by a biased forecast. A more appropriate definition of 'excess capacity' would refer to capacity above an RCR that is set by an unbiased forecast. To illustrate Western Power's reasoning for this view, consider the case where:

- 'Excess capacity' is defined as capacity above the RCR, regardless as to whether or not the RCR is set by a biased peak demand forecast, and
- The RCR is initially set by an upwardly biased peak demand forecast, and then
- The forecast bias is corrected in subsequent years.

Under this definition/scenario, the correction to the forecast bias would cause 'excess capacity' to increase in subsequent years, which would delay the onset of the compulsory auction. Western Power sees this as posing a significant risk to the implementation of the reform.

To elaborate, the RCM Position Paper relies on the market operator's most recent peak demand forecast to estimate the duration of the transition period that it proposes should transpire before the compulsory capacity auction is introduced, i.e. when the RCM Position Paper's concept of 'excess capacity' falls to below six per cent. Thus, the reform timetable for the introduction of a compulsory capacity auction relies on a peak demand forecast, past versions of which the *Options Paper* identified suffered from overcapacity bias. If the current forecast is similarly biased this will risk:

- Continuing to impose costs upon consumers and taxpayers for unneeded capacity as a result of the forecast bias, and/or

- Decades of delay to effective reform of the RCM if there is a subsequent correction to that bias given that, as explained above, a correction of this nature will cause 'excess capacity' to increase.

The RCM Positon Paper provides some sensitivity analysis as to the impact of a range of uncertainties on the likely timing of the reserve capacity auction's implementation. However, Western Power notes that the RCM Position Paper does not report the sensitivity of implementation timing to the forecast peak demand growth assumption. As such, Western Power has conducted its own sensitivity analysis for this variable, provided in Table 1 below.

Table 1 - Projected 'excess capacity' factoring in capacity retirement and lower than expected demand growth

Capacity year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Current capacity projections and peak demand forecast	24%	23%	22%	22%	21%	20%	19%	18%
Current capacity projections minus 595 MW of capacity and current peak demand forecast	11%	10%	9%	9%	8%	7%	6%	5%
Current capacity projections minus 595 MW of capacity, and plus 0.4% demand growth p.a. assumption	12%	11%	11%	10%	10%	10%	9%	9%
Current capacity projections minus 595 MW of capacity, and minus 0.4% demand growth p.a. assumption	13%	14%	14%	15%	15%	15%	16%	16%

Source data: Western Power analysis based on input data from IMO's 2014 Statement of Opportunities Report (pages 72 - 76)

As outlined above, the RCM Position Paper proposes that the implementation of the compulsory auction should not occur until its definition of 'excess capacity' falls to below six per cent. Assuming the market operator's current peak demand forecast is correct, Western Power's analysis indicates that under this approach an auction will not be implemented until 2023-24, and only if 595 MW of capacity is retired early. However, if average compound annual peak demand growth is 0.4% instead of 0.8%, the auction will not be implemented until beyond 2024-25 even with 595 MW of early capacity retirement. Moreover, if compound annual peak demand growth is negative rather than positive, 'excess capacity' as defined by the PUO will increase over time, in which case the auction implementation criterion may never be triggered.

For the reasons outlined above, Western Power is concerned that the current approach to the transition period risks the unintended consequence of causing an indefinite delay to the implementation of the reserve capacity auction reform.

Western Power notes that the justification given in the RCM Position Paper for requiring that there be a transition period to allow peak demand to rise and/or capacity to be retired before the introduction of an auction is as follows:

"While is not desirable for consumers to continue paying for capacity that is over-valued, conducting an auction with a large excess of capacity could result in disruption to businesses participating in the capacity market with flow on effects to the energy market." (p. 8)

No explanation appears to be given in the RCM Position Paper as to the nature of any flow on effects to the energy market. Western Power notes that generation plants that currently provide capacity are fixed assets and would continue to exist and likely compete in the energy market if the capacity mechanism were removed or the capacity price were to fall.

In Western Power's view, the introduction of a compulsory auction should not be dependent upon forecast increases in peak demand which may never eventuate. Based on the considerations outlined above, Western Power submits that a compulsory auction should be implemented as soon as possible. In this sense Western Power supports the establishment of a deadline for introduction of the capacity auction if the auction has not already been triggered. Moreover, as discussed in Section 9 below, there are constrained regions on the network, such as the Eastern Goldfields (EGF), which would benefit from the immediate implementation of a (regional) capacity auction due to a current a shortage of capacity in those areas.

5. AUCTION DESIGN

5.1 Demand curve parameterisation

The RCM Position Paper appears to propose the following demand curve parameters:

- A zero crossing point set between 15 to 20 per cent above the RCR
- A convex shaped curve
- A price cap set at either:
    - Long run marginal cost (LRMC), or
    - 1.5 to 1.6 times 'the net cost of new entry'[1]
- The capacity associated with the point on the demand curve that the Maximum Reserve Capacity Price (MRCP)[2] passes through should be greater than the RCR, resulting in the auction under procuring, on average, once every four years.

Western Power notes that if:

- A price cap is set at LRMC, and
- The MRCP is considered an accurate estimate of LRMC, and
- A convex demand curve is positioned according to the "*one in four year expected under procurement*" criterion, then
- The point on the demand curve that passes through the RCR must be equal to the MRCP (see Figure 2 below).

[1] Footnote 20 of the RCP Position Paper defines the 'the net cost of new entry' as LRMC minus expected energy revenue.

[2] Footnote 15 of the RCP Position Paper describes the MRCP as an estimate of LRMC (for a 160 MW plant).

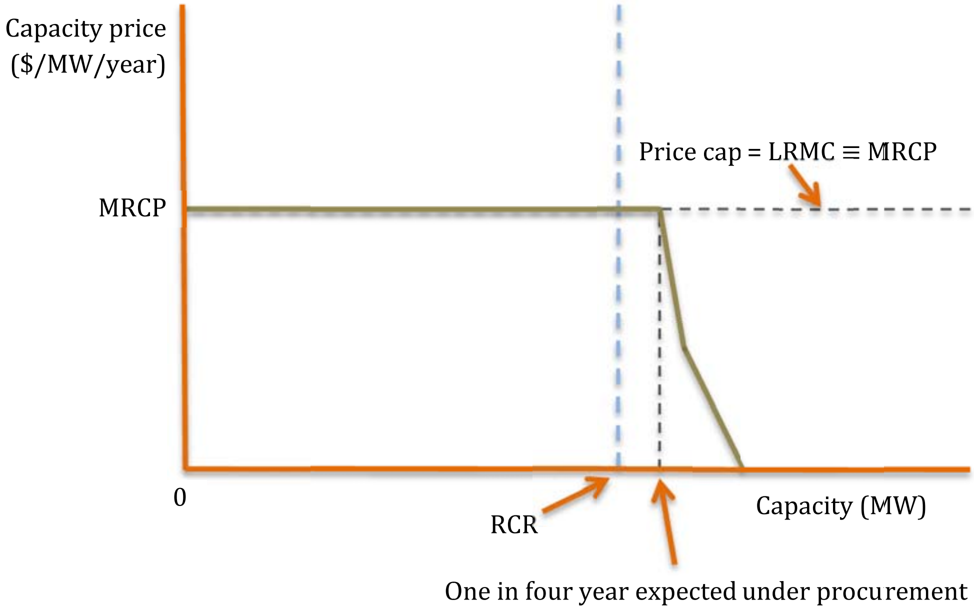

Figure 2 – RCP Position Paper design parameters with the price cap is set at LRMC (illustrative)

The implication of this auction design would be that the administered MRCP would be retained for a wide range of capacity, including a range of 'excess capacity' as it is defined in the RCM Position Paper.

Moreover, Western Power notes that the elasticity of demand over the relevant portion of capacity will need to be close to zero to implement the design parameters proposed in the RCP Position Paper. To evidence this statement, Figure 3 below depicts a price capped, constant elasticity of demand curve. The parameters of the curve have been selected to reflect the demand curve parameters proposed in the RCM Position Paper. The LRMC of new entry is assumed to be $150,000/MW/year, and the demand curve is assumed to pass through this price at 4,557 MW. These values correspond to the MCAP and RCP respectively for the 2016/17 Capacity Year. The price cap is assumed to be $240,000/MW/year, i.e. 1.6 times the 'the net cost of new entry' at an assumed expected energy revenue of zero (see p. 27 of the RCM Position Paper). Mathematically, there is no zero crossing point for a constant price elasticity of demand curve, so it is assumed that the demand curve crosses through the price of $10,000/MW/year at 5,468 MW of capacity, this being 20 per cent above the 4,557 MW target (this assumption is conservative compared to the 15 to 20 'excess capacity' zero crossing point proposed in the RCP Position Paper). Solving for the price elasticity of demand gives an absolute value of 0.067.[3] This is an extremely inelastic demand curve given absolute price elasticity of demand values less than one are considered inelastic, and a zero price elasticity of demand (i.e. a vertical demand curve) is defined as 'perfectly inelastic'.

[3] This is over the downward sloping part of the demand curve not constrained by the price cap.

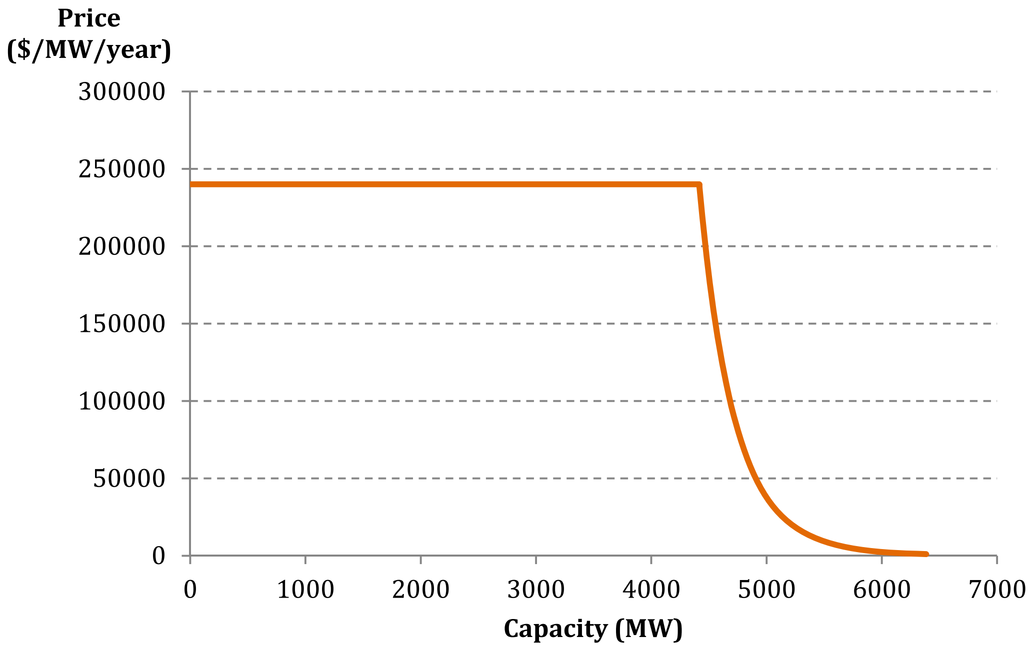

Figure 3 – Example, constant price elasticity of demand curve (ε=-0.067)

While the shape of the demand curve could be modified in a way that makes some sections of it more inelastic than others (e.g. by using a linear demand curve) the fact remains that retention of the other parameters proposed by the RCM Position Paper will be almost certain to result in an extremely low average price elasticity of demand along the length of the curve.

Western Power presents the evidence above in the context of the discussion within the RCM Position Paper (pp. 8 – 23) which states that a low price elasticity of demand would have:

- The disadvantages of:
  - High volatility price outcomes
  - Greater susceptibility to the exercise of market power,
- And the advantage of:
  - A relatively narrow reliability distribution.

In particular, in the context of the discussion in Section 5.24 of the RCM Position Paper around the "*Reliability implications of using a sloped demand curve*" (pp. 24-26), a demand curve with a price elasticity of zero - i.e. a vertical demand curve positioned at the RCR – would provide certainty with respect to the meeting of the reliability standard.

Western Power's assessment of the trade-off between the advantages/disadvantages of the sloped demand curve proposed by the RCP Positon Paper versus those of a vertical demand curve is that a vertical demand curve positioned at the RCR should be preferred to the design parameters proposed in the RCM Position Paper. This is because:

- Market power is unlikely to present a problem for the foreseeable future, given the severe overcapacity in the market (see Section 6 below),

- "*An auction designed with expectation to under procure, on average, once every four years*", would be unnecessarily complex and difficult to audit for effectiveness over a reasonable timeframe,
- The "*under procure, on average, once every four years"* design would introduce further bias towards overcapacity, and
- The near-zero price elasticity of demand of the downward sloping sections of the demand curve proposed by the RCM Position Paper is unlikely to offer any substantial reduction in price volatility and market power mitigation advantages when compared to a vertical demand curve design.

5.2 Auction parameters independent of the demand curve

Western Power supports the following additional auction design elements proposed in the RCM Position Paper:

- Mandatory participation in the capacity auction, with all capacity offered into the auction, including bilaterally traded capacity
- Auctions should apply to a one year delivery period
- A sealed bid style of auction should be implemented, provided a pay-as-bid design is adopted (see the discussion in the following section)

However, Western Power believes the following auction design elements need further consideration:

- As previously discussed, there should be annual reconfiguration auctions to reduce the costs associated with peak demand forecast error and bias.
- A well designed capacity auction should not require the implementation of a defined supplementary capacity procurement process, or if so only rarely. For example, the NEM's Reliability and Emergency Reserve Trader has been rarely drawn upon, despite the NEM being an energy-only market with a constrained network model. The appropriate introduction of regional capacity price signals would help reduce the need to procure supplementary capacity.

5.3 Pay-as-bid design

Western Power supports the RCM Position Paper's view that a simple, single-round sealed bid auction format for the WEM is appropriate, with the caveat that a regional pay-as-bid approach be adopted rather than a uniform clearing price for all capacity. As its name suggests, a pay-as-bid approach would result in a capacity provider being paid no more than the price that the provider offers into the market for a block of capacity. This approach would reflect the nature of the bilateral market, in that generally:

- Capacity providers in the bilateral market will offer capacity at a no less than the price they expect will allow them to breakeven over the period of a contract
- Market customers will buy capacity off those providers who offer it at the lowest price first, and at no more than the price that is offered.

Figure 4 is an illustrative, partial equilibrium diagram, which indicates that a regional, multi-pricing, pay-as-bid pricing approach has the potential to maximise economic efficiency (i.e. there is no deadweight loss) while minimising the overall cost of capacity to wholesale consumers. The various price levels shown in the diagram are for each of the steps in the capacity offer stack (which represents the supply curve). 'Price 4' indicates the highest price that clears in the stack (i.e. the marginal price) and 'Price 0' indicates the offer price in the auction for bilaterally traded capacity. The shaded area in the diagram indicates the producer surplus that could be transferred to consumers if a pay-as-bid approach were introduced rather than a uniform clearing price (at 'Price 4') for all capacity.[4] Western Power advocates this approach, as it would minimise the pass-through of capacity costs to retail prices and/or operational subsidies.

A pay-as-bid approach also has market power mitigation advantages, as low cost capacity in the offer stack will not benefit from any withholding of capacity to force up the marginal price.

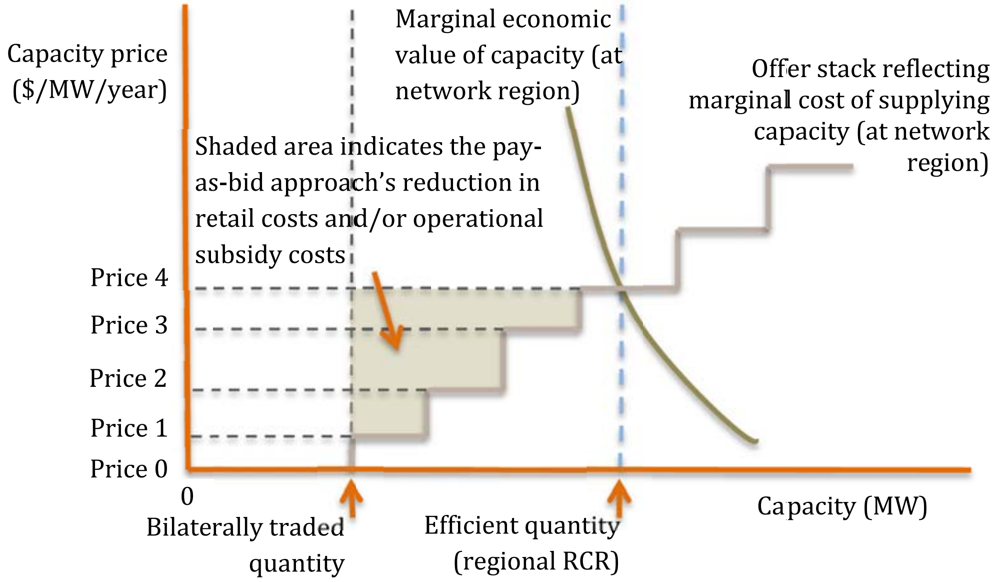

Figure 4 – Economically efficient, regional, pay-as-bid approach to capacity pricing (illustrative)

6. MARKET POWER MITIGATION

The RCP Position Paper suggests that capacity auctions are characterised by supplier market power because dominant suppliers may be able to exert influence over the price of capacity through strategic withdrawal of capacity into the auction. The RCP Position Paper states that the possible exertion of market power suggests that a steep demand curve should not be adopted.

[4] Note the producer surplus transfer to consumers does not extend to the bilaterally traded quantity of capacity, as this capacity will be traded at negotiated contract prices which are unaffected by the auction price.

Western Power's view is that the focus on market power in the capacity auction is not a priority issue. It is extremely unlikely that market power is going to present a concern in the Western Australian wholesale electricity market for the foreseeable future, particularly if a pay-as-bid style of auction is adopted (see Section 5.3 above). Given the severe overcapacity in the market, strategic withdrawal of capacity would be a positive outcome in the current environment. We note reports that the Minister for Energy has expressed a view that strategic withdrawal of capacity will be required to repair the market.[5] The RCM Position Paper suggests early withdrawal of capacity may be needed if a reasonably short capacity auction transition period is to be achieved.

7. HARMONISATION OF DEMAND SIDE MANAGEMENT

Western Power generally concurs with the proposed changes to the demand side management (DSM) availability requirements. However, there are some other fundamental aspects of DSM that prevent it from being considered an alternative to other generation even under the proposed rules. Currently DSM can only ever be called when all other generation options have been exhausted, which would suggest that at the time DSM is called upon System Management is likely to be in critical need of a reliable option to maintain system integrity. However, the reliability of DSM is not guaranteed; it has only ever been called on twice, once in relation to Muja under extraordinary circumstances, and once under the conditions it was intended for. In the latter case, System Management was unable to confirm whether or not the DSM provider delivered the load reduction at the time or level required.

The proposal to include a telemetry requirement for DSM may be seen as somewhat costly and burdensome but has the advantage of providing System Management with real time information regarding the load levels of DSM programs. This proposal does not, however, address the efficiency of payments for DSM programs. The proposed option of DSM providers forecasting their load reduction availability will provide little assurance that a DSM program will be able to deliver a load reduction at the level required if there is no way of testing for availability. DSM providers have little control over the real-time load usage of their customers which can fluctuate greatly over time for a wide variety of reasons. It would be beneficial for the reform program to address some of the other non-dispatch issues with DSM such as the apportionment of availability payment based on actual availability (DSM has restricted availability and should not be compensated for the times it is unavailable).

Any changes that make DSM more available for dispatch that makes DSM a more reliable alternative are welcome changes. DSM resources should in principle be allowed to compete in the capacity market on an equal footing with supply side resources to the extent that they provide an equal capacity service. While they remain as non-balancing facilities, there will continue to be limited practical opportunity to dispatch DSM and treat them as equivalent to generation facilities. In general terms, it would be of benefit for the Steering Committee to give thought to the development of a price-based merit order for capacity dispatch. This may help reduce the problem of DSM facing large operational costs when called upon, but at a low probability of being actually

[5] http://www.abc.net.au/news/2015-08-26/mike-nahan-tips-solar-power-to-take-over-wa-power-generation/6727558

dispatched, making it profitable for demand side resources to offer a low price into the capacity market than other resources which are more likely to be dispatched. Conceivably, if some form of price-based capacity dispatch merit order to be were introduced, then demand side management resources would have the incentive to adjust their offer prices to more closely reflect their expected cost of dispatch.

8. TRANSITIONAL ARRANGEMENTS

Western Power sees the transitional arrangements as being a minor variation on the current design of the RCM, i.e. a steeper demand curve and the removal of demand side resources from the RCM.

Due to the reasons outlined in the following section on 'Region Specific Capacity Pricing', Western Power proposes that regional capacity pricing is introduced during the transitional period before the introduction of a mandatory reserve capacity auction, and that a regional capacity pricing system remain after its introduction. Capacity pricing should provide incentives to maintain generation on constrained parts of the network and to retire excess capacity on parts of the network where capacity is well in excess of peak demand in that region.

9. REGION SPECIFIC CAPACITY PRICING

The South West Interconnected Network (SWIN) is a single interconnected network. However the degree of interconnection and the "strength" of the network varies from region to region. The majority of the load and generation is located in the Perth Metropolitan and South West regions. These parts of the network are well interconnected via strong 330 kV and 132 kV networks with multiple transmission lines providing diverse paths for electricity to be transferred.

In highly meshed areas of the SWIS, the multiple transmission network paths provide alternate pathways for in-service generation to be delivered to the demand centres. However the extremities of the SWIN are characterised by relatively small clusters of customers centred around regional centres. These areas are typically connected to the remainder of the SWIN via a few very long and relatively weak transmission lines. Examples of these weak interconnections include the Eastern Goldfields region centred around Kalgoorlie and the North Country Mid-West regions centred around the corridor between Three Springs and Geraldton.

For these weak interconnections there is a critical distinction between generation capacity that is locally connected in a region verses generation that is connected in the WEM as a whole. An outage of available transmission interconnections and its associated capability to support local regions means that electrical energy is unable to be supplied even where sufficient generation capacity is in-service in the WEM as a whole. In contrast, locally connected generation is available to supply load within that regional area independent of the availability of transmission interconnectors.

Therefore outside of the meshed, well interconnected portions of the SWIN there is also a requirement for locally based generation to manage local network security and stability issues rather than simply contributing to generation capacity into the overall SWIS. Localised generation is also necessary to manage power system stability and transfer issues which are not able to be met by generators operating outside of the region. Due to these localised requirements Western Power submits that the capacity pricing mechanism should act to incentivise sufficient generation capacity in regions where it is necessary, as opposed providing overall capacity to the WEM/SWIS.

Due to geographic remoteness there is a high cost to meeting the technical network requirements of supplying remote load centres. The long, weak interconnections are characterised by a high cost per MW as the costs are highly correlated with line length whereas the demands are relatively low. Transfer constraints also typically exist along long lines requiring additional primary plant to provide reactive compensation and to maintain system stability which increase the network costs. In these scenarios, local generation may be technically and economically viable as an alternative to a network based solution. A reserve capacity price in these regions which reflects the higher opportunity cost of the non-network solution would act to incentivise the investment of generation in regions that often are characterised by high fuel costs.

The reliability of long, weak interconnections is generally lower for various reasons and localised generation is desirable as an alternate means of maintaining supply to customers to the required standards. Some of those reasons include:

- Long lines traversing vast, sparsely populated distances are more vulnerable to faults due to their increased exposure to the elements compared to shorter lines. In a similar manner their increased length also results in relatively longer time required to identify certain faults, and for repair crews to reach the fault region. This leads to a higher risk of unplanned outages and an increased risk of outages of longer duration. The resultant lower availability of the network transfer could result in an electricity supply shortfall which would need local generation to fill.
- Longer transmission lines also consist of a large number of physical assets requiring ongoing maintenance. This can potentially lead to the need to dispatch local generation to maintain supply during planned outages as a result of routine maintenance activities or construction associated with project delivery.
- Where a pair of transmission lines connect a regional area to the remainder of the SWIN, the transmission lines are typically built in separate corridors and are generally running parallel in a relatively direct route. While there may be a few kilometres separation between the corridors any significant environmental disturbance such as a major storm or bushfire may impact an area which covers both corridors and cause a fault on both lines concurrently, effectively leaving the regional area disconnected from the SWIN. In these situations locally connected generation would be required to maintain supply during network conditions which extend beyond the typical N-1 reliability requirement.

9.1 Eastern Goldfields Example

The EGF area is centred on the City of Kalgoorlie and extends west of Kalgoorlie to Merredin and south of Kalgoorlie to Kambalda. The load area supplies approximately 16,500 customers. The majority of the customer demand in the region is driven by mining demand and the communities that support the mining industry.

EGF is connected to the SWIN via a 650 km single circuit transmission line originating from Muja Terminal and is an example of a remote regional load area connected to the SWIN via a long transmission supply. A network diagram of the SWIN is shown in Figure 5 below to demonstrate the supply of EGF from a wider network perspective.

9.1 220 kV Reliability

The 220 kV single circuit is the sole transmission supply to the EGF and any outage of the circuit will result in the area losing supply. With the 220 kV out of service, the supply of the region is dependent upon the availability of generation to supply demand requirements locally.

The 220 kV line is a high reliability circuit. Over the past 5 years, the 220 kV has been unavailable for an average of 47 hours per annum as a result of planned and unplanned outages. This represents an average availability of 99.95% of the year.

Without the 220 kV interconnection the only available method to supply customers in the EGF is the dispatch of local generation. Over the past five years, approximately 3.36 GWh per annum of local generation was required to maintain customer supply during planned outages of the 220 kV network.

Over the past five years, all of the unplanned outages have been due to transient causes and have not necessitated any major repairs. The average restoration time for unplanned outages is approximately 29 minutes. However with increasing age and associated deterioration of the asset the likelihood of a 220 kV line failure requiring significant repair time increases. In this case the availability of sufficient available local generation is required to restore the area's customers while repairs are carried out.

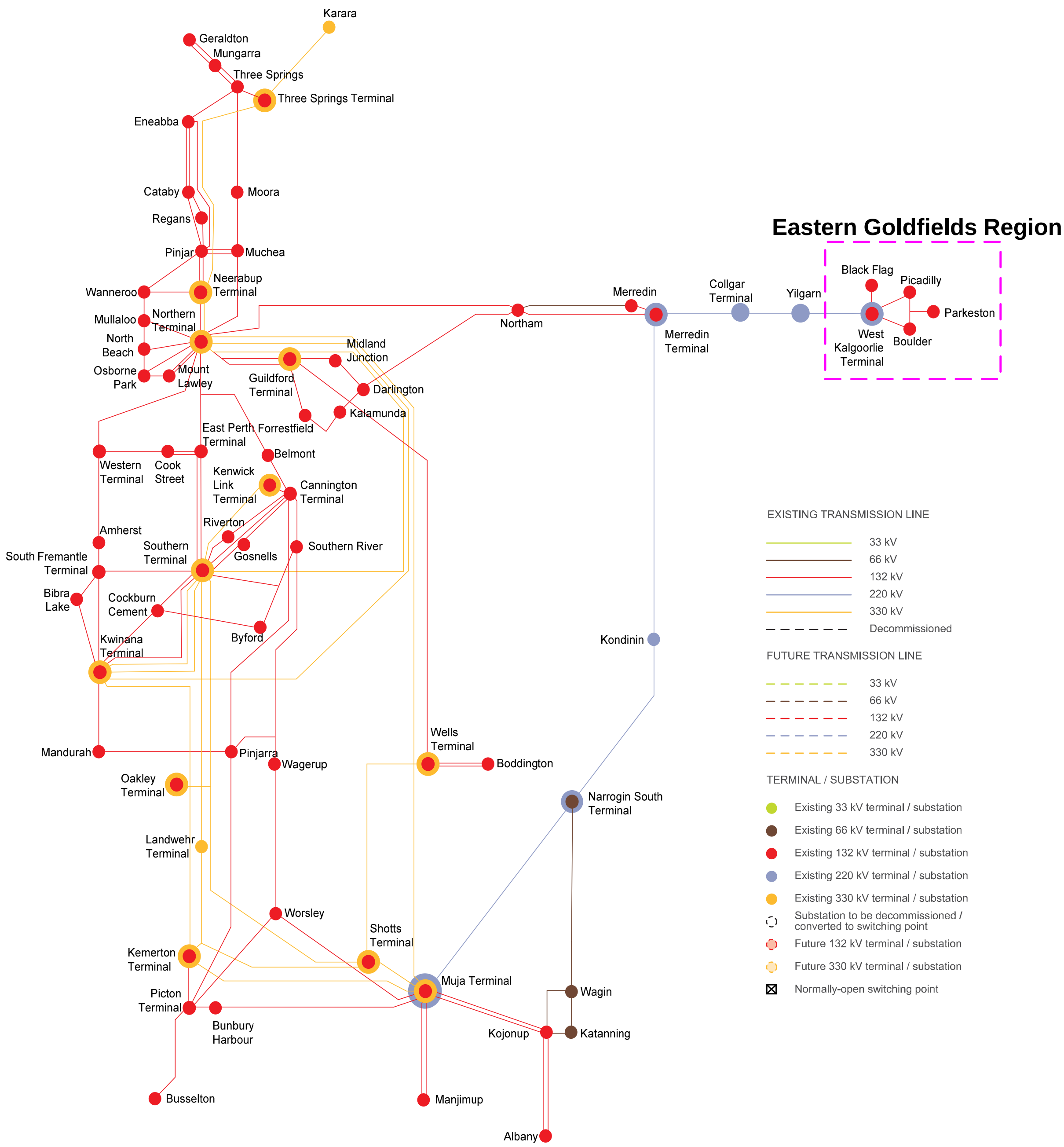

Figure 5 - Eastern Goldfields Load Area with respect to the SWIN

9.2 Reserve Capacity in the Eastern Goldfields

The analysis undertaken here focuses on the calculation of a regional RCR for EGF. These calculations are based on the methodology outlined in Sec 7.1 of the 2014 Statement of Opportunities Report published by the Independent Market Operator (now AEMO).

The regional RCR is calculated using the 10 per cent probability of exceedance load forecast for maximum demand in the region, with specific allowances for intermittent loads, reserve margins and frequency control.

9.3 Regional Maximum demand

The regional maximum demand is defined as the Western Power loads supplied within the load area. Western Power has included the impact of connecting additional customers of approximately 45 MW, as considered in the current EGF Competing Applications Group.

Specifically, this includes the peak customer demand from the following Western Power owned zone substations and customer connection applications:

- West Kalgoorlie 33 kV and 11 kV
- Boulder Zone Substation
- Picadilly Zone Substation
- Black Flag Zone Substation
- EGF Competing Applications Group.

The total maximum demand for Western Power load plus the additional load proposed in the EGF CAG is approximately 147 MW, shown in Figure 6 below.

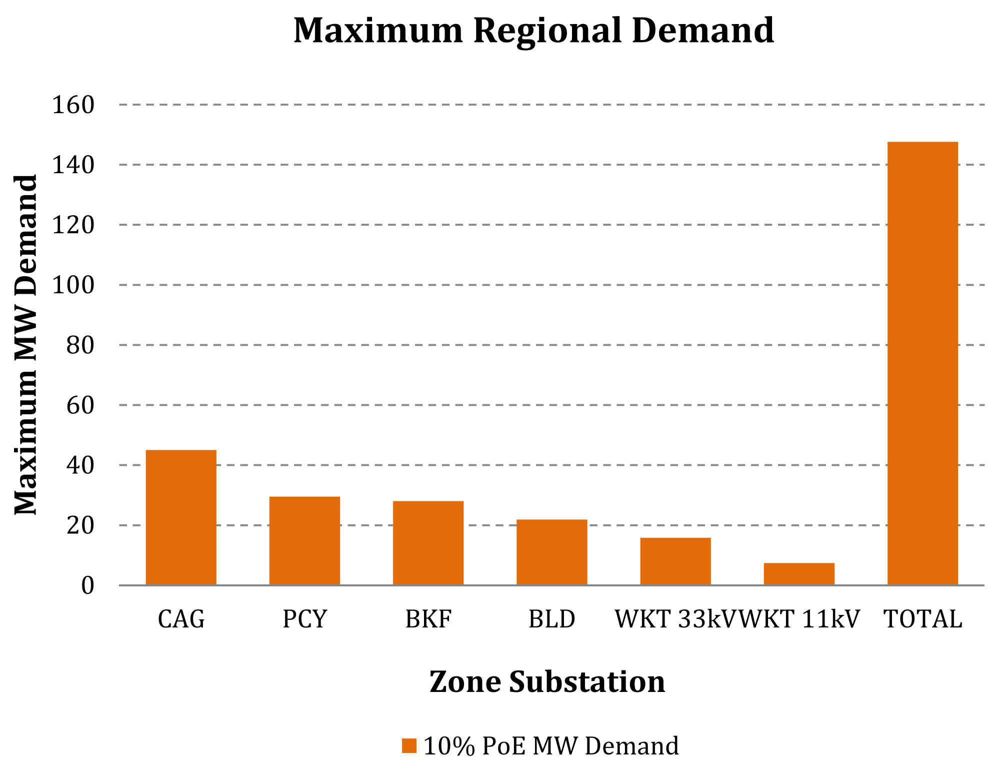

Figure 6 - Maximum regional demand

9.4 Reserve margin

The maximum reserve margin is based on the capability of the 220 kV network to supply the Eastern Goldfields. The maximum supportable demand limited by the 220 kV is currently approximately 145 MW. For the purposes of this analysis, the reserve margin is set at 145 MW to represent the 220 kV network as the largest source of supply into the Eastern Goldfields region and equivalent to the largest generating unit defined within WEM Market Rule 4.5.9.(a)ii.

As the capacity of the 220 kV network far exceeds 7.6 per cent of forecast peak demand in the EGF, the capacity provided by the 220 kV network is used as the reserve margin for calculating the regional RCR in line with the requirements of the WEM Rules.

9.5 Intermittent Loads and Load following

The intermittent load allowance and load following allowance is based on a pro-rata value of the 2016-2017 values from Table 7.1 of IMO 2014 Statement of Opportunities Report by the size of the EGF maximum demand (not taking into account the EGF CAG) compared to SWIS Maximum demand. They are minimal compared to the overall regional demand and reserve margin required.

9.6 Total Eastern Goldfields Regional Reserve Capacity Requirement

The calculated Eastern Goldfields regional RCR is 296 MW and is summarised in Figure 6 and Table 2 below.

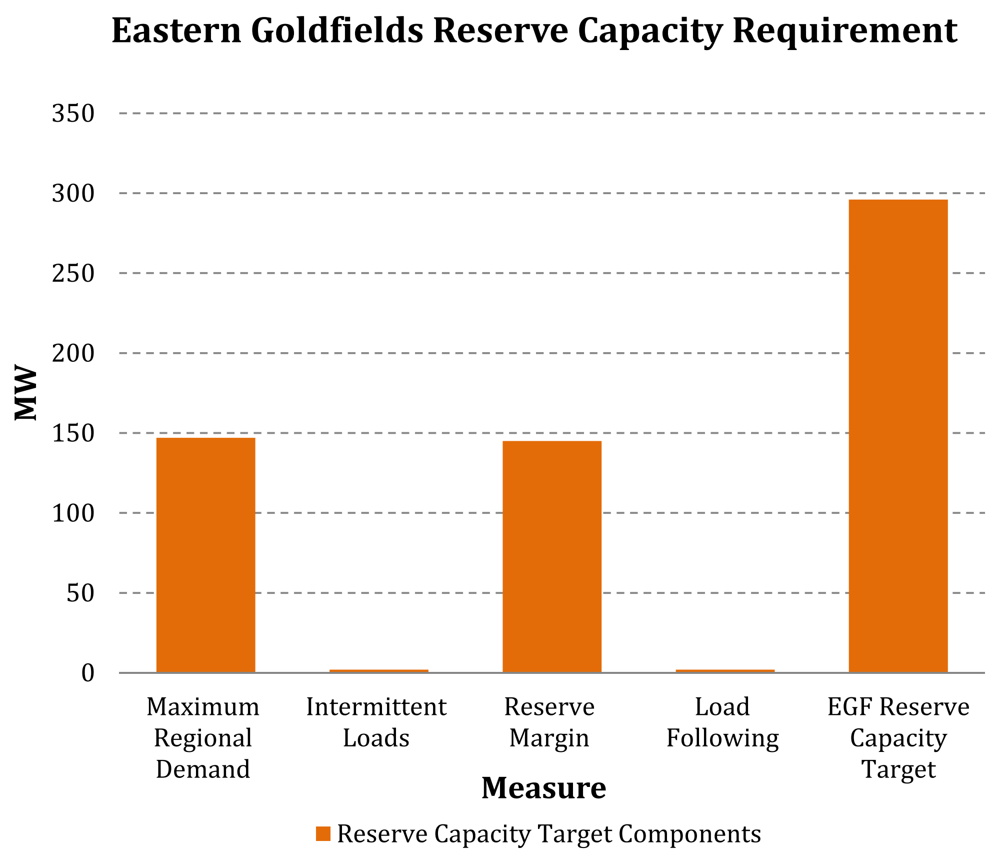

Figure 7 - Eastern Goldfields Reserve Capacity Requirement

Table 2 - Eastern Goldfields Reserve Capacity Requirement

Maximum Regional Demand (MW)	Intermittent Loads (MW)	Reserve Margin (MW)	Load Following (MW)	Total (MW)
147	2	145	2	296

9.7 Total Eastern Goldfields Capacity

The available EGF capacity is based on the available contracted capacity in the region. These values represent the contracted declared sent out capacity as opposed to the installed capacities available in the region. This is summarised in Figure 8 below and includes total generation in the region in addition to the maximum supportable demand provided by the 220 kV network.

A total of 300 MW of capacity is currently available in the EGF.

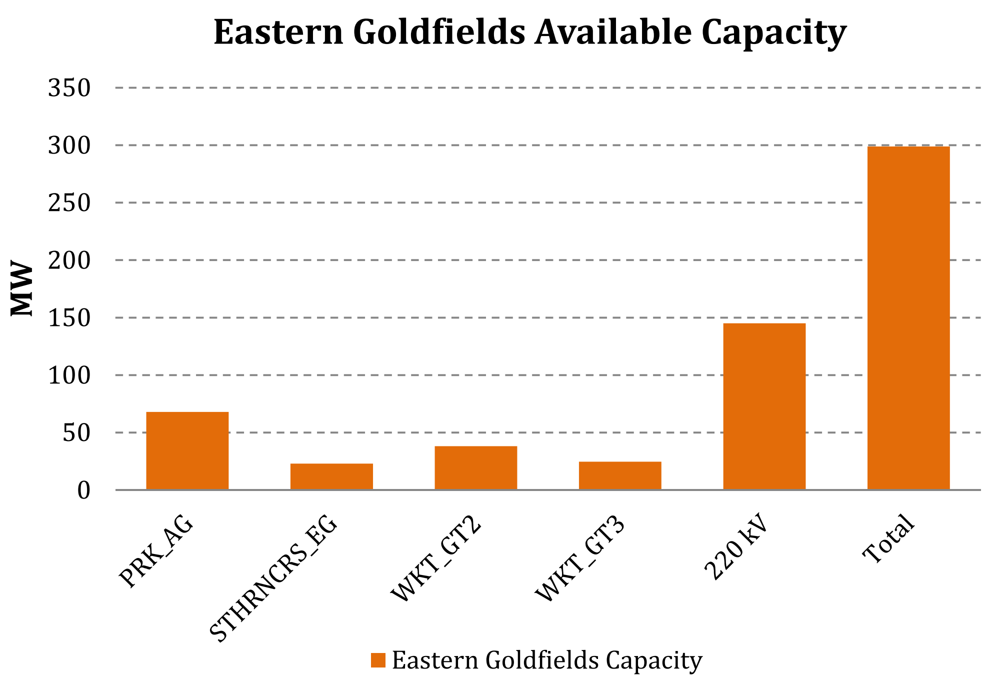

Figure 8 - Eastern Goldfields available capacity

9.8 Total Eastern Goldfields Capacity Verses Regional Reserve Capacity Requirement

Considering the current capacity of 300 MW in the EGF verses a regional RCR of 296 MW (after taking into consideration connection of additional EGF CAG demand) there will be insufficient capacity to meet the recommended 6 per cent reserve margin. Additionally, due to the small number of generator participants available in the EGF and the size of each connected generator, the retirement of any single generator would have a marked impact on the available capacity in the EGF region.

As an example, the retirement of Synergy's West Kalgoorlie turbine (WKT) GT3 or GT2 unit would reduce the existing capacity in the EGF by a significant amount. It is worthwhile to note that retirement of these units will have a negligible impact on the 1000 MW of surplus reserve capacity currently in the WEM, but would have a large impact on the EGF region. This reflects the relative difference in the value of capacity in local regions verses the WEM as a whole.

Figure 9 summarises the EGF regional reserve capacity requirement verses the available capacity in the region. The retirement of either WKT GT3 or WKT GT2 would result in a shortfall of approximately 20 MW and 35 MW respectively, in comparison to the regional RCR.

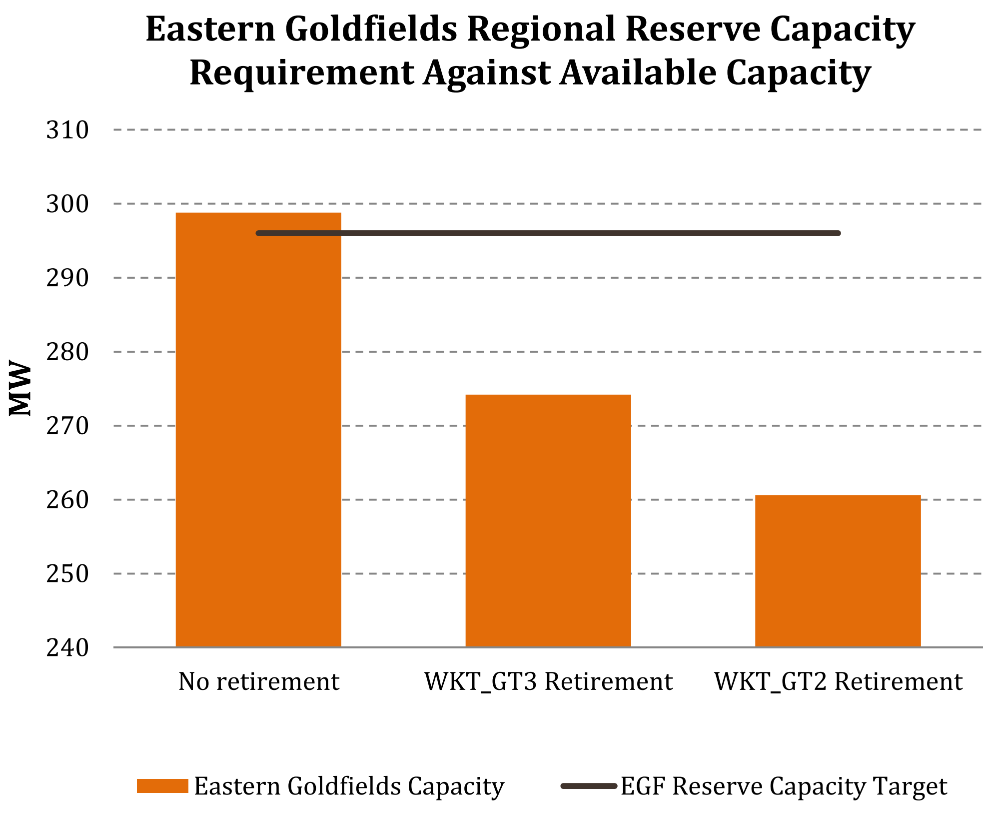

Figure 9- Eastern Goldfields capacity shortfalls assuming retirement of Synergy units

Synergy's WKT GT2 and GT3 were installed in 1984 and 1989 respectively and legacy commercial arrangements that underpinned their installation may no longer exist, or may expire in the near future. The existing Dispatch Support Contracts which provide support to the local EGF network expire in 2017. Therefore, incentives to encourage the continued operation of generation facilities in local regions would ideally be considered as part of the capacity market design. Retirement of any of Synergy's West Kalgoorlie units will result in insufficient capacity in the region to supply existing load and future customer connections.

A number of the larger loads connections in the EGF have requested that the region be supplied from the SWIN in favour of local generation options. The supply of larger load connections in the EGF from the network may result in existing generation facilities losing foundation customer loads. A capacity price which reflects the requirement for these generators to either remain connected or for them to be replaced by other local generation options would support the reliability of power supply to the EGF region.

Western Power emphasises that this case study is indicative of a general market design issue rather than concern specific to the EGF. There are other regions on the network where there is a shortage of generation capacity relative to localised peak demand.