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Department of Finance
Public Utilities Office

Electricity Market Review

Options Paper

Electricity Market Review Steering Committee

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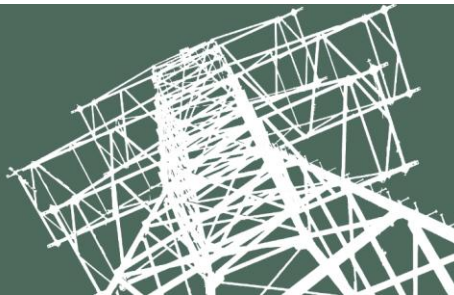

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Disclaimer ---- **ii**
1. Executive summary, findings and recommendations ---- **1**
1.1. Introduction and the Review Objectives ---- *1*
1.2. The problem of increasing costs for electricity services ---- *2*
1.3. Industry structure ---- *4*
1.4. The wholesale electricity market ---- *6*
1.5. The electricity network ---- *8*
1.6. Energy Safety ---- *9*
1.7. Institutional arrangements ---- *10*
1.8. Implementation and Transition ---- *11*
1.9. Recommendations ---- *11*
2. The South West Interconnected System – the need for reform ---- **13**
2.1. Introduction ---- *13*
2.2. The South West Interconnected System ---- *13*
2.3. The cost of supplying electricity ---- *17*
2.4. Industry structure in the SWIS ---- *19*
2.5. The Wholesale Electricity Market ---- *26*
2.6. Findings ---- *33*
3. A competitive industry structure ---- **35**
3.1. Introduction ---- *35*
3.2. Increasing competition in generation ---- *35*
3.3. Increasing competition in the retail sector ---- *42*
3.4. Restructuring or divesting Synergy's portfolio ---- *46*
3.5. The primary fuels industry and market ---- *47*
3.6. Findings ---- *50*
4. Improving market outcomes - market design options ---- **52**
4.1. Introduction ---- *52*
4.2. The Reformed WEM option ---- *53*
4.3. The NEM Energy-only option ---- *60*
4.4. Stakeholder comments: the NEM Energy-only option ---- *65*
4.5. Comparison of options ---- *66*
4.6. Impact on government ---- *76*
4.7. Findings ---- *80*
5. Network arrangements ---- **83**
5.1. Introduction ---- *83*
5.2. Transmission access and congestion ---- *83*
5.3. Obligation to connect customers to the network ---- *88*
5.4. Cost reflectivity of network tariffs ---- *89*
5.5. The need for better metering technology ---- *90*
5.6. Adequacy of access to capital funds ---- *91*
5.7. Safety regulation ---- *92*
5.8. Adoption of the national framework for network regulation ---- *93*
5.9. Findings ---- *93*
6. Regulatory and institutional arrangements ---- **95**
6.1. Overview of current arrangements ---- *95*
6.2. Assessment of existing arrangements in the SWIS ---- *97*
6.3. Institutional arrangements under the NEM Energy-only option ---- *103*
6.4. Findings ---- *103*
7. Transition, sequencing and implementation costs ---- **105**
7.1. Introduction ---- *105*
7.2. Implementation ---- *105*
7.3. Transitional arrangements ---- *106*
7.4. Changes to industry structure ---- *107*
7.5. Market design reform ---- *108*
7.6. Regulation and market governance ---- *109*
7.7. Sequencing ---- *110*
7.8. Findings ---- *111*
Appendix 1 – Terms of Reference ---- **114**
Appendix 2 – Modelling assumptions ---- **118**

A2.1 Energy and demand ---- *118*
A2. 2 Fuel Costs ---- *121*
A2. 3 New entrant costs ---- *122*
Appendix 3 - Glossary ---- **123**

Index of tables

Table 1: Plant configuration with two generation portfolios **39**
Table 2: Plant configuration with three generation portfolios **40**
Table 3: Total Net Present Value cost from 2016 to 2030 (real $2014 prices) **69**
Table 4: Impact of forecast error as percentage of Reserve Capacity Requirement on reserve capacity annual cost ($million) ($2014) **74**

Index of figures

Figure 1: Costs and cost components for supply of electricity services to residential customers in different Australian electricity systems, 2013-14 ..... **3**
Figure 2: Modelled energy costs for residential electricity customers under alternative wholesale electricity market arrangements **7**
Figure 3: The South West Interconnected System **14**
Figure 4: The load duration curve and available capacity on the SWIS, 2013 ..... **16**
Figure 5: Comparative adjusted costs for Synergy to provide residential electricity in the SWIS ($2014) **17**
Figure 6: Comparative adjusted residential retail costs across Australian jurisdictions, 2014 ..... **18**
Figure 7: Residential retail cost stack (including the TEC in the case of SWIS), 2013-14 ..... **18**
Figure 8: Generation market shares by plant nameplate capacity and energy production, 2013-14 ..... **20**
Figure 9: Generation market shares by energy produced, 2006-07 and 2013-14 ..... **21**
Figure 10: Composition of market shares by load tranche (MWh Generated 2013-14) **21**
Figure 11: Market share by total customer load **23**
Figure 12: Retail market share 2012-13 ..... **24**
Figure 13: Amount by which the A1 tariff exceeds notional competitive market prices **25**
Figure 14: Composition of capacity since market commencement **27**
Figure 15: Installed and excess capacity measures, 2013-14 ..... **29**
Figure 16: WEM historical forecasts compared to actual demand **30**
Figure 17: Historical reserve capacity requirement **31**
Figure 18: Wholesale price outcomes (comparison of time weighted prices in an energy-only market for a two and three entity structural separation of synergy generation) **41**
Figure 19: Capacity price curves **56**
Figure 20: Maximum capacity price curve for Reformed WEM capacity mechanism **57**
Figure 21: NEM electricity annual contract volumes by type **63**
Figure 22: NEM electricity annual contract volumes by region **64**
Figure 23: Entrant plant by plant type - baseline scenario **68**
Figure 24: Annual average wholesale price for all options, baseline line demand. **69**
Figure 25: 2020 price duration curves (nominal $/MWh) **70**
Figure 26: Projected Reserve Capacity Price – Status Quo baseline case **71**
Figure 27: Reserve Capacity Price outcomes for three demand cases **71**
Figure 28: Projected Reserve Capacity Price and excess capacity – Reformed WEM option baseline **72**
Figure 29: Capacity price outcomes with different demand projections – Reformed WEM option **73**
Figure 30: A1 Tariff class per unit energy cost – Baseline case **75**
Figure 31: Tariff savings A1, L1 and L3 – baseline case **76**
Figure 32: Potential future trajectories of the retail electricity subsidy ($million) **77**
Figure 33: Estimated Total Cost Savings ($ per MWh Real 2014) **79**
Figure 34: Forecast Subsidy **79**
Figure 35: Timeline for Reformed WEM option **112**
Figure 36: Timeline for the NEM Energy-only option **113**

1. Executive summary, findings and recommendations

1.1. Introduction and the Review Objectives

On 6 March 2014, the Minister for Energy launched the Electricity Market Review (the Review), which covers the structure, design and regulatory regime of the electricity industry in the south-west of the State (the South West Interconnected System), including a review of the principal market institutions. The Minister expressed concern that there has been a deterioration in the efficiency and effectiveness of the electricity industry operating in the South West Interconnected System that is leading to higher costs for electricity.

The Terms of Reference for the Review (Appendix 1) specify three objectives (the Review Objectives):

- Reducing the costs of production and supply of electricity and electricity related services, without compromising safe and reliable supply.
- Reducing Government exposure to energy market risks, with a particular focus on having future generation built by the private sector without Government investment, underwriting or other financial support.
- Attracting to the electricity market private-sector participants that are of a scale and capitalisation sufficient to facilitate long-term stability and investment.

Substantial consultation occurred during the course of the Review with industry participants and other stakeholders.

The Review published a Discussion Paper on 13 August 2014, presenting views on the causes of high costs and prices for electricity services in the South West Interconnected System and canvassing the matters to be considered by the Review in presenting recommendations and options to the Western Australian Government.

The Review received 51 written submissions in response to the Discussion Paper. These submissions (with the exception of a few submissions containing commercially sensitive information) have been published on the Public Utilities Office website.[1]

In addition to receiving written submissions, many discussions were held during the course of the Review with industry participants and other stakeholders.

The Steering Committee acknowledges the substantial investment made by many parties in making submissions to the review and in meeting for discussions.

The Review has also sought expert advice and analysis from consultants with relevant expertise, in particular addressing:

- Components of retail costs (Sapere Research Group).
- Transmission and distribution, access and regulation (Frontier Economics).
- Transmission and distribution (Incenta Economic Consulting).
- Historical and projected performance of the National Electricity Market and the Western Australian Wholesale Electricity Market (ACIL Allen Consulting).

[1] http://www.finance.wa.gov.au/cms/Public_Utilities_Office/Electricity_Market_Review/Electricity_Market_Review.aspx

- Fuels for electricity generation (KPMG and RISC).
- Transitional Arrangements and considerations (ACIL Allen Consulting and Farrier Swier).

The reports of these consultants are available on the Public Utilities Office website.

This Options Paper is the final report of the first phase of the Review. In accordance with the Terms of Reference for the Review, the Options Paper presents recommendations and options for Government to consider in addressing the problems of high costs and prices for electricity services. It builds on material presented in the Discussion Paper and has been informed by the feedback received in submissions and stakeholder engagement sessions.

This chapter summarises consideration of each of the matters raised in the Terms of Reference, presents the Review's findings and presents the Review's recommendations.

The Terms of Reference contemplate that this Options Paper will be followed by a second phase of detailed planning and design for the reforms that Government chooses to implement. Therefore, once Government has determined the path of market reform, it is expected that the Review may move to a detailed design phase to develop plans for the implementation of the approved market reform program.

1.2. The problem of increasing costs for electricity services

Several characteristics of the South West Interconnected System have been important considerations for the Review, as they have been for previous reviews of the sector. These characteristics are:

- The South West Interconnected System is a relatively small electricity system in terms of total energy demand, but covers a large geographic area.
- The South West Interconnected System lacks interconnection with other electricity networks and systems. It must, therefore, be self-sufficient in having adequate installed generation capacity to meet peak electricity demand and reliability standards.
- The South West Interconnected System has a peaky electricity demand. As a result of mild winters and high summer temperatures during heatwaves, high electricity demand tends to occur for very short periods of time during the summer months.

Up until the late 2000s, electricity demand grew rapidly year on year as it had done for several decades, driving requirements for investment in generation and network capacity. However, growth in electricity demand from the South West Interconnected System has tapered off since then. Future projections of demand for grid-supplied electricity are for much lower rates of growth, and are also increasingly uncertain in the face of emerging technologies for small-scale (distributed) electricity generation, energy efficiency and local battery storage.

The emergence of these disruptive technologies and the associated evolution of consumer behaviour and expectation, will pose fundamental questions of the regulatory and competitive frameworks that govern the operation of the electricity market as we know it. While technology and consumer-behavioural change is not the focus of this paper, the management of their impacts is nonetheless consistent with the Review Objectives in so far as they will be best addressed by a market which is characterised by high levels of effective competition, low levels of Government participation and heightened opportunity for

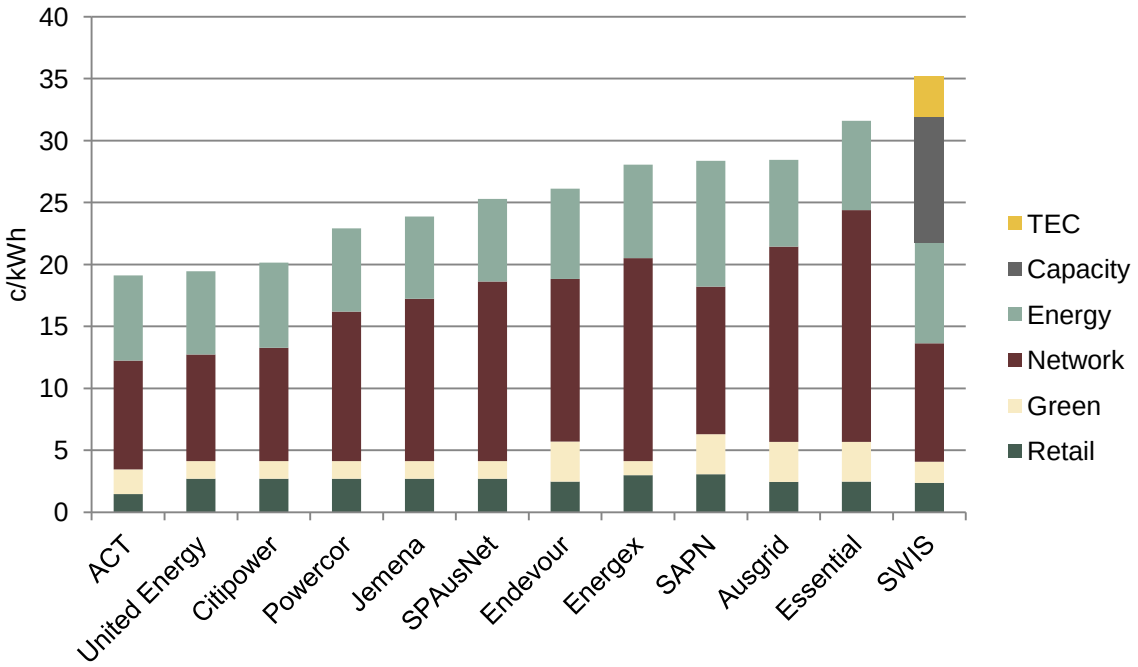
consumers to exercise choice. A dynamic market with these characteristics will be best placed to respond to emerging challenges with innovative and customer-needs driven solutions.

The current industry structure and market mechanisms for the South West Interconnected System are not delivering the outcomes expected in 2006 when reforms were implemented to introduce competition into the market and provide industry participants with additional incentives for investment.

Between 2006-07 and 2013-14 the cost of providing electricity to residential customers in the South West Interconnected System increased by 61 per cent.

A comparison across Australian jurisdictions of the component costs of electricity supply for residential customers indicates that wholesale energy costs are a significant contributor to the higher costs in the South West Interconnected System (Figure 1). Wholesale energy costs (comprising energy and capacity costs) are substantially higher in the South West Interconnected System than any other distribution area, and about 80 per cent higher than the next highest distribution area in South Australia (SAPN), which is also the most similar distribution area to the South West Interconnected System in terms of system size, generation fuel mix and demand characteristics.

Figure 1: Costs and cost components for supply of electricity services to residential customers in different Australian electricity systems, 2013-14



Source: Sapere 'Electricity Market Review - Components of Retail Tariffs' and Public Utilities Office analysis.

Note: TEC is the Tariff Equalisation Contribution collected from distribution connected customers in the SWIS to fund the subsidy of electricity services in regional (non-SWIS) areas of Western Australia.

The Review has identified the increasing costs of electricity generation as the major driver of electricity costs. This is different to the situation in other major Australian electricity systems where generation costs have tended to remain flat while rising costs and prices have been driven by increased charges for transmission and distribution networks. While network tariffs

have also been a component of the increasing costs of electricity services in the South West Interconnected System, they have contributed less than the increase in generation costs.

The Review finds that the principal reasons for the high cost of generation in the South West Interconnected System are:

- An industry structure where the wholesale and retail markets are dominated by the state-owned generation and retail business leading to a lack of competitive market discipline to constrain prices charged to residential and small business customers.
- The capacity plus energy design of the wholesale electricity market under which the Reserve Capacity Mechanism has led to electricity customers paying a higher price for reserve capacity than they need to, while surplus generation capacity has been procured based on forecasts of energy demand that have not been realised, with the cost largely passed through to electricity customers.

The Review finds that, for the Review Objectives to be met, the current industry structure and the current market mechanisms cannot continue.

Three major reforms are needed to prevent the industry continuing on its current path of high and rising costs: reducing the market dominance of Synergy to create a more competitive generation sector, the introduction of full retail contestability and reform of the wholesale electricity market mechanisms (particularly the Reserve Capacity Mechanism).

If these reforms are pursued, the downward pressure on costs will provide Government with the opportunity to cease subsidising electricity services, currently costing about half a billion dollars per year and will relieve the State of the need to underwrite or fund industry investment.

1.3. Industry structure

Despite market reforms to the electricity sector in 2006, only limited competition has developed. Where competition has become established there has been a benefit to electricity customers – however this has mainly been for large commercial users and particularly in recent years when there has been a surplus of generation capacity. Where competition has been stifled or prevented from developing, such as in the small-business and residential customer segments, the costs of providing electricity services have increased and there have been large flow-on increases to electricity prices and related government subsidy payments.

Synergy (previously Verve Energy) is the dominant generation business. Concern over Synergy's market dominance constitutes a barrier to entry for new generation.

Growth in the South West Interconnected System since the reforms of 2006 and changing technology mean it is now possible to alter the industry's structure to achieve greater competition, lower costs, exert downward pressure on prices and lower electricity subsidies for the Western Australian Government.

Reforms to industry structure are a threshold issue in addressing problems in the electricity industry. Reforms to the retail and wholesale electricity markets will only deliver benefits if reforms to industry structure are undertaken before wholesale and retail market changes are effected.

In the generation sector, having four or five major market participants is expected to be necessary to achieve and sustain the level of competition that will drive efficiencies and lower costs. Two major market participants may emerge from the portfolios of existing private generators, so achieving a competitive generation sector requires restructuring or divesting a proportion of the generation assets of Synergy. The Review considers that this should be undertaken with a view to creating three generation portfolios from the current Synergy generation portfolio.

In the retail sector, greater competition in providing electricity services to customers can be achieved by introducing full retail contestability for small-business and residential customers, allowing existing and new retail businesses to expand their activities into the small-use customer sector.

Extending retail competition to small-use business and residential customers is fundamental to achieving sufficient competition in the retail electricity market to drive efficiencies and cost reductions through the electricity supply chain.

In restructuring Synergy's generation portfolio or undertaking strategic asset sales, further analysis should be undertaken during the detailed design phase of the composition of divested or restructured generation portfolios and the extent to which one or two of them should be a combined generation and retail (gentailer) activity. The Review recommends against restructuring the generation portfolios of Synergy to create gentailers for all restructured entities as this may impede the development of a liquid and active wholesale energy market and the related market in financial and risk management instruments.

The restructured or divested generation portfolios should be established in a manner that facilitates and encourages competition and with a reliance on national frameworks of competition law. While the Review recommends that these portfolios be separately managed with independent boards, corporate management and commercial decision making, ultimately these will be matters to be considered by Government during the detailed design phase of the reforms.

Eventual privatisation of at least some of the generation portfolios is desirable and to some extent inevitable if reform is to achieve an efficient and competitive wholesale electricity market that creates incentives and pressures for cost minimisation. Future changes in ownership of the restructured Synergy portfolios would also assist in achieving the Review's objectives in reducing Government exposure to energy market risks, ensuring that future generation is built by the private sector and removing the need for the Government to underwrite investments or provide other financial support.

The cost and availability of primary fuels are important considerations in shaping the industry's costs. Both Government and electricity industry participants have concerns over the primary fuels market. These concerns include increasing primary fuel prices, market concentration and instability in the coal sector. The Review considers that events in both the gas and coal industries indicate that fuel suppliers and electricity generators are dealing commercially with potential short-term supply constraints for both gas and coal. The Review does not see any reason for greater government intervention in the gas or coal industries to secure supply or impose new market arrangements.

Restructuring Synergy into competing generation portfolios will assist the resolution of fuel supply issues by introducing competitive pressures into the supply of fuels with competing

companies seeking to gain an advantage through their fuel supplies as well as through efficiencies in their generation process.

1.4. The wholesale electricity market

The design features of the current Wholesale Electricity Market (WEM) have been a major contributor to the high cost of electricity generation in the South West Interconnected System. The Review has considered two options for a new market mechanism for the South West Interconnected System.

The first option is to substantially change the existing market arrangements while retaining a capacity plus energy wholesale electricity market in Western Australia. This Reformed WEM option embodies the following principal reforms to the current market arrangements:

- A revised Reserve Capacity Mechanism that utilises a capacity auction to acquire generation capacity with the intention that the price paid is based on a more competitive process than the current arrangements.
- A revised reliability criterion for the South West Interconnected System which determines the amount of generation capacity that is to be procured to meet reliability standards.
- An enhanced energy market mechanism to promote greater competition between generation facilities by individual facility bidding and transparent real-time pricing in the market.

The second option is for the South West Interconnected System to become an unconnected region of the National Electricity Market (NEM). This NEM Energy-only option involves adopting the market arrangements of the National Electricity Market together with the National Electricity Rules governing the energy market, regulation of electricity networks and retail arrangements. Operation of the wholesale electricity market would shift from the Independent Market Operator in Western Australia to the Australian Energy Market Operator.

The Reformed WEM option would involve fewer changes to the current market arrangements than the NEM Energy-only option. It would retain the same market manager and similar regulatory arrangements. The major changes to the market arrangements would occur through the existing process for changes to the Wholesale Electricity Market Rules that govern the existing market.

Combined with the reforms to industry structure and full retail contestability, the Reformed WEM option would deliver a more competitive market than the status quo. Retention of a capacity mechanism would retain incentives for the inefficient use of plant and to keep plant open only to collect capacity payments but these incentives would be countered by competitive wholesale and retail markets. The improved energy market is intended to result in a more competitive and transparent market allowing electricity retailers to minimise their wholesale energy costs.

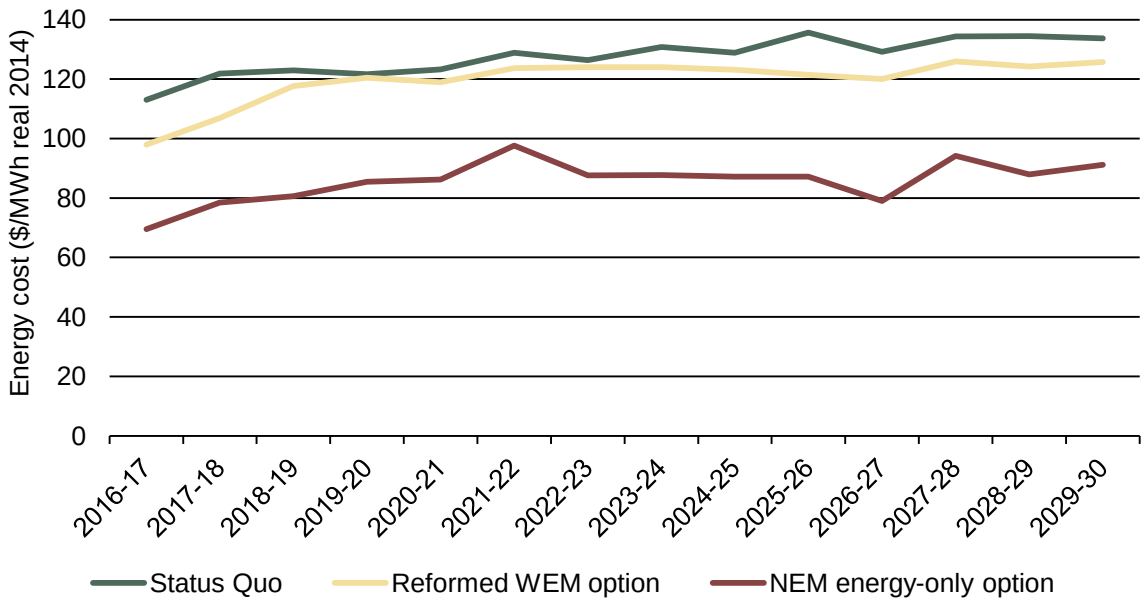
The NEM Energy-only option is a major change from existing market arrangements, although it involves applying the well-tested market arrangements that have been in operation in the National Electricity Market for over 15 years.

Modelling of electricity market outcomes under the two reform options indicates that both options would produce benefits over existing wholesale electricity market arrangements.

Energy costs are projected to be about 6 per cent lower under the Reformed WEM option and about 30 percent lower under the NEM Energy-only option over the period to 2030 than compared to the current wholesale electricity market arrangements (Figure 2).

Total cost savings for electricity customers are estimated at approximately $50 million per annum under the Reformed WEM option and $250 million per annum under the NEM Energy-only option.

Figure 2: Modelled energy costs for residential electricity customers under alternative wholesale electricity market arrangements



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Comparison of the two options for reform of the wholesale electricity market indicates clearly that retaining the capacity plus energy market in Western Australia results in higher costs than moving to the energy-only market arrangements of the National Electricity Market. This is because there is an extra impost on consumers arising from the capacity payment which would not arise in a well functioning market. This impost becomes greater if forecasts of load requirements are too high, which they have been in recent years.

Reforming the wholesale electricity market to adopt the market arrangements of the National Electricity Market provides the greatest opportunity to achieve the Review Objectives.

Adopting the market arrangements of the National Electricity Market will provide better outcomes for electricity customers in the South West Interconnected System for the following reasons:

- The price of electricity generation under this option will be lower than it will be under the Reformed WEM option as it will not include an explicit additional payment for capacity and nor will generation costs be affected by the accuracy of a centralised forecast of electricity demand.

- Lower electricity costs will result in less upward pressure on residential tariffs and will allow the Western Australian Government to reduce and perhaps eliminate subsidies in the South West Interconnected System.
- The Western Australian Government can ensure the market continues to have a mechanism in place to maintain a continuous safe level of reserve capacity. This could be through the maintenance of a reserve trader role. This can be put in place before the State enters the National Electricity Market in the form of a derogation to the National Electricity Rules.
- The National Electricity Market is the low risk option. It is a stable well-governed market in which the market institutions perform at a high standard at a relatively low cost. It is a developed national capability that Western Australia can now access. The Reformed WEM option is untested and will be a unique market mechanism requiring a considerable development effort.
- The Western Australian Government would retain important powers in its electricity industry as a member of the National Electricity Market. In particular, the Minister for Energy's powers to administer the market or intervene in other ways in the event of an emergency would remain.
- Similar markets commenced in Singapore and New Zealand when they were of a similar size to the South West Interconnected System and had a similar, if not lesser, number of competing generators than is being recommended in this Review. These markets have maintained sufficient competition to ensure market-based outcomes without the need for intervention or a capacity payment.
- The National Electricity Market operating in the South West Interconnected System would attract national financial institutions, such as the Australian Stock Exchange, offering financial products and national energy companies, such as Origin and AGL, supporting new investment and competition.

1.5. The electricity network

The network component of the electricity supply chain is an important element of a well-functioning electricity market. Networks not only transport electricity from generators to consumers but also have an important role in facilitating effective competition in wholesale and retail markets and in enabling secure and reliable energy supply at the lowest total system cost.

The Review finds that the efficiency of the electricity supply chain in the South West Interconnected System can be improved by reform of the planning, regulatory and funding arrangements of network infrastructure and services.

Connection to the Western Power Network has in the past required market participants to pay for unconstrained access to the network. This has meant that, not only have they needed to pay for their direct connection costs, they have also been required to pay additional costs arising throughout the network to prevent constraints arising from their connection. In recent years, Western Power has also offered constrained access so that the network has participants with both constrained and unconstrained access agreements.

Some industry participants have expressed concern that the unconstrained access approach is not ideal, as it can lead to inefficiencies in generation connection and can lead to overinvestment in the network. The Economic Regulation Authority in recent years has noted that while an unconstrained network approach facilitates simpler operation of the power

system and the wholesale market, it does not serve the Market Objectives for the following reasons:

- Unconstrained access does not promote the economically efficient supply of electricity because it is likely to cause investment in assets that may have a low utilisation.
- Unconstrained access creates a barrier to competition, as new entrant generators must pay the cost of network augmentation.
- It is not clear that unconstrained access minimises the long-term cost of supply, as the requirement may provide more reliability than customers are willing to pay for through increased electricity prices.[2]

Resolving this problem can be best achieved by adopting more flexible network planning criteria in the form of a constrained access model that facilitates more efficient investment decisions for both the network and generation plant.

Regulations currently impede Western Power from substituting stand-alone electricity systems in place of network services in regional areas. The regulations should be amended to allow the use of stand-alone electricity systems if they will reduce network costs and maintain or improve the quality of electricity services to customers.

Network pricing under the *Electricity Networks Access Code 2004* (Access Code) does not provide efficient pricing signals to electricity retailers, who are the users of the network services. Currently, there is very little regulatory obligation and guidance for Western Power to focus on the structure of its network tariffs. A more fundamental reform of how network tariffs are structured and costs recovered from customers in the South West Interconnected System is critically needed, in particular, having metering arrangements and tariff structures that ensure that the prices facing retailers and customers reflect the drivers of the costs of providing network services. Electricity retailers and customers need better network pricing signals to allow customers to make more informed decisions about how and when they use energy services and the technologies they invest in to help manage their energy use.

Without the right type of advanced metering technology, the benefits of providing cost reflective prices in network tariffs will be limited. A roll-out of advanced meters will foster competition and innovation in the retail electricity market and enable more efficient pricing of network and retail electricity services. This can be done through private-sector capital investment in metering assets facilitated by the competitive provision of metering assets and services.

Many of the deficiencies of the regulatory framework for electricity networks can be readily addressed by adopting the parts of the National Electricity Law and National Electricity Rules that deal with network regulation.

1.6. Energy Safety

Safety regulation of the Western Power Network is not undertaken within a clear performance-based regime that places the onus and responsibility on the regulated business

[2] Economic Regulation Authority, 2010 Wholesale Electricity Market Report to the Minister for Energy, June 2011, p. 25.

to determine how it will manage the safety of its operations, subject to requirements for transparency and reporting and the high-level oversight of the safety regulator. Government should support initiatives by Energy Safety to introduce a best practice regulatory regime through the proposed *Electricity (Network Safety) Regulations*.

1.7. Institutional arrangements

The Review addresses the institutional arrangements for the electricity sector, in particular the roles of the Independent Market Operator, the System Management business of Western Power and the Economic Regulation Authority. Reforms to these institutions are necessary to improve the operation of the electricity sector. To some extent the necessary reforms depend on the nature of reforms to the wholesale electricity market design.

If the Western Australian Government elects to adopt the Reformed WEM option, operation of the electricity sector would be improved by several institutional changes.

The System Management business should be moved out of Western Power and combined with the Independent Market Operator, allowing improved coordination of the technical operation of the electricity system with the economic and commercial operation of the Wholesale Electricity Market.

The decision making function for changes to the Wholesale Electricity Market Rules should be moved from the Independent Market Operator to avoid the potential for conflicts of interest.

The Review finds that a rule making committee made up of the chair of the Economic Regulation Authority, the Coordinator of Energy (from the Public Utilities Office) and the chair of the merged Independent Market Operator/System Management (or their respective nominees) would provide a less conflicted process.

If the Western Australian Government elects to adopt the market arrangements of the National Electricity Market, several functions currently undertaken by the Independent Market Operator and System Management would transfer to the National Electricity Market institutions. The Australian Energy Market Operator would undertake the day to day management of the market and the Australian Energy Market Commission would manage the governance of the market, giving consideration to the efficient operation of the market and processing proposed rule changes.

Regardless of the reforms to electricity market arrangements implemented as a result of this Review, it is likely that the Western Australian Government will retain regulation of retail electricity prices until it is satisfied that there is adequate competition in the retail electricity market to make price regulation unnecessary. Submissions have emphasised the importance of a transparent tariff setting process and if retailers operating in the National Electricity Market are to enter the retail market in the South West Interconnected System, they will want assurance that an independent regulatory body is setting retail tariffs with reference to efficient costs. In order to promote participation in the market by private sector retailers, responsibility for regulation of retail prices should move from the Minister for Energy to independent regulation by the Economic Regulation Authority or regulation should require the Economic Regulation Authority to conduct an inquiry to inform the Minister for Energy's decision-making in respect of retail prices.

1.8. Implementation and Transition

Implementation of reforms identified in this Options Paper will involve the following major work streams:

- The significant restructuring or divesting of Synergy assets to reduce market concentration with a view to creating three competing generation portfolios.
- The introduction of full retail contestability.
- The management of a framework for subsidies and concessions.
- The introduction of new access codes and regulatory systems for the electricity network.
- The passage of legislation for adoption of the NEM or significant changes to the Wholesale Electricity Market.
- The design and application of transition measures to take the South West Interconnected System from its current architecture to a new one without disruption to services.

Transitional arrangements may require compensation for entities that have made investments on the understanding that existing structures and market mechanisms would remain. However, the grounds for compensation are limited, as detailed in Chapter 7.

A move to the National Electricity Market Rules for regulation of the transmission and distribution networks will require a transition mechanism and the management of the transfer of unconstrained access rights to the new regime.

In the cases of both the Reformed WEM option and the NEM Energy-only option a path will be needed to transition from the status quo to the new market mechanism. This will involve the estimation and maintenance of a safe reserve capacity level and the maintenance of contracts across the market supporting electricity supply to customers.

1.9. Recommendations

1. The generation assets of Synergy should be restructured or divested with a view to creating three competing generation portfolios each with a mix of baseload, mid merit and peaking generation assets.
2. One or two of the restructured or divested generation portfolios derived from Synergy could be a combined generation and retail (gentailer) activity. The Review recommends against restructuring the generation portfolios to create gentailers for all restructured or divested entities as this may impede the development of a liquid and active wholesale energy market.
3. When the generation portfolios formed from the restructuring or divesting of Synergy's assets are operating in a reformed electricity market, the Western Australian Government should consider the full or partial privatisation of some or all of the asset portfolios. This would reduce government exposure to energy market risks, remove the need for the Western Australian Government to underwrite investments or provide other financial support and increase the likelihood that future generation is built by the private sector.
4. Full retail contestability should be introduced as soon as is practical. The retail market should be open to dual retailing of both gas and electricity by all retailers.

5. Subsidies and concessions currently paid to or through Synergy should be made available to all relevant customers across all retailers.
6. The retail subsidy currently paid to Synergy (the Tariff Adjustment Payment) should be phased out as quickly as possible as wholesale electricity costs decline as a result of the reforms resulting from the Review.
7. The Tariff Equalisation Contribution, which is levied on users of Western Power's distribution network as a means of subsidising electricity services in regional (Horizon Power) areas should be paid directly as a Community Service Obligation from Western Australian Government revenue.
8. The Western Australian Government should maintain its present approach of facilitating commercial outcomes in the market for generation fuels.
9. The wholesale electricity market arrangements of the National Electricity Market should be adopted as these market arrangements provide the greatest opportunity to achieve the Review Objectives.
10. The new market arrangements should also include the adoption of the network-regulation arrangements and retailing rules applying in the National Electricity Market under the National Electricity Law and the National Electricity Rules.
11. Regulatory barriers to Western Power's substitution of stand-alone electricity systems in place of network services in regional areas should be removed, subject to adequate consumer protection measures being established to ensure that regional customers continue to receive electricity services at acceptable standards.
12. The Western Australian Government should support initiatives by EnergySafety to introduce a best practice regulatory regime through the proposed new *Electricity (Network Safety) Regulations*.
13. Advanced meters should be rolled out across the South West Interconnected System. This will foster competition and innovation in the retail electricity market and more efficient pricing of network and retail electricity services. Metering services should be open to competition.
14. The task of setting regulated retail electricity tariffs should be undertaken by the Economic Regulation Authority. Over time, as retail competition improves, price regulation should evolve from a tariff setting to a price monitoring function.

2. The South West Interconnected System – the need for reform

2.1. Introduction

The Review addresses the electricity industry and electricity market in the South West Interconnected System in Western Australia (SWIS).

This chapter provides a brief description of the SWIS and identifies the reasons for its high costs of electricity in comparison with other major Australian electricity systems. This high cost of electricity supply in Western Australia and the associated high cost of a government subsidy for small-use customers is the main reason for the proposed reforms to industry structure and market mechanisms identified by the Review.

The high and increasing cost of electricity generation in the SWIS is contrary to the situation in other major Australian electricity systems, where generation costs have tended to remain flat and rising costs and electricity prices have been driven by increased network tariffs. While network tariffs have also been a component of the increasing costs of electricity services in the SWIS, they have been of a second order compared to the increase in generation costs.

The costs of operation and maintenance of generation plant and the fuel input costs in the SWIS are more expensive than the most efficient generators in eastern Australia but not markedly so. The Review finds that the principal reasons for the high cost of generation in the SWIS, contributing to the requirement for a high level of government subsidy, are:

- An industry structure where the wholesale and retail markets are dominated by a State-owned generation and retail business leading to a lack of competitive market discipline to constrain prices charged to electricity consumers.
- The capacity plus energy design of the Wholesale Electricity Market (WEM) in the SWIS, under which the Reserve Capacity Mechanism has operated in such a manner that electricity customers pay a higher price for reserve capacity than they need to. Adding to this, surplus generation capacity has been procured on the basis of forecasts of energy demand that have not been realised, with the cost largely passed through to electricity customers.

If the Review objectives are to be met, it is clear that the current industry structure and the current market mechanism cannot be continued.

2.2. The South West Interconnected System

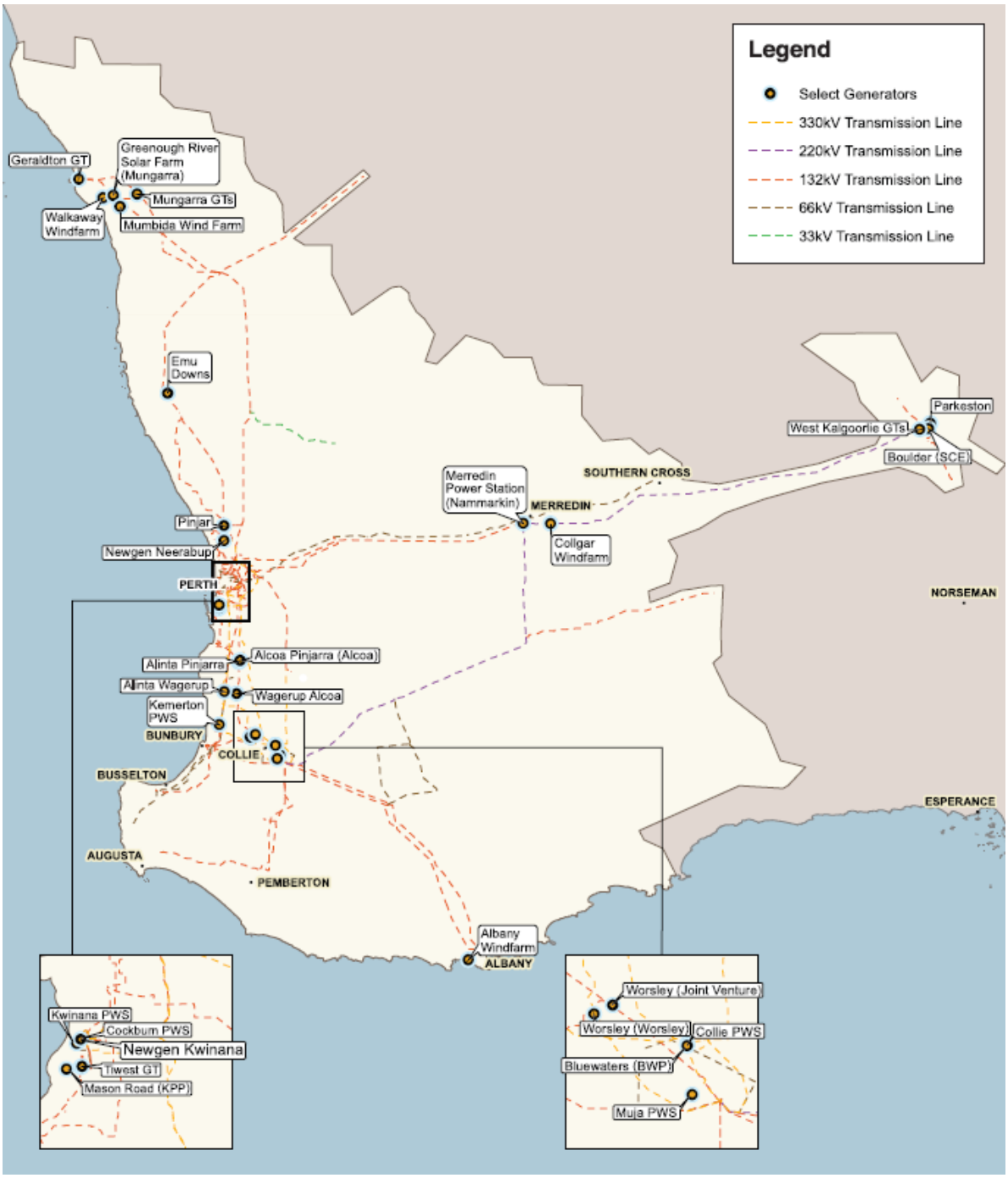
The SWIS comprises the power stations, network service providers, retailers and consumers electrically interconnected through the South West Interconnected Network.

The SWIS extends south to Albany, north to Kalbarri and east to Kalgoorlie, and it covers an area of 261,000 square kilometres (see Figure 3). It serves 1.05 million customers, 99.8 per cent of whom are small-use customers[3], with the other 0.2 per cent being large-use (mostly commercial and industrial) customers.[4]

[3] As defined by the *Code of Conduct for the Supply of Electricity to Small Use Customers.*

[4] Western Power 2013 Annual report.

Figure 3: The South West Interconnected System



Source: Provided by Western Power.

The conventional supply chain for electricity services delivery is made up of power stations operated by electricity wholesalers, high voltage transmission lines, low voltage distribution lines, retail supply businesses and consumers.

Distributed generation has become increasingly common in recent years, involving generally small-scale generation connected directly into the distribution network and self-generation by electricity customers through solar photovoltaic panels on rooftops. Demand-side management has also become common in various forms including direct participation as a virtual generator in the wholesale electricity market, through commercial agreements between major consumers and wholesale or retail supply businesses and by individual

consumers themselves curtailing or reducing electricity use during periods of peak system load to reduce their exposure to electricity charges.

Several characteristics of the SWIS are important in any consideration of industry structure and market mechanisms and these have been taken into account during this review:

- The SWIS is a relatively small electricity system in terms of total energy demand, albeit with a large geographic coverage of the network. As a consequence, the optimal scale of generation plant tends to be relatively small in comparison with other electricity systems.
- The SWIS lacks interconnection with other electricity networks and systems. It must, therefore, be self-sufficient in having adequate installed generation capacity to meet peak electricity demand and reliability standards. This is a different situation to the electricity systems of the eastern states of Australia where the systems are interconnected and can provide some interstate reserve.
- The SWIS has a peaky electricity demand in comparison to most other electricity systems. As a result of mild winters and high summer temperatures during heatwave events of relatively short duration, high electricity demand tends to occur for very short periods of time.

These characteristics were important considerations in government decisions of the early to mid 2000s when the current industry structure and market mechanisms were established. With a view to introducing competition into the electricity market, these reforms aimed to provide industry participants with additional incentives for investment in new power stations in a small and isolated electricity system with an outlook, at the time, of continuing high rates of growth in electricity demand.

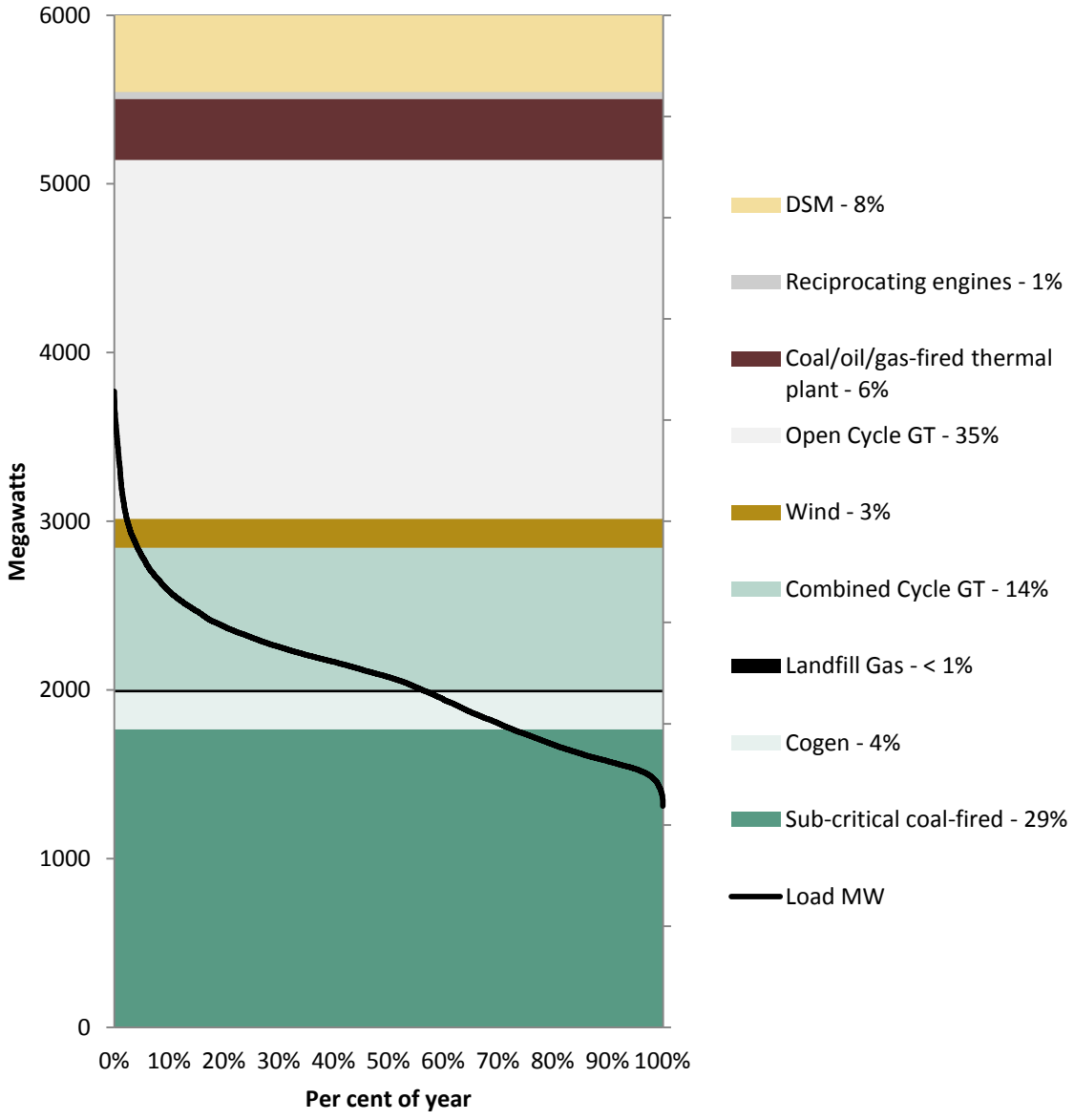
Since current industry arrangements were established, there has been a change in trends of electricity demand in the SWIS. Up until the late 2000s, electricity demand grew relatively rapidly year on year as it had done for several decades, driving requirements for investments in generation and network capacity. However, growth has tapered off since the late 2000s due to factors such as penetration of distributed generation and consumer investments in energy efficiency in response to increasing electricity prices. Future projections of demand for grid-supplied electricity now encompass lower rates of growth and are also increasingly uncertain in the face of emerging technologies for distributed generation, energy efficiency and local battery storage.

The industry structure and market design are now giving rise to excessive increases in electricity costs and causing the current system to be unsuitable for providing electricity consumers with efficiently delivered and priced services.

Figure 4 shows the current quantities of generation capacity as a background to the 2013 load duration curve for the SWIS. Each point on the load duration curve reflects the percentage of the year that demand exceeds a certain level. The figure shows the excess of capacity on the SWIS, particularly the excess of peaking and demand-side management capacity that has been introduced under the Reserve Capacity Mechanism. On average the system uses about 35 per cent of available capacity, with capacity in excess of the peak being over 2,225 MW, or about 37 per cent of capacity. This is high by the standards of most electricity systems but the estimation of the annual required level varies with the characteristics of each system. As noted above, the SWIS is an isolated network, unable to access capacity in a neighbouring system in the event of a major plant failure and demand is

peaky and has grown rapidly at times. There is, therefore, a legitimate bias towards conservatism when setting the reserve capacity requirement for the SWIS. However, it is also clear from Figure 4 that the Reserve Capacity Mechanism has acquired excessive and unnecessary levels of reserve to the detriment of consumers and the Western Australian Government, who pay for a large proportion of it.

Figure 4: The load duration curve and available capacity on the SWIS, 2013



Source: IMO data, Public Utilities Office analysis.

Since the commencement of the WEM in 2006 about 50 per cent of the new capacity brought into the market has been peaking and demand-side management. It has entered the market because of a consistent and substantial price being offered for new capacity when for much of this time none has been needed.

Changes in the SWIS and the broader electricity industry environment since the industry and market reforms of the mid 2000s create opportunities to address the current problems of the

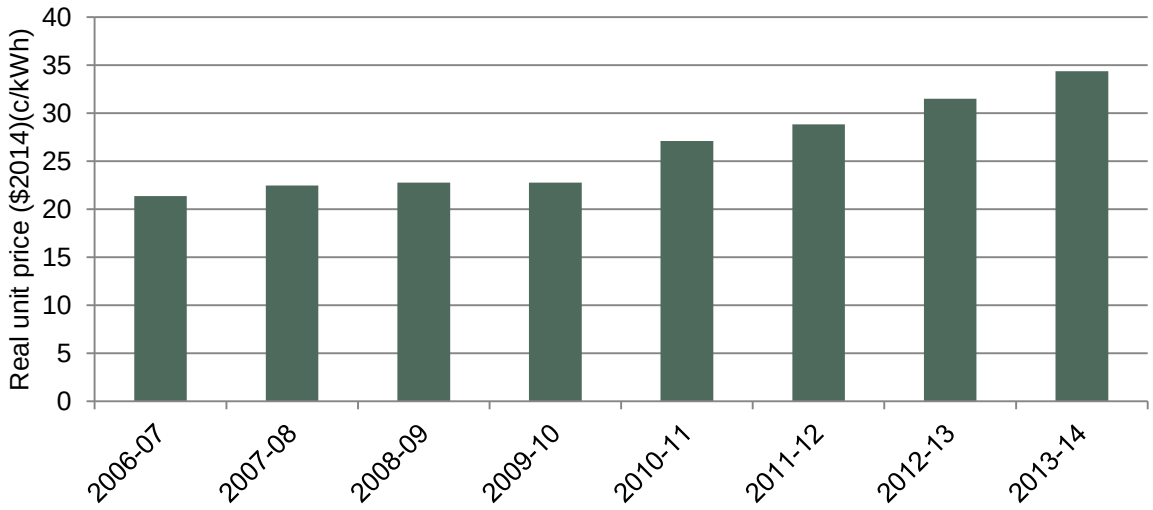
sector. The SWIS is now over 1.4 times the size that it was in 2005 in terms of total electricity demand,[5] allowing greater scope for competition between generation and retail businesses. The information technology and financial arrangements for electricity market systems have advanced considerably over the past 10 years allowing greater opportunities for innovation and competition in wholesale and retail markets. New technologies in metering and distributed generation allow for greater consumer participation in the market rather than consumers being passive recipients of electricity as a regulated utility service.

2.3. The cost of supplying electricity

The problem in Western Australia of high and increasing costs of electricity services is most evident in the cost of electricity services to small-use customers, particularly residential customers.

The cost of providing electricity to residential customers (the customers on Synergy's A1 Tariff) has increased by 61.5 per cent between 2006-07 and 2013-14 from 21.3 cents per kilowatt hour in 2006-07 to 34.4 cents per kilowatt hour in 2013-14 (Figure 5).

Figure 5: Comparative adjusted costs for Synergy to provide residential electricity in the SWIS ($2014)



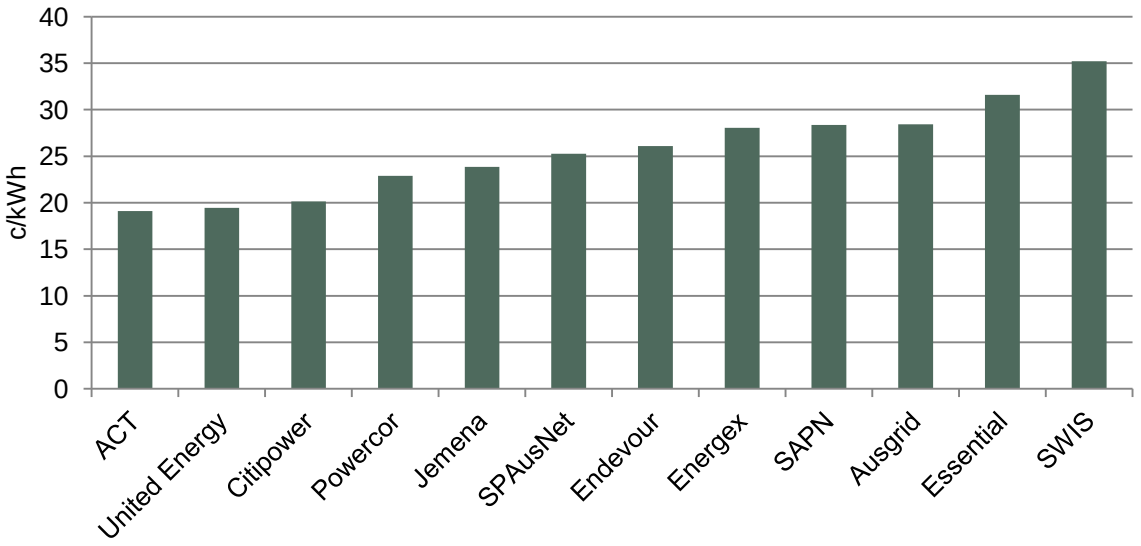
Source: Sapere "Electricity Market Review - Components of Retail Tariffs".

Note: Comparative adjusted costs are calculated by summing the A1 retail price with the Tariff Equalisation Fund component attributable to A1 tariff customers and the State Government subsidy component (or netback component prior to 2009) attributable to A1 customers.

These cost increases have resulted in the SWIS now having the highest retail electricity costs for residential customers of all the major distribution networks in Australia (Figure 6).

[5] IMO data – 2005 Electricity Statement of Opportunities, 2014 Statement of Electricity Demand Outlook.

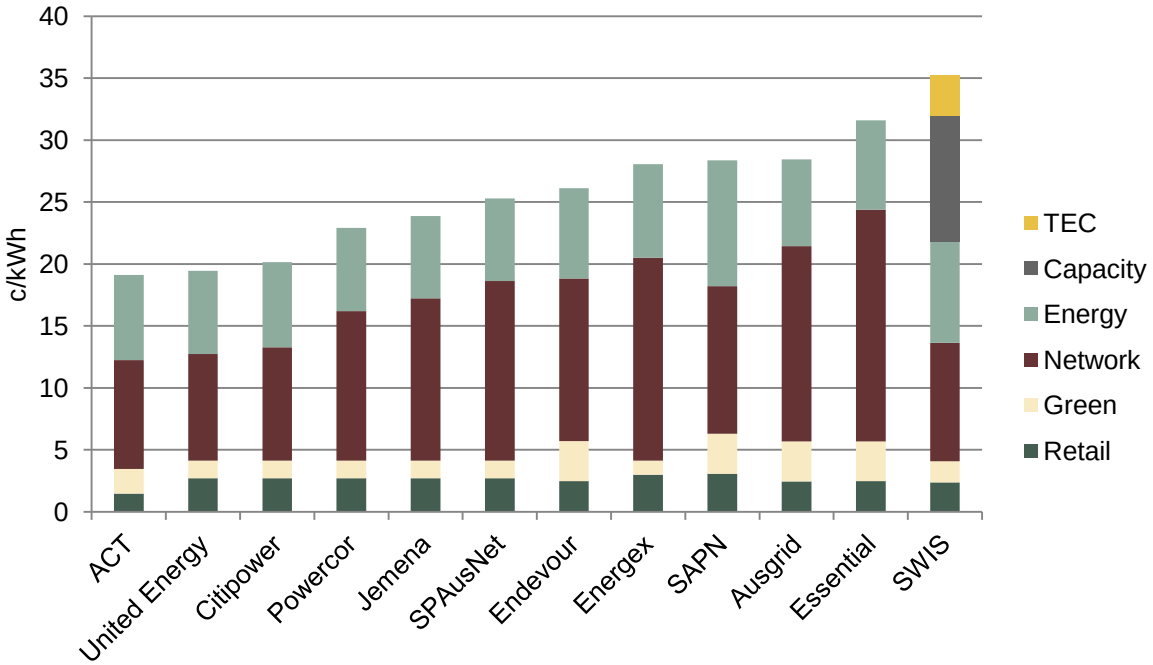
Figure 6: Comparative adjusted residential retail costs across Australian jurisdictions, 2014



Source: Sapere "Electricity Market Review - Components of Retail Tariffs".

A comparison across Australian jurisdictions of the component costs of electricity supply for residential customers indicates that wholesale energy costs are a significant contributor to the comparatively higher costs in the SWIS (Figure 7). Wholesale energy costs (that comprise energy and capacity costs in the SWIS, but just energy costs in other systems) are substantially higher in the SWIS than any other distribution area and about 80 per cent higher than the next highest distribution area in South Australia (SAPN), which is the most similar to the SWIS in terms of system size and generation fuel mix.

Figure 7: Residential retail cost stack (including the TEC in the case of SWIS), 2013-14



Source: Sapere 'Electricity Market Review – Components of Retail Tariffs' and Public Utilities Office analysis.

Note: TEC is the Tariff Equalisation Contribution levied on electricity customers in the SWIS to fund the subsidy of electricity services in regional (non-SWIS) areas of Western Australia.

In investigating the reasons for the high wholesale energy costs in the SWIS, the Review has examined which factors have cause these higher costs in relation to the structure of the electricity industry and the design of the wholesale electricity market. These matters are addressed in the following sections of this chapter.

2.4. Industry structure in the SWIS

2.4.1. Past reforms to create a competitive industry structure

As with most other Australian electricity systems, industry and market reforms implemented since the 1990s have been directed at introducing and sustaining competition between market participants in the generation and retail sectors of the electricity supply chain while having effective regulation of the network sector. The underlying philosophy of these reforms has been that competition between market participants, where possible, provides the best mechanism for imposing discipline on market participants to be efficient and responsive to customer needs in the provision of electricity services. It was only in the natural monopoly network sector of the supply chain where competition has not been as readily achievable and a regulatory framework has been relied on as a second best alternative to competitive markets.

The industry and market reforms implemented in the SWIS in 2006 were directed at establishing competitive generation and retail markets. Initiatives included:

- The disaggregation of Western Power and the creation of Verve Energy and Synergy businesses with moratoria imposed on these businesses on, respectively, retailing and generating electricity.
- The displacement schedule, aimed at diversifying Synergy's wholesale portfolio beyond Verve Energy as a provider and diversifying Verve Energy's wholesale customer base.
- The cap on Verve Energy's generation capacity, aimed at creating space in the market for new entrant generators.
- Reductions in the contestability threshold for retail electricity customers, increasing the number of customers open to retail competition with an original intent to transition to full retail contestability at a later date.

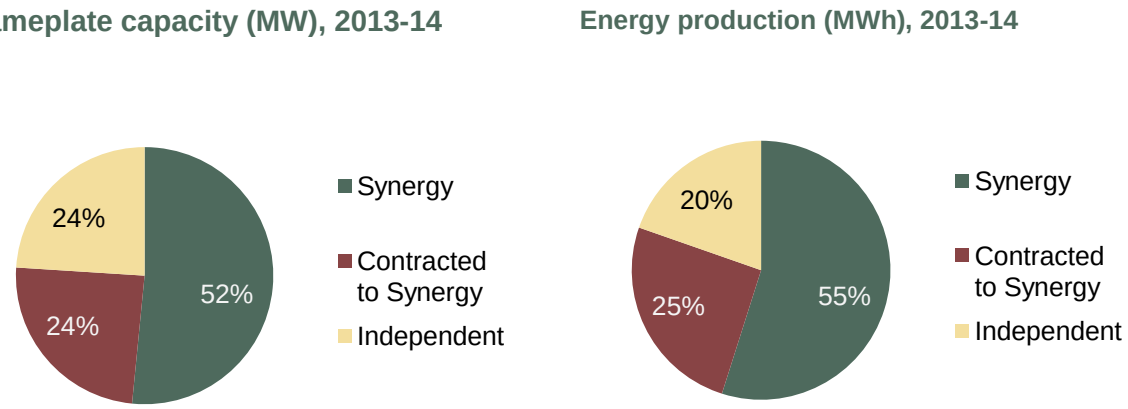
Despite these initiatives, only limited competition has developed among participants in the generation and retail sectors. Where competition has become established there has been considerable benefit to electricity customers – mainly for large commercial users and particularly in recent years where there has been a surplus of generation capacity. Where competition has been stifled or prevented from developing, the costs of providing electricity services have increased, with flow-on increases to electricity prices and government subsidy payments.

In 2013 the Western Australian Government merged Verve Energy and Synergy to create a gentailer to secure improved cost efficiencies through vertical integration. The merger has reduced costs due to more optimal plant utilisation, overhead rationalisation and improved risk management. Now that these cost efficiencies are being achieved, ongoing reform to the industry structure to reduce market dominance is an important and natural step to achieve further cost economies through the increase in effective competition. The merger has been an important precursor to this next step.

2.4.2. The generation sector

At face value the generation sector in the SWIS looks to be competitive with a large number of market participants. In September 2014, there were 29 licensed generation businesses in the SWIS with 84 generation facilities.[6] However, despite the large number of participants the generation sector is highly concentrated. Synergy is the dominant market participant (Verve Energy held this position before the merger on 1 January 2014), directly owning and operating 52 per cent of generation capacity and controlling the output of an additional 24 per cent through long-term power purchase agreements. The 76 per cent of generation capacity owned or controlled by Synergy supplied 80 per cent of the energy to the market in 2013-14 (Figure 8).[7]

Figure 8: Generation market shares by plant nameplate capacity and energy production, 2013-14



Source: IMO data, Public Utilities Office analysis.

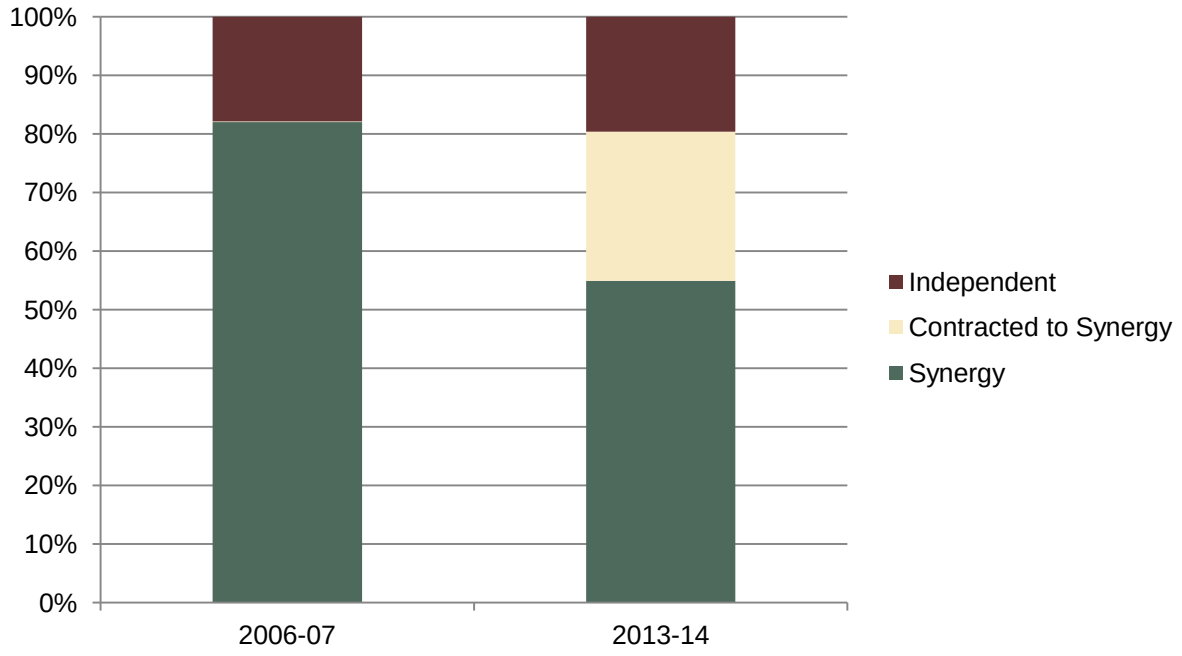
The dominance of Synergy has become entrenched in the sector. Despite policy interventions aimed at constraining Synergy's (and previously Verve Energy's) level of participation,[8] Synergy's generation share (including contracted energy) has only reduced from 82 per cent to 80 per cent over the 7-year period since market commencement. The reduction in Synergy-owned assets has been almost wholly offset by an increase in contracted assets through long term power purchase agreements (Figure 9, Figure 10).

[6] See http://www.imowa.com.au/home/electricity/market-participants/facility-information/facility-details

[7] Public Utilities Office analysis of IMO data.

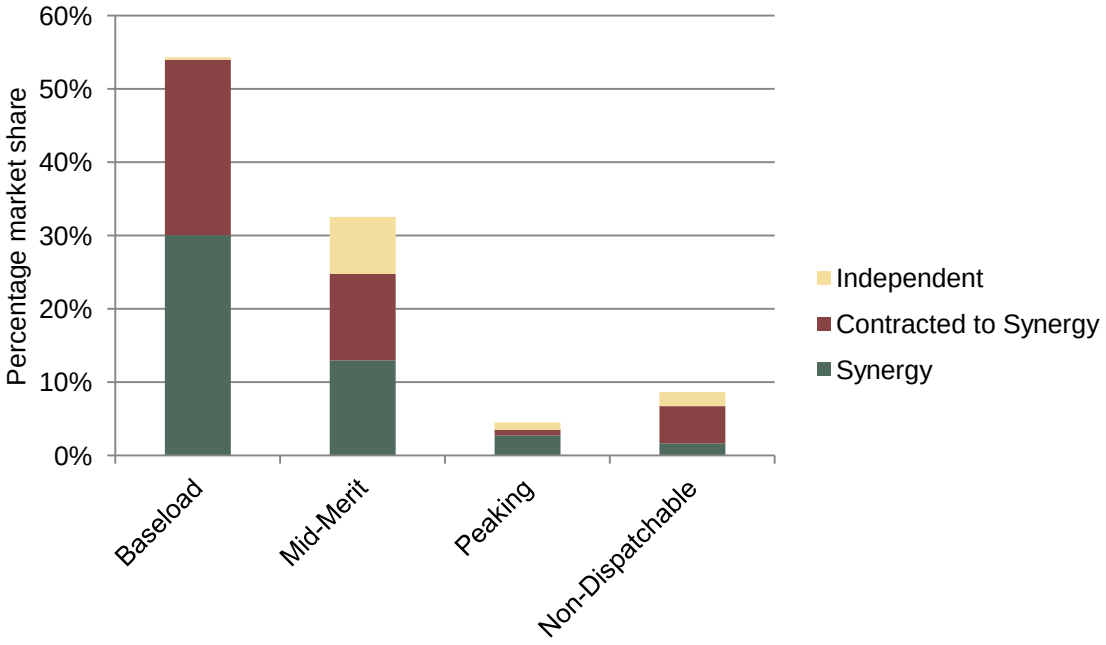
[8] Generation Capacity Cap Ministerial Direction and the Vesting Contract Mandatory Displacement Mechanism.

Figure 9: Generation market shares by energy produced, 2006-07 and 2013-14



Source: IMO data, Public Utilities Office analysis.

Figure 10: Composition of market shares by load tranche (MWh Generated 2013-14)



Source: IMO Data, Public Utilities Office analysis.

As a consequence of sector domination, Synergy has the ability to set energy prices in the electricity market (in particular the Balancing Market) for much of the time. Synergy holds the majority of the baseload and mid merit generators that are likely to be the marginal price setting generation units in the electricity market for most of the time. Synergy was the price setting generator for 82 per cent of the time in 2012-13 and 70 per cent of the time in

2013-14.[9] As Synergy is allowed to bid into the Balancing Market as a single portfolio, rather than being required to bid into the market by facility or power station, it has the ability to limit its exposure to capacity refunds and to retain plant in its portfolio that may hinder the efficient entry and exit of plant in the market as a whole.

There is substantial concern on the part of industry participants over the market dominance of Synergy.

Until Synergy's dominant position in the generation and retail sectors and its status as a government-owned entity are addressed, it is likely that most new generation investment will either need to be developed by Synergy or underwritten by Synergy through long term power purchase agreements.

2.4.3. Retail sector

Retail businesses acquire energy either directly from generators through bilateral contracts, through internal transfers (in the case of generator/retailers such as Synergy) or through the wholesale energy market. They make use of secure network services and customer connections and undertake customer billing to provide a retail service.

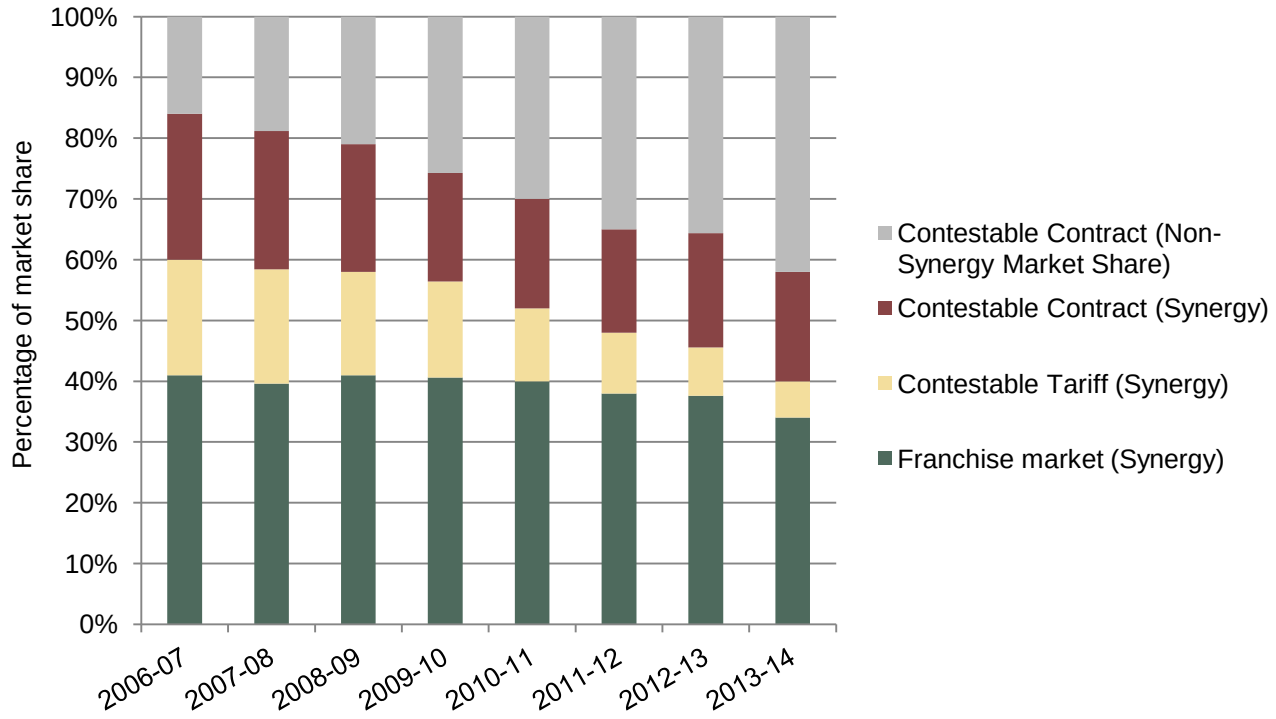
In the SWIS, customers belong to one of three categories:

- Residential and small-business customers that consume less than 50 MWh of electricity per year, who may only have retail services provided by Synergy under regulated tariffs. These are non-contestable customers, or the franchise market.
- Customers that consume between 50 and 160 MWh per year, who can choose their retailer, but can also opt to be supplied by Synergy on a regulated tariff. These are referred to as contestable tariff customers.
- Customers consuming greater than 160 MWh per year, who have choice of retailer and no access to regulated electricity tariffs. These are often referred to as contestable contract customers.

Since 2006, the proportion of the contestable market supplied by Synergy has decreased. Synergy's retail market share has reduced from 84 per cent in 2006-07 to 58 per cent in 2013-14 as new retailers have successfully competed for the business of existing and new electricity customers (Figure 11).

[9] IMO data.

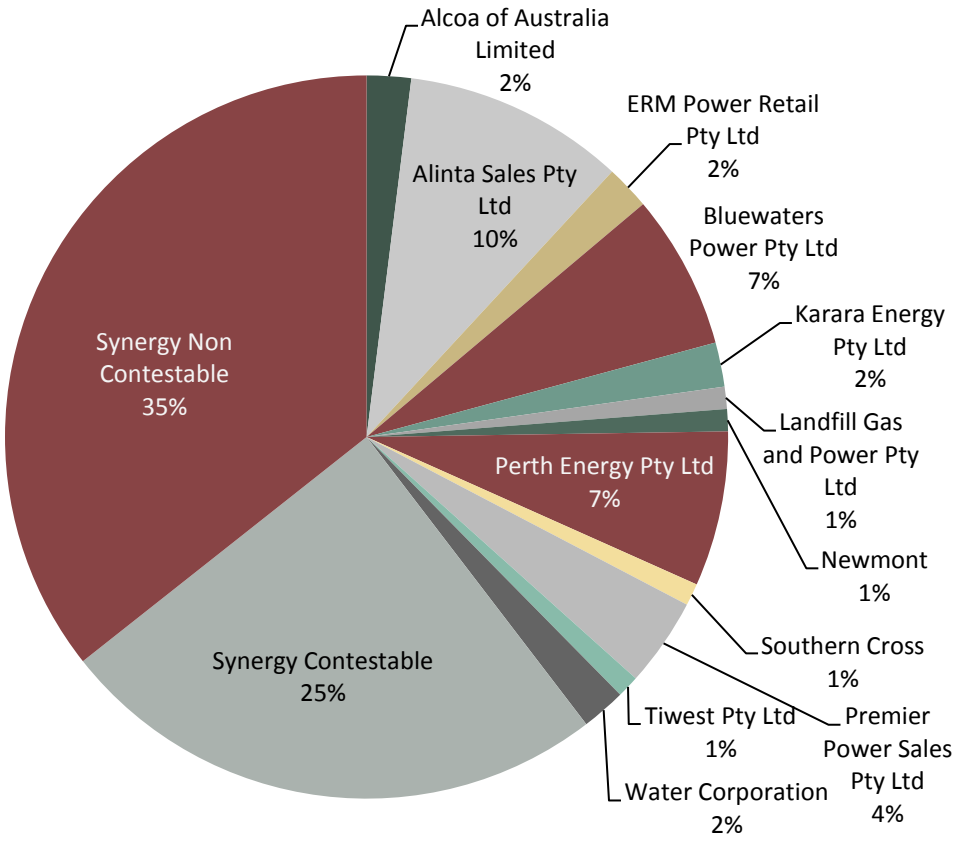
Figure 11: Market share by total customer load



Source: Data provided to the Public Utilities Office by Synergy.

Since 2006 there has been a steady increase in the participation of private-sector retailers. In 2012-13, there were 17 businesses with retail licences in the SWIS, however not all were active in market at that time (Figure 12).

Figure 12: Retail market share 2012-13



Source: IMO data, Public Utilities Office analysis.

As the contestability threshold in the retail electricity market has been reduced and new retail businesses have entered the market, there has been a profound change in retail market shares and pricing of electricity services for contestable customers. The extent of competition has determined market outcomes. A clear example of this is the comparison of recent price outcomes in the contestable segment where customers have a choice of competing retailers relative to the franchise market where customers don't have a choice of retailers.

In the contestable market segments a combination of static or declining demand and surplus generation capacity has resulted in intense competition for customer contracts and aggressive pricing strategies by retailers, including both Synergy and private-sector retailers. Retailers have tended to adopt avoidable cost pricing strategies in aggressive attempts to capture and maintain market share, to the benefit of their electricity customers. Aggressive mark-to-market[10] retail and competitive pricing strategies have resulted in the observed decline in Synergy's market share, despite the business advantages that Synergy would have from the benefits of incumbency, including established (and largely written-down) generation plant and legacy lower cost fuel contracts.

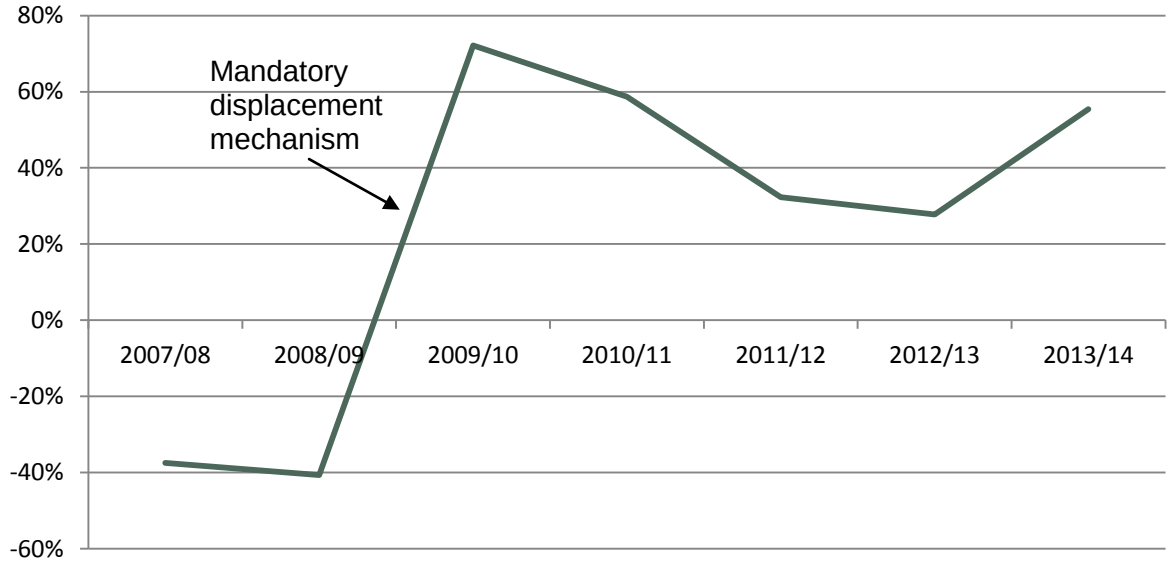
Outcomes in the non-contestable franchise segments of the market, including residential customers, have been very different. There have been no competitive pressures on Synergy

[10] Mark-to-market pricing strategies refers to pricing according to the prevailing market price of an asset or liability.

as the retailer to seek to minimise costs and price to match the market. Synergy has been able to sustain increases in the regulated prices of electricity services that are recovered from its non-contestable household and small-business customers while its contestable customer base has declined.

In 2013-14, prices of electricity services for non-contestable customers were on average about 55 per cent more than the price available to contestable customers who were subject to competition in 2013-14 (Figure 13).[11] This difference will vary from customer to customer depending on the individual load characteristics but the average difference is a broad indication of the different competitive forces evident in the franchise market and contestable market where retailers can construct offers based on a combination of the balancing price and the Reserve Capacity Price.

Figure 13: Amount by which the A1 tariff exceeds notional competitive market prices



Source: Public Utilities Office analysis.

This high level of concentration in the retail sector was central to many submissions received. Of the 51 submissions received, 19 addressed the issue of the dominance of Synergy in the market and consequent lack of competition as the main problem of the electricity industry and/or expressed the view that achieving the Review Objectives will require that the market dominance of Synergy be reduced in some way to increase competitive behaviour and market discipline.

AGL stated in its submission that:

> *"[I]t is important to the development of a competitive electricity market in Western Australia (WA) that the structural separation of Synergy occur. An increase in the number of generators and retailers participating in the market would, all else being equal, likely improve competition with a*

[11] While there is little transparency of price offerings in the contestable sector of the market it is possible to reconstruct the wholesale cost of supply that would underpin customer offerings. This is a simple high level comparison only. No consideration is taken of the peakier load profiles of franchise customers or the likely hedging that such customers would seek to ensure they are not fully exposed to the volatility of the balancing market. The prices are for the 2013-14 year and incorporate, among other costs, an average capacity price adjusted for the cost of excess capacity and average balancing price (information supplied from the IMO).

coincident impact on end use customer bills. However, there would need to be careful consideration of how Synergy's assets were packaged and separated given the characteristics of WEM…"

Perth Energy argued in its submission to the Review that it could profitably supply the residential market at the existing regulated A1 tariff, and that no pre-conditions need to be met before full retail contestability can be introduced.

Synergy stated in its submission to the Review that establishing the most competitive industry structure will probably require its break up into several generation and/or retail entities, noting that costs would be incurred in doing so. Synergy identified the opportunities arising from structural separation as being:

- The creation of higher levels of disaggregated ownership within the electricity market to increase the likelihood of adequate generator competition.
- The creation of an open market environment in which multiple retailers can provide competitive offers to customers.
- There will be value adding opportunities in electricity and gas for separated businesses arising from the disaggregation of Synergy.
- There will be greater flexibility for the Western Australian Government to pursue alternative ownership models for the separated businesses and manage its level of ongoing risk exposure in the electricity market.

2.5. The Wholesale Electricity Market (WEM)

The WEM was established in 2006 at the time of disaggregation of Western Power.

The WEM is a capacity plus energy market where generation capacity and the energy output from generation are traded separately.

The capacity component of the WEM (referred to as the Reserve Capacity Mechanism) is designed to ensure that there is adequate generation capacity available in the system to meet forecast peak electricity demand plus a margin to allow for forecast errors or plant failures. The capacity mechanism operates by generation plant (and demand-side management capacity) being certified and allocated capacity credits in relation to their underlying generation capability (or equivalent). Electricity retailers are required to procure capacity credits in proportion to their share of the electricity load in periods of peak electricity demand. The retailers may meet this obligation by either purchasing capacity credits directly from generators under bilateral contracts and at a commercially negotiated price, or procuring capacity credits via the Independent Market Operator at an administered price.

The energy component of the WEM provides for generation plant to be dispatched according to price bids placed into the market by generation businesses. Generation plant is dispatched on the merit order of bids, with cheapest generation plant dispatched first followed by progressively more expensive plant as necessary to meet the load at any given time (although the order of dispatch is subject to changes from the merit order as necessary to address network constraints or other system constraints). All energy in the WEM is dispatched on the basis of gross pool dispatch. A market price for energy is determined by the bid value of the last generation plant dispatched. Generators and retailers may have bilateral contracts for energy whose settlement is based on the market price for the difference between their declared bilateral contract volume and their respective metered

load. The market also has a day ahead Short Term Energy Market operated by the Independent Market Operator for generators and retailers to adjust bilateral positions.

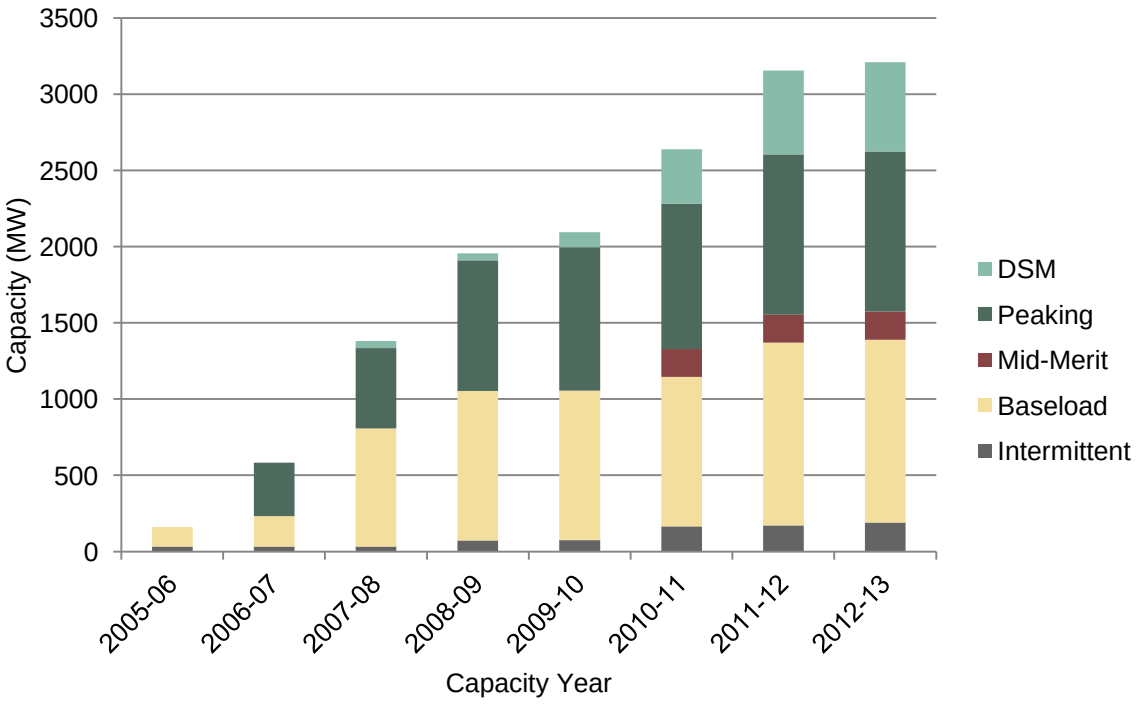
In the capacity plus energy market of the WEM, generators receive payments separately for making generation capacity available to the market and for the supply of energy when and if that generation is dispatched. This allows generators the option of a business model whereby the fixed costs of generation plant are recovered through capacity payments and actual generation costs are recovered through energy payments.

This is markedly different from the electricity market that operates in the NEM in the eastern states of Australia (presently in all jurisdictions except the Northern Territory). The NEM is an energy-only market where energy is dispatched and settled though a gross pool. Generators do not receive capacity payments and instead rely on sales of energy to the market for recovery of fixed costs, with energy prices covering both their short run costs and a return on their capital investment.

The Reserve Capacity Mechanism is the mechanism in the WEM by which generation capacity is procured. The Reserve Capacity Mechanism is intended to provide the incentive to ensure sufficient generating capacity is available to meet demand during certain contingency events that may occur concurrently with a one in ten year weather-related peak demand event – the Reserve Capacity Requirement.

As shown in Figure 14, since the commencement of the WEM in 2006 about 50 per cent of the capacity brought into the market has been peaking and demand-side management. This capacity has been encouraged by the consistent and substantial price offered for new capacity. Although some of this capacity is required due to the peaky load duration curve in the SWIS (Figure 4), the capacity mix is skewed towards peaking plant and would be inadequate and inefficient to provide energy on an ongoing basis to service customer load.

Figure 14: Composition of capacity since market commencement



Source: IMO data, Public Utilities Office analysis.

A step change in the Maximum Reserve Capacity Price may occur in future, which would encourage further peaking and demand-side management capacity to be brought to market. The Maximum Reserve Capacity Price which is used to determine the WEM's administered Reserve Capacity Price aims to reflect the marginal cost of providing additional Reserve Capacity in each Capacity Year. The underlying methodology requires the Independent Market Operator to perform a technical bottom-up cost evaluation of the entry of a 160 MW Open Cycle Gas Turbine (OCGT) generation facility. In this context, the existence of transmission constraints is factored into the price. As the SWIS faces increasing constraints on network capacity there is an expectation that this will feed into a higher Maximum Reserve Capacity Price in coming years. As seen in the 2012-13 and 2013-14 capacity years, a step change in price encourages the entry of new capacity including a large volume of non energy producing capacity, further skewing the plant mix in favour of non-energy producing (peaking) generation.

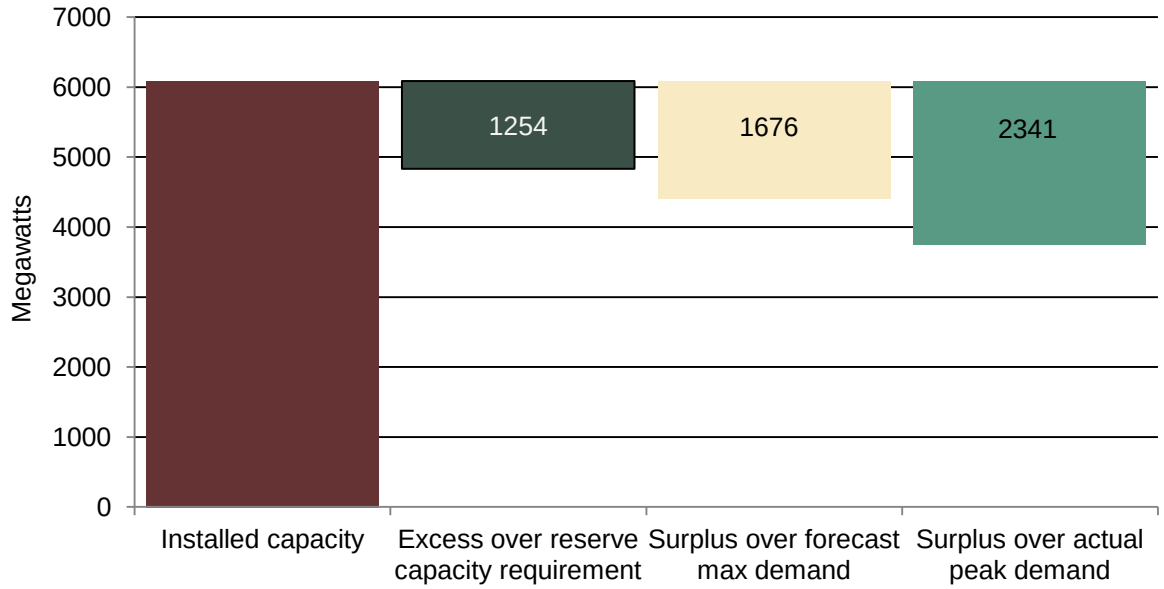
Under the current design of the Reserve Capacity Mechanism, the Reserve Capacity Requirement is set two years in advance. Given the time necessary for the process to establish the Reserve Capacity Requirement, the underlying load and energy forecast is effectively made two and a half to three years before the requirement takes effect.

With rapidly changing economic conditions and the growing up-take of solar power, forecasts have failed to predict historically low levels of electricity demand growth and the extent to which that limited demand growth is met by small-scale solar photovoltaic panel systems.

As a result, the Reserve Capacity Mechanism has produced a large amount of surplus generation and demand-side management capacity over and above the peak demand for electricity.

In 2013-14, the amount of surplus capacity amounted to 1,254 MW over and above the Reserve Capacity Requirement (about 20 per cent of total installed capacity), 1,676 MW over and above forecast maximum demand (27 per cent of total installed capacity), and 2,341 MW over and above actual peak demand (38 per cent of total installed capacity) (see Figure 15). Generators and providers of demand-side management receive capacity payments for this considerable surplus of capacity, the cost of which is passed through to electricity retailers and customers. In the case of Synergy's small use customers, this becomes a significant component of the operating subsidy.

Figure 15: Installed and excess capacity measures, 2013-14



Source: IMO and Western Power data, Public Utilities Office analysis.

The principal factors that have caused the high electricity generation costs in the SWIS are:

- The Reserve Capacity Mechanism (a market with such a mechanism will result in customers paying more for capacity than they need to in most years).
- Unrealised forecasts of electricity demand.
- The Reserve Capacity Price (the price paid by the Independent Market Operator to generation businesses for capacity) being historically set at high levels and motivating a high level of new generation and demand-side management entry into the market.
- A high reliability standard applied in determining the Reserve Capacity Requirement.

2.5.1. The Reserve Capacity Mechanism

Even when forecasts are accurate, a Reserve Capacity Mechanism tends to compensate investors in generation more than is necessary to maintain sufficient reserve, except in years when new capacity is actually required. During these years, the price in an energy-only market would increase to a level that would provide an incentive for new entry which would be equivalent to the energy plus new capacity cost in a market with a Reserve Capacity Mechanism.

When the market is in balance or oversupplied (as the SWIS been for some years) the market settles at the short run marginal cost of the marginal generator. In the SWIS this is likely to be a gas fired combined cycle plant for most of the time. The average of these settlement prices across the year would provide a return on capital to the plants with a lower marginal cost, such as coal fired generators, and would be sufficient to keep the market supplied. In an efficient market, such a price would be too low to provide an incentive for new entrants, which would be the correct outcome when the market is in balance.

Another way to view this is to consider the rationale for capacity payments: that they are compensation for the imposition of a price cap on the balancing pool and necessary to

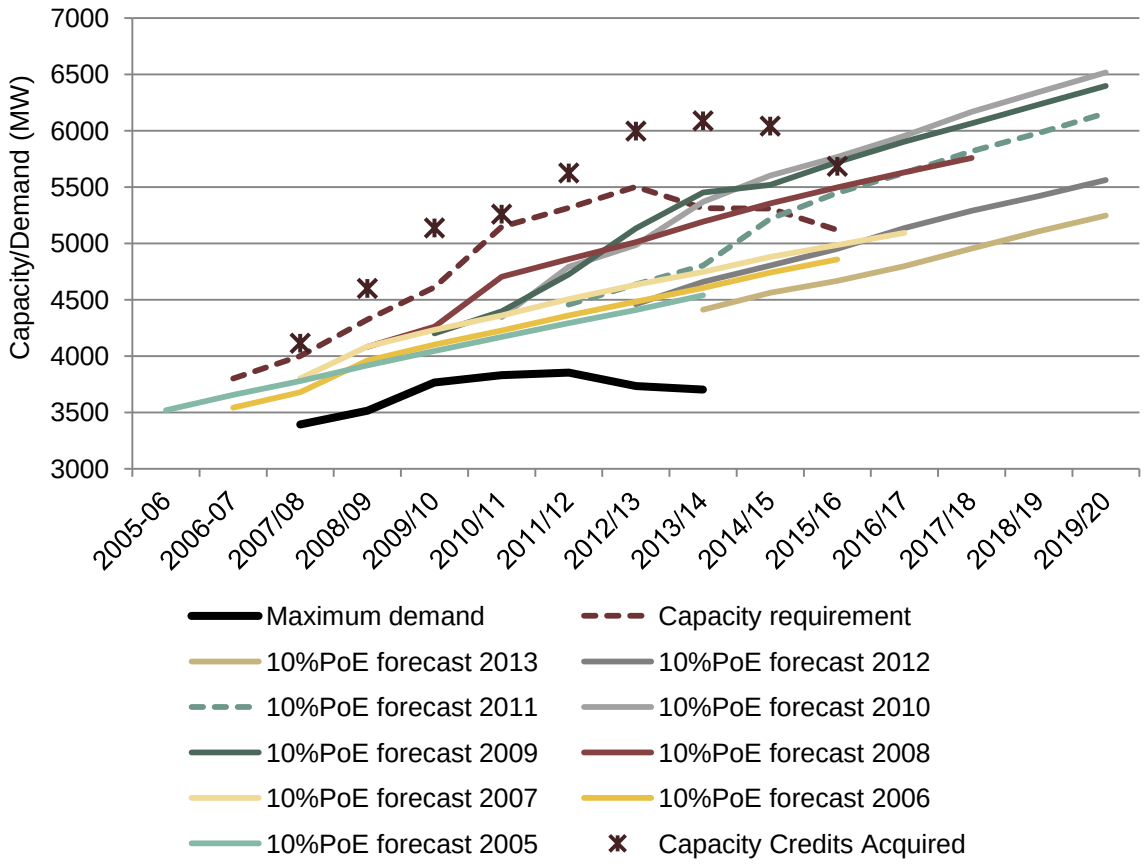
maintain price signals for new entry. However, in most years this payment is more than enough to compensate generators for the loss of revenue they suffer from the imposition of a price cap on the balancing market and results in a transfer payment from consumers to generators for limited additional benefit.

In the NEM the energy-only market has always provided enough reserve capacity to supply the system, even during extreme weather events and coincident outages, without the need for an additional capacity payment.

2.5.2. Demand forecasts

Since the commencement of the WEM, forecasting electricity demand has proven to be difficult. Realised electricity demand has been substantially less than the maximum forecast demand in all years, resulting in the Reserve Capacity Requirement being well in excess of the level needed to meet the reliability standard (see Figure 16).

Figure 16: WEM historical forecasts compared to actual demand

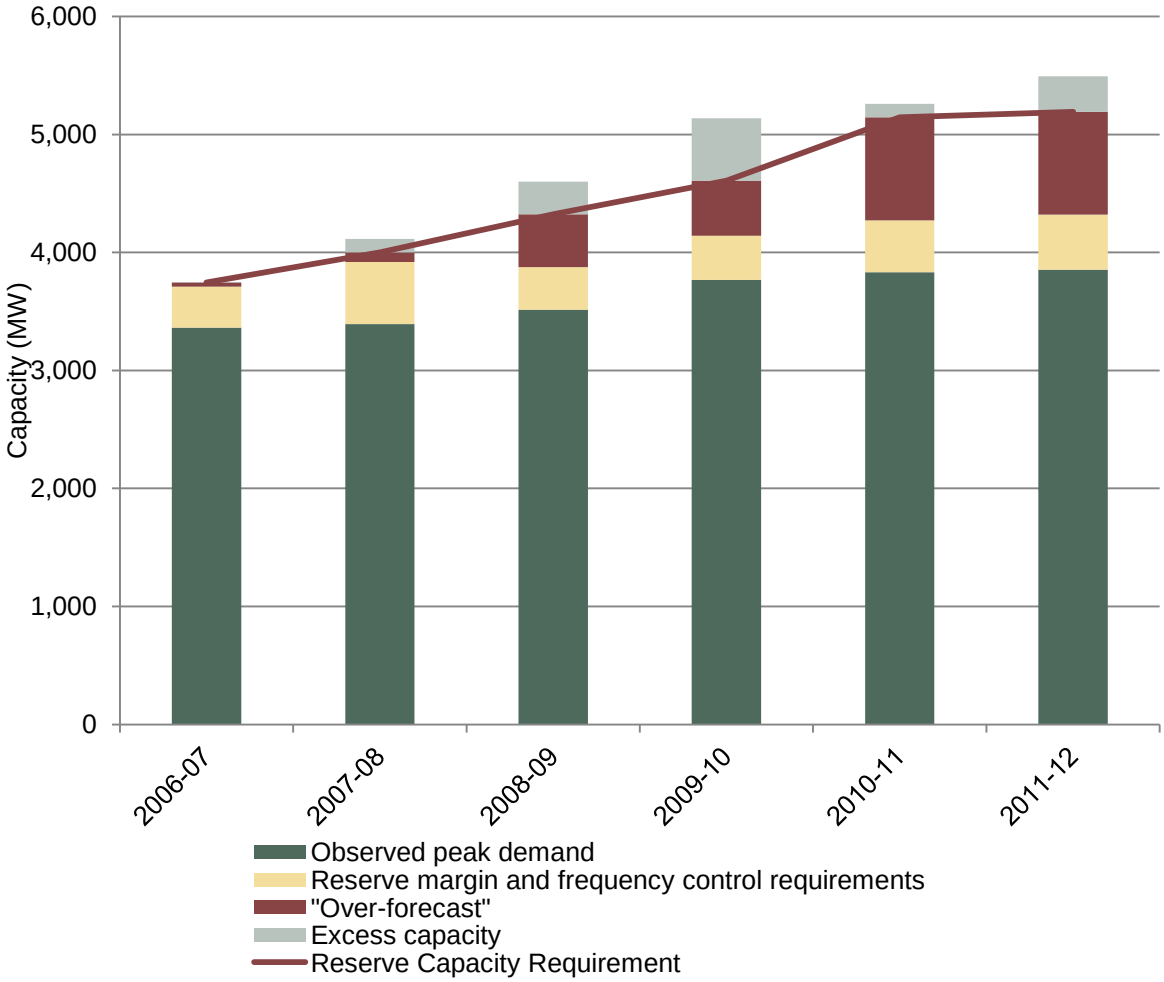


Source: IMO data, ACIL Allen analysis.

The over-forecast demand has been a substantial component of the Reserve Capacity Requirement, and at 1,000 MW in 2011-12 was a far more significant component of surplus capacity than what is more commonly referred to as excess capacity, which is generation capacity over and above the Reserve Capacity Requirement (Figure 17). The combined effect of forecast error over the nine year period of 2007-08 to 2015-16 has or will cost the

market $1.03 billion more than the minimum cost that would have been necessary to ensure that reliability standards are met.[12]

Figure 17: Historical reserve capacity requirement



Source: IMO data, Public Utilities Office analysis.

2.5.3. A high Maximum Reserve Capacity Price

Generators providing capacity to the market either contract with retailers for the retailers to meet their Individual Reserve Capacity Requirements or are paid for capacity by the Independent Market Operator. The price paid by the Independent Market Operator – the Reserve Capacity Price – is determined with reference to the cost of bringing a 160 MW open-cycle gas turbine generation facility into the WEM in the relevant capacity year including all costs of construction, commissioning and network connection.

The Independent Market Operator changed the method and assumptions used to determine the Maximum Reserve Capacity Price in 2010.[13] Before then, the Maximum Reserve Capacity Price was set too high due to network connection costs being overestimated. This attracted too much generation capacity into the market. In 2010, for example, the Maximum

[12] IMO data and ACIL Allen analysis, quoted in the Electricity Market Review Discussion Paper, Public Utilities Office, 25 July 2014, p.26

[13] See procedure change PC_2011_06, available at http://www.imowa.com.au/home/electricity/procedures/procedure-changes/imo/commenced/pc_2011_06

Reserve Capacity Price increased from the previous year by $74,400 per MW to reflect estimates of network connection costs. In the same year 519 MW of new capacity was accredited.

Actions by the Independent Market Operator since 2010 to reduce the Maximum Reserve Capacity Price and address the over-incentive for generation entry have resulted in a reduction in the volume of generation entry, however plant that entered earlier remains and contributes to surplus generation capacity in the market. This problem could be aggravated if the increasingly constrained state of the network leads to an increase in the Maximum Reserve Capacity Price that would result in a similar increase in the entry of new capacity, particularly non energy producing capacity as occurred in 2010.

2.5.4. Reliability requirements and standards

The Reserve Capacity Mechanism operates to ensure that there is sufficient generation capacity on the SWIS to meet a specified reliability standard. This standard is set by the more conservative of the following two methods:[14]

1. Sufficient capacity to meet forecast peak demand (including transmission losses and allowing for intermittent loads) supplied through the SWIS plus a reserve margin equal to the greater of:
    a. 7.6 per cent of the forecast peak demand (including transmission losses and allowing for intermittent loads); or
    b. the maximum capacity, measured at 41 degrees Celsius, of the largest generating unit;

    while ensuring that the electricity system is operating within safe technical limits (such as maintaining frequency control). The forecast peak demand is calculated to a probability level that the forecast would not be expected to be exceeded in more than one year out of ten.
2. Sufficient capacity to limit expected energy shortfalls to 0.002 per cent of annual energy consumption (including transmission losses).

The first method has consistently been the more stringent of the two and has been used to set the reliability target. Within the first method, the 7.6 per cent criterion has been greater than the maximum capacity of the largest generating unit at 41 degrees, so it has been used to set the level of the reserve margin.

The reliability standard applied in the WEM is substantially more conservative than the reliability standard applying in the NEM and as a result gives rise to greater costs. For consumers, this is a costly insurance premium against the risk of shortfalls in supply.

In the NEM, a reliability standard of 0.002 per cent expected unserved energy is used as the basis for a benchmark of supply security. This is the same as the second element of the WEM standard and corresponds to a reliability level of no more than 10 minutes per year of loss of supply to consumers from generation and transmission failure. The NEM also has a more moderate 50 per cent benchmark for the probability of exceeding forecast demand. Applying this reliability standard in the WEM would result in a Reserve Capacity

[14] Clause 4.5.9(a) of the Wholesale Electricity Market Rules.

Requirement that is about 687 MW less than the current value,[15] representing a simple saving in capacity market costs of approximately $122 million in 2013-14.

The savings possible in adjusting the reliability standard to a more moderate level are considerable but that is not the only consideration in determining reliability. The SWIS is an isolated system with extreme weather peaks, so a more conservative standard may be appropriate. Nevertheless, given the very high levels of excess capacity that have resulted from high demand forecasts and a conservative reliability standard, it is worth revisiting the reliability standard calculation and considering a standard that may be less costly than the current standard but which meets the reliability needs of consumers in the SWIS.

2.6. Findings

- Many features of the current industry structure and market design in the SWIS were established to create incentives for investment in generation and address concerns regarding the adequacy of generation capacity in a small and isolated electricity system that had experienced high rates of growth in electricity demand. However, with changes in demand patterns these features are now giving rise to excessive increases in electricity costs.
- The cost of providing electricity to residential customers in the SWIS increased by 61 per cent between 2006-07 and 2013-14. These cost increases have resulted in the SWIS having the highest retail electricity costs for residential customers of all the major distribution networks in Australia.
- Despite reforms to the electricity industry in 2006, only limited competition has developed among market participants. Where competition has become established there has been considerable benefit to electricity customers – mainly for large commercial users and particularly in recent years when there has been a surplus of generation capacity. Where competition has been stifled or prevented from developing, the costs of providing electricity services have increased, with large flow-on increases to electricity prices for non-contestable customers and related government subsidy payments.
- Synergy (previously Verve Energy) remains the dominant generation business in the market. Concern over the potential for Synergy to use this market dominance constitutes a barrier to entry for new market participants and hinders the efficient dispatch of generation plant on a system wide basis.
- There are profound differences in electricity market outcomes for those commercial customers that are open to retail competition and the small-business and residential customers that remain non-contestable customers of Synergy. In the contestable market a combination of low electricity demand growth and surplus generation capacity has resulted in intense competition for customer contracts, aggressive pricing strategies by retailers (including Synergy) and declining electricity prices. For small-business and residential customers, Synergy has been able to achieve increases in the prices of electricity services, and therefore has increased the share of its fixed costs that are recovered from its non-contestable customers as its contestable customer base has declined.

[15] PA Consulting 'Reliability Assessment and Development of the Availability Curve 2013' [report prepared for the Independent Market Operator], p.3.

- Design features of the WEM (particularly the Reserve Capacity Mechanism) have contributed to electricity cost and price increases through a higher than necessary price being paid for capacity and a surplus of generation capacity, the costs of which are passed through to electricity customers. The principal factors that have contributed to the surplus generation capacity and a consequent high cost to electricity customers have been:
    - The Reserve Capacity Mechanism causing payments for new capacity to be higher than they need to be to attract the necessary level of reserve.
    - Over-forecasting of electricity demand.
    - The Maximum Reserve Capacity Price (the price paid by the Independent Market Operator to generation businesses for capacity) being historically set at high levels and motivating high levels of new generation and demand-side management entry into the market.
    - A high reliability standard applied in determining the Reserve Capacity Requirement.
- In the absence of reform to both the industry structure, through reducing the market dominance of Synergy, and the market mechanisms (particularly the Reserve Capacity Mechanism), the industry will continue along its present path, leading to higher costs, higher tariffs and higher government subsidies. The Western Australian Government will also continue to be required to underwrite any major new investments in generation, as it has done to date.
- Notwithstanding the problems that have arisen from the current industry structure and market mechanisms, growth in the SWIS and developments in the broader electricity industry environment since the industry and market reforms of the mid 2000s create opportunities to address these issues. The SWIS is over 1.4 times[16] the size that it was in 2005 in terms of total electricity demand, allowing greater scope for competition between generation and retail businesses. The information technology and financial arrangements for electricity market systems have advanced considerably over the past 10 years allowing greater opportunities for innovation and competition in wholesale and retail markets. New technologies in metering and distributed generation allow for greater consumer participation in the market and consumers need no longer be passive recipients of electricity as a regulated utility service.

[16] IMO data – 2005 Electricity Statement of Opportunities, 2014 Statement of Electricity Demand Outlook.

3. A competitive industry structure

3.1. Introduction

Industry structure[17] is critically important in the functioning of the electricity industry because it largely determines competitive behaviour in the wholesale and retail sectors, which in turn drives cost efficiency, innovation and the quality of customer service. As indicated in Chapter 2, the importance of industry structure and competitive behaviour is evident in the different market strategies of industry participants, and the consequent electricity price outcomes, in the competitive and non-competitive segments of the retail electricity market in the SWIS.

Lack of competition in the wholesale and retail markets of the SWIS is one of the two major causes of high costs and electricity prices (the other being the Reserve Capacity Mechanism). The consequences of the uncompetitive industry structure are further compounded by State ownership of the dominant generation and retail business and the Western Australian Government playing multiple and conflicting roles as the industry policy maker, major asset owner, market participant and regulator.

This chapter identifies the characteristics of an industry structure which promote competition, and also considers the structural changes which could be advanced to improve the economic efficiency of the SWIS.

The two major elements of reforms to industry structure are the creation of competitive generation portfolios from the current Synergy assets and the introduction of full retail contestability for small-business and residential customers.

The objective of restructuring Synergy's generation assets should be to create as many viable generation portfolios as possible. This will ensure that the resulting wholesale electricity market is as competitive as possible, while ensuring that each business has a sufficiently deep and diverse portfolio of generation assets so as to enable the businesses to be efficient and commercially sustainable.

Full retail contestability is critically important to ensure that electricity customers both drive and receive the benefits of competition in the wholesale electricity market. Full retail contestability requires a market and industry environment that is conducive to the entry and expansion of new retailers.

This chapter also addresses the industry structure and status of the markets for primary fuels (coal and gas) for generation. Competitive markets for fuel supply provide generators (and also to some extent retailers) with differentiation of input prices and therefore facilitate greater competition in the energy marketplace.

3.2. Increasing competition in generation

The only practical means of achieving a competitive generation sector is reducing the market dominance of Synergy by restructuring or divesting Synergy's assets to create multiple

[17] The term industry structure in this report is used to refer to the number, size, portfolio composition and ownership of the generation businesses in the wholesale market and the number and market shares of the retail businesses in the retail market.

generation portfolios. This was recognised and proposed in submissions to the Review from market participants, including Synergy.

One party that made a submission to the review – Sustainable Energy Now – argued that separation of Synergy is not necessary, as its market power can be reduced by forced retirement of plant. The Review considered whether the market could evolve into a more competitive structure without structural separation through both forced retirement of Synergy plant and new investment in generation being limited to market participants other than Synergy. The Review finds that this is not feasible for three reasons.

First, with current forecasts of only low rates of growth in electricity demand, little new investment in generation is required for some time, so developing a more competitive generation sector by this process would take a long time. Market modelling by Synergy indicates that the SWIS will not need new baseload capacity until almost 2030. Modelling undertaken for the Review, using the Independent Market Operator's load growth forecasts, suggests baseload plant will not be required by the market until around 2025.[18]

Secondly, the domination of the SWIS by Synergy reduces incentives for investment in Western Australia by private sector retailers. In discussions with the Review Steering Committee major electricity businesses active in the eastern states indicated that they would be unlikely to invest in the SWIS while Synergy's market dominance continues.

Thirdly, there are barriers to new generation entry created by Synergy's ownership and control of many prospective sites for new generation plants. Together with their legacy arrangements for firm network access this gives Synergy a substantial advantage over new market entrants in developing new generation plant.

The restructuring of Synergy's generation portfolio is therefore necessary if the market is to become competitive. The objective of restructuring or divesting Synergy's generation assets should be to create as many viable generation portfolios as possible while ensuring that these portfolios are each of a scale sufficient to enable efficient operation and commercial sustainability. For generators, this means establishing portfolios of generation assets that allow each generation business to offer a range of generation plant into the market (baseload, mid-merit and peaking), and allows them scope and scale to contract with retailers and other large consumers and for fuel supplies.

Evidence from other jurisdictions establishes a threshold number of businesses upon which a competitive marketplace can be established. Electricity market reform in the UK in 1989 created an industry structure whereby 80 per cent of the generating capacity in the market was controlled by just two entities, PowerGen and National Power. Over the ten-year period for which this circumstance prevailed wholesale costs declined by around 40 per cent due to declining gas prices and improving efficiencies, however the wholesale prices remained relatively unchanged. This meant that PowerGen and National Power were effectively a duopoly. Absence of competition in the generation sector and the existence of a retail franchise protected the power companies from competitive forces, allowing them to extract monopoly rents rather than passing efficiency benefits back to customers.[19]

[18] ACIL Allen WEM and NEM comparison for the Electricity Market Review, 2014.

[19] OFGEM – Office of Gas and Electricity Markets (1999) Electricity and Gas Competition Review; OFGEM – Office of Gas and Electricity Markets (2000) Introduction of the Market Abuse Condition into Licences of Certain Generators. Second

Analysis conducted by ACIL Allen for the Review indicates that four to five similarly-sized generators servicing up to 70 to 80 per cent of the generation marketplace can deliver competitive outcomes.

In discussions with the Steering Committee, the Australian Energy Market Commission and the Australian Competition and Consumer Commission both said that effective competition could be achieved with four to five strong participants in the generation sector, subject to considering scale economies. The Australian Energy Regulator has done analysis of market power in electricity markets, highlighting issues that arise if an electricity market is too concentrated.

The pattern of generation ownership varies markedly across the NEM regions. This variation includes pockets of high concentration. The NEM regions have also been affected differently by the trend of vertical reintegration.

In its 2013 State of the Energy Market report, the Australian Energy Regulator noted:

> *"High levels of market concentration and greater vertical integration between generators and retailers give rise to a market structure that may, in certain conditions, provide opportunities for the exercise of market power...In April 2013 the AEMC found potential for substantial market power to exist or to be exercised in future in the NEM, particularly in South Australia....A tight supply-demand balance caused South Australian prices to average $106 per MWh in April-June 2013, almost double the average in other mainland regions in the NEM...The tight supply conditions were not due to a lack of installed capacity in South Australia. Rather, [the] three major generators – Alinta, International Power and AGL Energy - made commercial decisions to reduce their available capacity to the market and increase the offer prices of remaining capacity....[While, the AER] did not find evidence of generators engaging in significant short term strategic bidding to capitalise on market conditions during this period [it was noted that] a general withdrawal of capacity created tight conditions that left AGL Energy's Torrens Island plant strongly positioned to materially influence spot prices..."*[20]

The Australian Energy Regulator's findings are pertinent to consideration of industry structure in the WEM. Constraints on the interconnector between South Australia and Victoria mean that at times South Australia is effectively an island system like Western Australia. Limitations on the level of competition at various points in the generation load tranches together with other inter-temporal events[21] can and do result in individual generators having market power at particular times. The level of generation market diversity in South Australia, where there are three large generators and several smaller participants, is at times insufficient to prevent the exercise of market power.

The Review examined Synergy's generation portfolio and concludes that this can be restructured or divested into two or three efficient and sustainable generation portfolios. A

Submission to the Competition Commission, London UK; Green. R. and McDaniel T (1998) Competition in Electricity Supply: Will 1998 be worth it? Department of Applied Economics, University of Cambridge.

[20] AER State of the Market Report, 2013 pp 28,33,42.

[21] Such as network constraints and fuel constraints in certain trading intervals.

possible indicative composition of these generation portfolios is shown in Table 1 and Table 2, below.

In order to examine whether separation into two or three generation portfolios would make a material difference, the Review contracted ACIL Allen to undertake market simulation modelling of the effects of Synergy becoming two or three generation portfolios in an energy-only market. The energy-only market was used for this analysis as prices tend to be more sensitive to market power than in a market with a capacity mechanism and balancing market. If an industry structure can support competition in an energy-only market, it should also support competition in a market with a capacity mechanism, where price caps and volatility are generally lower.

The three-portfolio scenario modelled incorporated similar shares of baseload plant with open-cycle and combined-cycle gas turbines and intermittent generation to make up a balanced portfolio of assets, while the two-portfolio scenario incorporated an imbalance in plant to facilitate trading. The separation of assets and the way they are packaged will need more detailed attention and expert advice during the detailed design phase of the Review.

Table 1 shows the allocation of Synergy's generation assets under the two-portfolio scenario. The plant type reflects the recent deployment of these units in the WEM.

Table 1: Plant configuration with two generation portfolios

	SYNERGY A		SYNERGY B	
Plant Type	**Generator**	**Sent Out Capacity (MW)**	**Generator**	**Sent Out Capacity (MW)**
Baseload		**421**		**1012**
	Collie	307	Muja C	370
	Worsley SWCJV	114	Muja D	422
			Muja A&B	220
Mid Merit		**436**		**0**
	Kwinana HEGT	196		
	Cockburn	240		
Peaking		**582**		**525**
	Pinjar AB	227.2	Kemerton	308
	Pinjar C	232	Kwinana GT	20
	Pinjar D	123	Mungarra	112
			Kalgoorlie	62.8
			Geraldton	20
Renewable		**45**		**0**
	Albany	21.6		
	Grasmere	13.8		
	Greenough River	10		
TOTAL		**1484**		**1537**

Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Note: The Review recognises that Synergy is a counterparty to power purchase agreements with independent power producers, the output of which are not captured under these plant configurations. The treatment of such power purchase agreements would need to be subject to further analysis as a part of the detailed design phase, taking into account any transitional arrangements. These plant configurations still provide a useful comparison tool to determine the effects of different reforms to industry structure.

Table 2 shows the allocation of Synergy's generation assets under the three-portfolio scenario. The plant type reflects the recent deployment of these units in the WEM.

Table 2: Plant configuration with three generation portfolios

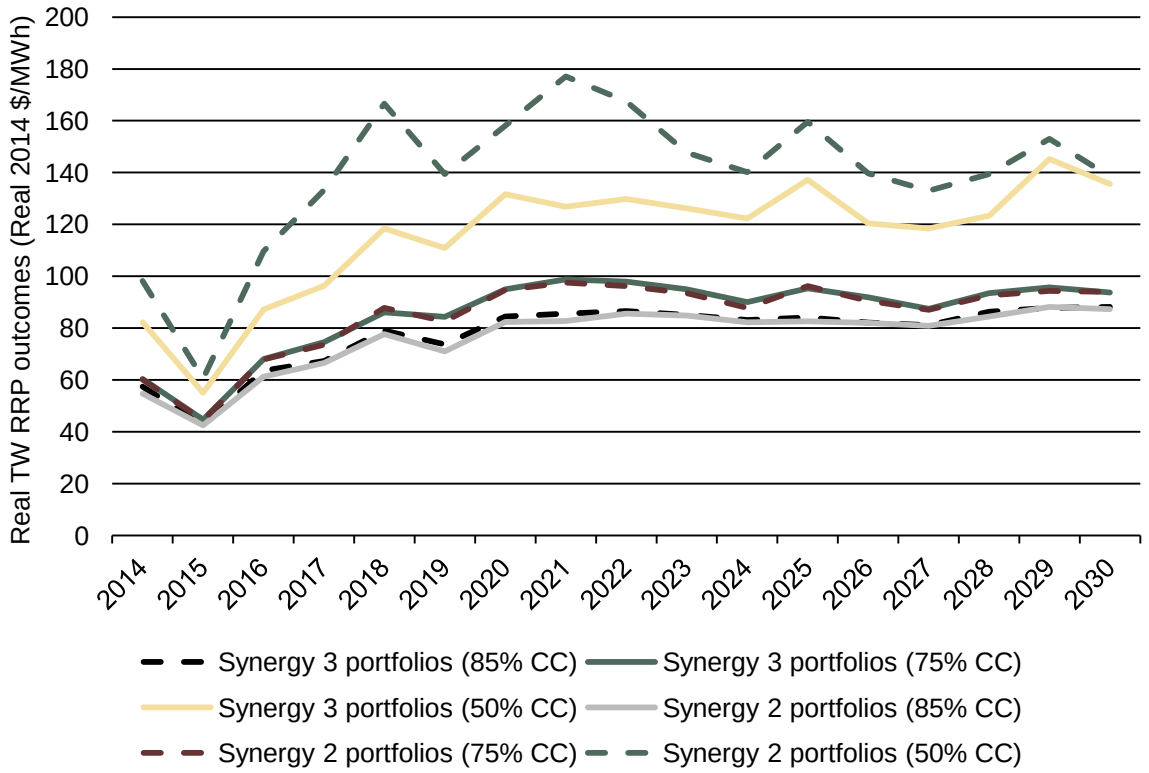
	SYNERGY A		SYNERGY B		SYNERGY C	
Plant Type	Generator	Sent Out Capacity (MW)	Generator	Sent Out Capacity (MW)	Generator	Sent Out Capacity (MW)
Baseload		**527**		**484**		**422**
	Collie	307	Muja C	370	Muja D	422
	Muja AB	220	Worsley SWCJV	114		
Mid Merit		**196**		**240**		**0**
	Kwinana HEGT	196	Cockburn	240		
Peaking		**328**		**196.**		**582**
	Kemerton	308	Mungarra	112.6	Pinjar AB	227.2
	Kwinana GT	20	Kalgoorlie	62.8	Pinjar C	232
			Geraldton	20.8	Pinjar D	123
Renewable		**0**		**45**		**0**
			Albany	21.6		
			Grasmere	13.8		
			Greenough River	10		
TOTAL		**1051**		**965**		**1004**

Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Note: The Review recognises that Synergy is a counterparty to power purchase agreements with independent power producers, the output of which are not captured under these plant configurations. The treatment of such power purchase agreements would need to be subject to further analysis as a part of the detailed design phase, taking into account any transitional arrangements. These plant configurations still provide a useful comparison tool to determine the effects of different reforms to industry structure.

Figure 18 below shows the modelled annual average price from six model runs over the forecast period 2014 to 2030. Three contract cover levels have been run (85, 75 and 50 per cent) and for each of these the two and three portfolio configurations have been run.

Figure 18: Wholesale price outcomes (comparison of time weighted prices in an energy-only market for a two and three entity structural separation of synergy generation)



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

All else being equal (demand, available capacity, forced and unforced outages, marginal costs), price outcomes depend on the number of generation portfolios and the level of market contract cover. When there are fewer competitors, there are more half-hour periods when a generator can raise prices above marginal costs, especially when the market is not fully contracted. When the model includes an assumption that the market is fully contracted, price outcomes are low, reflecting marginal cost bids from all generators. As the contracting assumption is lowered, generators have greater exposure to market prices, and greater incentive to place volume into higher bid-bands, lowering their volume of output but raising prices. The number of competing portfolios has significantly more effect on prices at lower levels of contracted capacity. ACIL Allen also contends that, when negotiating hedge contracts, the threat of not contracting creates power asymmetries. Under the two-portfolio scenario, generators would be able to extract higher revenues through higher contract prices which would ultimately flow to consumers in the form of higher prices.

Based on stakeholder consultations and the results of the ACIL Allen modelling, the Review considers that restructuring Synergy's power stations into three generation portfolios, each with one baseload power station and other generating assets, is commercially sustainable. Three portfolios will generate more competition and better outcomes for consumers than two. One or two of the generators could combine with a retail portfolio to create a gentailer. The Review recommends against initially covering the whole retail and generation markets

through gentailers however, as this may impede development of a liquid and active contracts market and perhaps deter new entrants. In time, market participants may want to undertake both retailing and generation. However, as gentailers rarely achieve a complete match between their generation and retail load, they will need to trade with independent generators and retailers.

Modelling of the wholesale electricity market for the Review indicates that either the two-portfolio or three-portfolio restructuring of Synergy's generation assets would give rise to competitive outcomes with similar wholesale price outcomes.[22] In order to maximise competition, the Review favours separation into three portfolios.

3.3. Increasing competition in the retail sector

Full retail contestability ensures there is competitive pressure on retailers to enter into the most cost-efficient wholesale arrangements for procuring energy and to ensure that customers benefit from these efficiencies. Full retail contestability would also allow private sector investors to accumulate customer load to underpin their investments in generation in the future.

The importance of competition in retail markets, coupled with mechanisms that enable active consumer participation, has recently been established as the foremost priority of the Australian Energy Market Commission:[23]

> *"Effective consumer participation can contribute to more efficient markets and help consumers manage how much they spend on energy. Competitive retail markets promote choice and value for consumers, by providing incentives for retailers to minimise costs and prices, and to offer a range of tariffs. This priority aims to empower customers to participate in regulatory processes, voice their demand for energy services and choose options right for them…"*

There is evidence that retail competition drives better price outcomes for electricity customers. This is seen in Western Australia in the different retail behaviours and price outcomes between the contestable and non-contestable segments of the electricity market, described in Chapter 2. In other Australian jurisdictions, retail competition in the electricity and gas markets has resulted in very substantial price discounts being made available to electricity customers, including discounts commonly five to ten per cent below regulated or standing-offer prices.[24]

The effect of retail competition for small-use customers has recently been evident in the gas market in Western Australia. When Kleenheat entered the small-use market in 2012 it offered residential customers a 10 per cent discount to the regulated retail price. Anecdotal evidence shows that the incumbent retailer (Alinta) was willing to match this discount in order to retain customers.

Contestability in street lighting could also yield significant benefits for local governments. Analysis by the Western Australian Local Government Association reported in its submission to the Review shows that the streetlight tariffs in Western Australia are at least 100 per cent

[22] ACIL Allen WEM and NEM comparison for the Electricity Market Review, 2014

[23] AEMC Strategic priorities for energy market development 2013. Available at http://www.aemc.gov.au/Markets-Reviews-Advice/Strategic-Priorities-for-Energy-Market-Develop-(1).

[24] AER State of the Energy Market 2013, p. 133

more expensive than any other jurisdiction in Australia, in some cases up to 200 per cent more.

Introducing retail competition for small-use customers would open an additional six terawatt hours (TWh) per annum (or 33 per cent of the retail market by energy volume) to competition, potentially delivering significant discounts to customers in the SWIS as it has in other jurisdictions throughout Australia.

Barriers to market entry in the retail businesses are much lower than in the generation sector. The main requirements for a new entrant retailer are having a billing system and access to a wholesale energy supply. There are many potential entrants to the retail electricity market that have billing systems already established that could be readily extended to electricity services in Western Australia. These include existing gas retailers in Western Australia (Alinta and Kleenheat) as well as retailers active in other jurisdictions. The ease of new retailers securing a wholesale energy supply is determined by efficient functioning of the wholesale electricity market.

In other Australian jurisdictions new retailers rapidly entered the electricity market once full retail contestability was introduced. What is most important in establishing and increasing retail competition is having a regulatory and electricity-market environment that is conducive to new retailers entering and competing with the incumbent retailer(s). Important elements of an environment conducive to retail competition include:

- Establishing the necessary regulatory frameworks for customer metering and customer transfers between retailers.
- Ensuring a well designed and fit-for-purpose customer protection regime.
- Applying a rigorous and transparent regulatory framework for determining regulated retail electricity tariffs during any period for which regulated tariffs for small-use customers are maintained.
- Removing blanket retail subsidies (i.e. the Tariff Adjustment Payment currently paid as a subsidy to Synergy), with customer assistance to be implemented through well-specified concession frameworks available to customers of any retailer.
- Establishing mechanisms for electricity customers to be aware of retail choice and to make informed decisions on offers from alternative retailers.
- Ensuring that retailers can participate and compete in both gas and electricity markets.

3.3.1. Metering and customer transfer arrangements

Implementing full retail contestability will require amending the regulatory arrangements in Western Australia for metering, storage and access to metering data, and allowing customer transfers between retailers. Systems and administrative processes to support full retail contestability will also have to be constructed.

As an example of the inadequacy of current regulatory arrangements to allow full retail contestability, the regulatory framework for transfer of customers between retailers is inadequate for the large number of customer transfers that may occur when competition is extended to small-use customers. The *Electricity Industry Customer Transfer Code 2004* allows a retailer to submit no more than 20 requests to Western Power for customer data per business day, severely limiting the number of customers able to be transferred to that retailer

and effectively preventing competitors from building a viable customer base in a reasonable time.[25]

3.3.2. Regulated retail electricity tariffs

Experience in other Australian jurisdictions suggests that government regulation of retail electricity tariffs for small-use customers could cease in three to five years following introduction of full retail contestability.

At present in Western Australia, regulated retail electricity tariffs are determined by a decision of the Minister for Energy. There is no transparent and public process to determine tariffs and decisions are influenced by the commercial state of Synergy, budget objectives and effects on customers. This process is opaque and uncertain and potential new retailers consulted by the Review said it is a deterrent to new investment. While regulated tariffs remain, they should be set through a rigorous, transparent and perhaps independent process.

The Review proposes two options for changing the manner in which regulated retail tariffs are determined.

The first option is for the Western Australian Government to commit to a transparent inquiry process for annual tariff adjustments to inform the decisions on regulated tariffs made by the Minister for Energy. This is similar to the process for regulated tariffs and rates for water and wastewater services, where the Economic Regulation Authority periodically undertakes inquiries to inform a government decision.[26] The Western Australian Government is not bound by the inquiry's recommendations but the process improves transparency and consistency of investigations and government is made accountable in explaining any departures from the recommendations of the inquiry.

The second option is for independent regulation of retail electricity tariffs by the Economic Regulation Authority under a well specified regulatory framework. This occurs in New South Wales and Queensland, where regulated retail electricity tariffs are set by the Independent Pricing and Regulatory Tribunal and Queensland Competition Authority, respectively, which have similar independence in regulatory decision making as the Economic Regulation Authority in Western Australia.

3.3.3. Consumer protection

With the advent of full retail contestability, customer protection arrangements will have to be strengthened to ensure that there are clear rights for customers, obligations on retailers, marketing codes, hardship provisions, and retailer-of-last-resort provisions.

Western Australia's consumer protection framework for electricity is based on the *Code of Conduct for the Supply of Electricity to Small Use Customers*, while the framework used in most NEM jurisdictions is the National Energy Customer Framework. While there is substantial alignment of the Western Australian consumer protection framework with the

[25] Electricity Industry Customer Transfer Code 2004 published in Government Gazette No. 233 29 December 2004, p.6287. Available at: http://www.erawa.com.au/cproot/2447/2/Customer_Transfer_Code_2004.pdf . This Code is the subject of a review of the customer transfer code currently being undertaken by the Public Utilities Office. More information can be found at http://www.finance.wa.gov.au/cms/content.aspx?id=17838.

[26] The latest inquiry by the ERA is documented at: http://www.erawa.com.au/inquiries/water-inquiries/efficient-costs-and-tariffs-of-the-water-corporation-agwest-and-the-busselton-water-board-2012.

National Energy Customer Framework, there are some material differences. These differences could constitute a barrier to entry to the SWIS for existing eastern-states retail businesses if compliance with the Western Australian framework requires new systems, processes and procedures for billing and managing customer relationships.

Establishing and maintaining retail competition for small-use customers will be assisted by either adopting the National Energy Customer Framework in Western Australia or aligning the Western Australian framework as closely as possible with the national framework.

3.3.4. Concession arrangements

Electricity subsidies and concessions are an important social policy instrument for government to address economic hardship and ensure that customers have access to high-quality electricity services.

The Western Australian Government has allocated nearly $87 million in 2014-15 to targeted energy concessions, most of which are applied as a credit to customers' electricity bills. These concessions include the Cost of Living Assistance payment, the dependent child rebate and the air-conditioning rebate. The Western Australian Government also funds the Hardship Utility Grants Scheme, which provides financial support for residential electricity, gas and water customers experiencing financial hardship.

In the event of full retail contestability, competition would be enhanced by the implementation of a transparent and accessible framework for funding energy concessions. Under this framework, any concessions should be available to all eligible customers regardless of their retailer. This framework would require adequate oversight and control measures to ensure the correct allocation of funding to all eligible retailers, which could be enacted through electricity retail licence requirements.

3.3.5. Customer information and engagement

Allowing retail competition for small-use customers will immediately give these customers more choice and allow retailers to offer more innovative and targeted products.

However, getting customers to engage with the process of assessing their electricity tariffs and electing to switch to a new supplier can be a challenging task requiring proactive engagement and customer education.

Recent experience in the Western Australian gas market shows that customers are typically slow to change retailer, even when offered discounts. Kleenheat's market share in September 2014 was only slightly above 3 per cent in the residential gas market, despite offering a 10 per cent discount.[27] However, despite their low market share this has still driven Alinta to respond with a price match offer, and these competitive behaviours have had benefits to customers.

Customers will need tools to compare retail offers easily. Recent analysis by the Australian Energy Market Commission shows that customers in the NEM jurisdictions are shopping around but want better information.[28] The study suggested customers are worried about energy prices but struggle to compare options. Qualitative research for the same study showed that the likelihood of switching is related to customer confidence in being able to

[27] Data provided to the Public Utilities Office by the Economic Regulation Authority

[28] AEMC 2014 Retail Competition Review, p. 21.

access understandable, credible and independent information about the offers available. This can be assisted by government or market initiatives, such as websites like 'YourChoice' in Victoria and 'Energy Made Easy' for NEM jurisdictions. These help customers to compare prices and determine how much they might save by switching retailers.

3.3.6. Combined electricity and gas retailing

Energy retailers should be able to retail gas and electricity products and services to small-use customers. Of the approximately 1 million electricity customers in the SWIS, two-thirds are also gas customers. Allowing retailers to make dual fuel offers will assist them to achieve economies of scale and scope and lower costs for consumers. Regulatory systems for retail gas and electricity markets should be aligned so there are no undue barriers to retailers making dual fuel offers.

The current moratorium on Synergy retailing gas services to small-use customers should be removed when full retail contestability for electricity is introduced.

3.4. Restructuring or divesting Synergy's portfolio

The Review finds that reducing the market dominance of Synergy is necessary to increase competition in the SWIS. On the basis of analysis and insights gained during the Review, restructuring of Synergy's generation assets into three competing generation portfolios is achievable.

Increasing competition in the retail electricity market does not depend on restructuring the retail business of Synergy, although such restructuring may increase the rate at which competition emerges. At least one retail portfolio could be bundled with a restructured or divested generation portfolio to create a gentailer. Further analysis should be undertaken of the composition of the generation portfolios and whether one or more of these portfolios should be a combined gentailer.

The Review recommends against restructuring or divesting the generation portfolios of Synergy to create a gentailer business model for all portfolios as this may impede the development of a liquid and active wholesale energy market and the related market in financial and risk management instruments.

The restructured or divested generation portfolios should be established in a manner that facilitates and encourages competition and with a reliance on national frameworks of competition law. While the Review recommends that these portfolios be separately managed with independent boards, corporate management and commercial decision making, ultimately these will be matters to be considered by the Western Australian Government during the detailed design phase of the reforms.

While matters of ownership have not been a major consideration in the Review, the Review proposes that eventual privatisation of the generation portfolios is desirable and to some extent inevitable if reform is to achieve efficient and competitive wholesale and retail electricity markets and reduce government risk and financial exposure to the electricity market.

The objective of restructuring Synergy's assets into multiple generation portfolios is to improve competition in the SWIS. This newly created competitive environment will not be sustained, however, if the market becomes more concentrated over time through mergers and acquisitions.

The experience of other Australian jurisdictions is that vertical integration and mergers of electricity businesses are common as businesses seek to expand, exploit opportunities for economies of scale and seek to manage wholesale electricity market risks through gentailer business structures. Maintaining a competitive industry structure will necessarily rely on the national framework of competition law. However, the Western Australian Government should investigate whether there are additional mechanisms that can be pursued to ensure competition is sustained in the restructuring or divestment of Synergy's generation portfolio and any subsequent privatisation process.

3.5. The primary fuels industry and market

The electricity supply industry is linked to the markets for primary fuels. Coal and gas account for 85% of energy generated in the SWIS.[29]

The markets for coal and gas in Western Australia are concentrated. There are currently two coal suppliers and seven gas suppliers to the domestic market. The North West Shelf and Varanus Island facilities together supply about 70% of the domestic gas market.[30] Policy settings for the coal and gas industries may be important in maintaining open and competitive markets for primary fuels.

The Review has examined whether any action by the Western Australian Government is necessary in primary fuels markets as part of reforms to the electricity industry.

3.5.1. Availability and price of primary fuels

Western Australia has abundant supplies of natural gas and coal. Physical availability of these fuels will not be a constraint to electricity generation in the foreseeable future.

Although resources are available, there are possible supply constraints for both fuels.

The North West Shelf has supplied most of Western Australia's domestic gas for decades. However, both domestic gas and LNG production are expected to decline as its fields become exhausted and the domestic gas market is currently in transition from the foundation supply obligations and contracts of the North West Shelf project to new supply sources and new contractual arrangements. In its submission to the Review, the DomGas Alliance drew attention to uncertainty about when these facilities will start producing domestic gas and also to potential shortfalls of supply, especially in the 2020s when North West Shelf supply is lower.[31]

Until recently, there was uncertainty over how supplies from the North West Shelf would evolve. The project's volumetric domestic gas obligation under its State Agreement was expected to be exhausted in 2014, but it had additional contractual obligations to supply some domestic gas until 2020. Beyond then it was not clear whether the project would continue to produce domestic gas, or how much. In November 2014 the project reached an agreement with the Western Australian Government which included a commitment to market a total of 700 petajoules of gas into the domestic market, equivalent to roughly 100 terajoules a day over the life to the project (to 2034). The agreement also approves the export of an additional 86 million tonnes of LNG, and provides that third parties tolling gas

[29] Independent Market Operator, SWIS Electricity Demand Outlook, p.40

[30] Independent Market Operator, Gas Statement of Opportunities, p.36

[31] DomGas Alliance submission.

through the joint venturers' LNG facilities would also be subject to a domestic gas obligation. This means that the North West Shelf will continue to produce domestic gas, although at lower levels than in the past. Both the Wheatstone and Gorgon projects are building domestic gas processing plants. Gorgon is expected to begin supplying the domestic market in 2015 or 2016, and Wheatstone in 2018.

New gas sources and producers have commenced operations during the past three years, in particular the Macedon and Devils Creek gas projects. Both of these projects supply only the domestic market.

Submissions had differing views of the State's domestic gas policy, which requires LNG projects to reserve the equivalent of 15% of their LNG sales for the domestic gas market, to build the infrastructure necessary to process and bring that gas into the domestic market, and to actively market gas. The Australian Petroleum Production and Exploration Association, representing suppliers, argued that the market has enough buyers and sellers to meet domestic demand without government intervention. Six of the seven current domestic gas processing facilities are not linked to an LNG project. The Association argued that this suggests that the domestic market is sufficient to underpin the investment required to develop and construct gas processing facilities.[32] However, the North West Shelf is still the largest supplier to the domestic market, and Wheatstone and Gorgon will make significant contributions as production from the North West Shelf declines.

The Domgas Alliance, representing major gas users, wants the policy retained and strengthened to give greater transparency and certain of supply. It argued:

> *"DomGas Alliance members reject the view that domestic industry is locked in the past and still expects prices of $2-$3 a gigajoule. Having acknowledged that, there is no logical reason why industry in an energy rich nation like Australia should be paying the same prices as industry in energy poor countries such as China and Japan. The Alliance believes that stronger policy leadership, particularly at a Federal level, is required to ensure that Australia's domestic industry has access to natural gas at prices that give Australia a competitive advantage. This should include a tougher approach to the granting of retention leases..."*
>
> - Domgas submission to the Review, p.3

While the new domestic-only gas supplies have been developed on a commercial basis, government policy settings and regulatory frameworks have supported entry of the new suppliers to the gas market. For the Macedon project, the Western Australian Government amended regulations to allow supply into the domestic gas market of a broader specification gas stream. It established mechanisms for the new gas producer to meet the cost of replacing old domestic gas appliances that could no longer be used safely, and for compensating pipeline businesses and other gas producers for the additional costs of gas transportation.[33]

In the coal industry, both Griffin Coal and Premier Coal are currently dealing with the challenge of fixed prices for coal under supply contracts coupled with rising mining costs.

[32] APPEA submission, p 4.

[33] Enacted by the Gas Supply (Gas Quality Specifications) Regulations 2010 under the *Gas Supply (Gas Quality Specifications) Act 2009.*

Griffin Coal suspended mining on several occasions during 2014.[34] The Chamber of Minerals and Energy's submission to the Review expressed a view that coal prices will need to rise to address the gap between fixed prices and rising mining costs.[35] A recent contract renegotiation between Premier Coal and Synergy included a rise in the coal price. Griffin Coal is reported to have negotiated a price increase when its main customer, Bluewaters, was sold in 2012.[36]

While not underestimating the difficulties of the coal companies, the Review finds that these are essentially commercial problems requiring commercial solutions.

The Review does not find any reason for greater government intervention in the gas or coal industries to secure supply.

3.5.2. Market competition and liquidity

With only two coal suppliers[37] and four major and three mid-tier gas suppliers[38] in the domestic gas market, there are risks of limited competition in the primary fuels market and limited trading liquidity. This may limit the effectiveness of market competition in disciplining pricing of these fuels and present barriers to entry to new generators that need to secure fuel supplies.

In its Discussion Paper the Review raised the possibility that the illiquid nature of the State's gas market (both supply and demand) may be a barrier to entry for new private sector generation. Parties making submissions to the Review did not express any particular concern over liquidity in the primary fuels markets but rather noted that the gas market was evolving to include mechanisms that increase liquidity and that opportunities exist for future development of new coal resources.

In respect of the gas market, submissions to the Review drew particular attention to the role that a robust spot market for gas and pipeline capacity could have in the gas market. Two submissions noted that the recent development of the Mondarra gas storage facility and the introduction of the Gas Bulletin Board and the Gas Statement of Opportunities have improved market liquidity and transparency.[39] In addition, new gas trading platforms operated by *Gas Trading* and *Energy Access* have increased opportunities for short term trading in the gas market.[40]

The general tone of submissions to the Review by gas users was that the gas market is being developed by industry participants to meet the circumstances of the electricity sector and there is no pressing need for intervention by government to further develop the market.[41] The Domgas Alliance raised two higher-level matters that could be addressed by

[34] See http://www.abc.net.au/news/2014-10-13/lanco-in-talks-to-sell-stake-in-griffin-coal/5808916.

[35] CME submission, p. 8.

[36] Raelene Heston, "Bluewaters sold: Japanese owners by Christmas", Collie Mail, 8 November 2012. http://www.colliemail.com.au/story/755147/bluewaters-sold-japanese-owners-by-christmas/.

[37] Griffin Coal and Premier Coal

[38] North West Shelf Gas, Varanus Island, Devils Creek and Macedon in the Carnarvon Basin; and Dongara, Beharra Springs and Red Gully projects in the Perth Basin.

[39] DomGas Alliance submission; Alinta submission, p 91.

[40] Alinta submission, p 88.

[41] APA submission; Alinta submission, p 87; Chevron submission, p 1.

government to increase supply and competition into the domestic gas market: supporting the end of the joint market arrangements by the joint venture participants of the North West Shelf Project, and enforcing stricter requirements for gas retention leases.[42]

With respect to the coal sector, one submission to the Review noted that coal supply could be expanded and made more competitive by developing new coal fields and that the Western Australian Government should, at least, not obstruct such development.[43]

Despite industry concentration and current commercial instability in the coal sector, the coal and gas markets in Western Australia do not impose constraints on developing and sustaining a competitive electricity industry.

Government has a legitimate role in supporting and regulating new developments and projects in the primary fuels sector, including potential development of new coal projects and unconventional gas. However, there is no need for a fundamental change in government policy settings to achieve the Review Objectives.

The gas market is developing to become more liquid with a greater number of suppliers, greater transparency and improved mechanisms for short term trading. While government action was instrumental in the initiatives of the Gas Bulletin Board and Gas Statement of Opportunities, other market developments are occurring largely at the initiative of industry participants.

3.6. Findings

- As a consequence of growth in the size of the SWIS since the reforms of 2006 as well as developments in knowledge and information systems of electricity markets, there is the opportunity at the current time to alter the industry structure to achieve greater competition between market participants, lower industry costs and lower fiscal liabilities for the Western Australian Government in payment of electricity subsidies.
- The only practical means of achieving a competitive generation sector is the restructuring of Synergy's generation assets into multiple competing portfolios. The Review favours a restructuring or divesting model which sees Synergy's generation assets becoming three portfolios.
- Expanding retail competition is a threshold reform to achieve competitive pressure on retailers to enter into the most cost-efficient wholesale arrangements for procuring energy and to ensure customers benefit from these efficiencies.
- It would be important in establishing and increasing retail competition to have a regulatory and electricity-market environment that is conducive to new retailers entering the market and competing with the incumbent retailers. Important elements of an environment conducive to retail competition include:
    - Establishing the necessary regulatory frameworks for customer metering and customer transfer between retailers.
    - Ensuring a well designed and fit-for-purpose customer protection regime.

[42] DomGas Alliance submission.

[43] CCI submission, p.17.

  - Applying a rigorous and transparent regulatory framework for determining regulated retail electricity tariffs during any period for which regulated tariffs for small-use customers are to be maintained.
  - Removing blanket retail subsidies (i.e. the Tariff Adjustment Payment currently paid as a subsidy to Synergy) and any customer assistance to be provided through well specified concession frameworks that are available to customers of any retailer.
  - Establishing mechanisms for electricity customers to be aware of retail choice and to make informed decisions on offers from alternative retailers.
  - Ensuring that retailers can participate and compete in both gas and electricity markets.
- In restructuring Synergy's generation assets, further analysis should be undertaken of the composition of restructured or divested generation portfolios and the extent to which one or more of these portfolios should be a combined generation and retail (gentailer) activity. The Review recommends against any restructuring creating gentailers for all restructured or divested assets as this may impede development of a liquid and active wholesale energy market and related market in financial and risk management instruments and perhaps deter new entrants.
- The restructured or divested generation portfolios should be established in a manner that facilitates and encourages competition and with a reliance on national frameworks of competition law. While the Review recommends that these portfolios be separately managed with independent boards, corporate management and commercial decision making, ultimately these will be matters to be considered by the Western Australian Government during the detailed design phase of the reforms.
- While matters of ownership have not been a major consideration in the Review, the Review is of the view that eventual privatisation of the restructured or divested generation asset portfolios is desirable and to some extent inevitable if reform is to achieve efficient and competitive wholesale and retail electricity markets.
- Maintaining a competitive industry structure will necessarily rely on the national frameworks of competition law. However, the Western Australian Government should investigate whether there are additional mechanisms that are practical and beneficial that can be pursued in the restructuring or divesting of Synergy's generation assets and any subsequent privatisation process.
- There are concerns over increasing primary fuel prices, market concentration and instability in the coal sector. However, both the gas and coal industries appear to be working within existing policy and commercial arrangements to address business pressures and possible supply constraints. The Review does not see any reason at present for Government to change its policy settings to ensure fuel security, or for a more active role for the IMO in developing a wholesale gas market, though this could change as circumstances evolve in the gas and coal markets.

4. Improving market outcomes - market design options

4.1. Introduction

This chapter addresses two market design options that have been considered by the Review.

The first option has been called the Reformed WEM option and comprises the continuation of the current WEM design with an amended capacity mechanism and pool. The Reserve Capacity Mechanism proposed in this option is based on 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 (in balance, excess or shortfall). This option also includes changes to the way the balancing pool operates, institutional and regulatory changes and a review of the current reliability criteria used to calculate the level of capacity required.

The second option has been called the NEM Energy-only option as it involves changing the market design to a NEM-style energy-only market. While this option involves primarily the adoption of the energy-only market mechanism it also follows, given the considerable development work and governance that has been applied to the NEM since its beginning in 1998, it would be most sensible to adopt the model as a whole, including governance, regulation and market rules. This would be achieved by the SWIS becoming an unconnected region of the NEM.

The Review has considered alternative mechanisms bearing in mind the following characteristics and outcomes required from an efficient market mechanism:

- Dispatch of generation plant so that prices reflect efficient costs. Market simulation modelling has been used to assist in this comparison allowing modelled wholesale prices to be compared under similar assumptions of demand growth, input costs, policy settings such as carbon pricing and renewable energy subsidies.
- The efficient entry and exit of generation capacity over time.
- Transparent seasonal and time-of-day pricing. Prices in electricity markets should display some volatility in order to reflect the underlying volatility in the cost of supplying electricity across the course of a day or year. Transparent prices can be used to set forward contracts and a variety of contracts and financial instruments need to be available for participants to manage their risks.
- Incentives which attract and price an appropriate level of reserve. This is an important consideration in the SWIS as there are no interconnections with other systems to provide reserve in the case of major outages or shortfalls in supply.
- A stable investment and business environment. It should be adaptable to changing market conditions without the need for substantive changes in rules or parameters.
- Regulatory frameworks that provide the Western Australian Government an adequate but appropriately defined and constrained, power to intervene to set administered prices, manage load shedding and manage the market in the event of a major infrastructure failure or natural disaster.

4.2. The Reformed WEM option

In Chapter 2 the Reserve Capacity Mechanism was identified as one of the two major contributors to the high cost of generation in the SWIS. The reasons why it has caused such high costs appear to be:

- The forecasts used to calculate the Reserve Capacity Requirement have consistently over-estimated capacity requirements.
- Even if forecasts of future demand are correct a Reserve Capacity Mechanism will, in most years, result in more being paid than is necessary to ensure sufficient reserve capacity. The capacity payment is intended to compensate generators for the lost revenue arising from the cap placed on the balancing pool. This lost revenue will usually be much less than the aggregate of capacity payments and is only likely to be close to the capacity payment in years when demand exceeds supply and there is a requirement for new capacity. In years where demand is static or growing only slowly and available reserve capacity is adequate, a capacity payment will still apply and consumers will pay more for their electricity supply than they need to.
- The method used to calculate the requirement for reserve is particularly conservative and leads to much higher levels of reserve than appear necessary, notwithstanding the SWIS being an isolated system that experiences severe weather peaks in demand at times.
- The method of acquiring capacity through an administered price tends to result in relatively high payments. The administered price paid (the Maximum Reserve Capacity Price) is largely unresponsive to the existence of a capacity surplus, for example, even though most available capacity is a sunk cost at such times.
- The mechanism pays the same price to all of the capacity it acquires regardless of its highly variable ability to service customer load.

4.2.1. The capacity auction

The major change in the capacity mechanism proposed in the Reformed WEM option is that capacity will be acquired through a staggered auction for residual capacity required to the extent that participants have not secured sufficient capacity via a bilateral agreement. For each capacity year, an auction will be held in each of the preceding three years. The Independent Market Operator will successively update its forecast of the reserve capacity requirement for each year with the expectation that the forecast error is smaller the shorter the time between the forecast and the actual capacity year.

Each auction will impose a demand curve (described in more detail later in this chapter) which will impose a cap on the price of capacity based on 1.5 times the cost of new entry of an open cycle gas turbine where capacity is insufficient to meet the Reserve Capacity Mechanism. The curve will impose a declining slope on auction prices such that the price of capacity will be zero at 12 per cent of excess capacity. This curve was based on a review of demand curves in capacity markets that have an auction to determine the capacity price.

Offers of capacity will submit a quantity and a price of capacity which will form a merit order. This will enable the auction to determine a market price of capacity based on the intersection of supply and demand.

Any offer of capacity with an offer price that is greater than the market price arising from the auction will not be cleared and hence will not be accredited and paid for by the market.

Transparency of offer prices by participants will be essential to ensuring competitive outcomes.

Parameters for the auction have been selected to allow comparative modelling of the options. However, the proportions of required capacity offered and the precise parameters of the demand curve used in each auction would need to be finalised in a detailed design phase, which would include consultation with the industry.

A number of stakeholder submissions addressed the operation of capacity auctions, most notably:

> *"Firstly, we recommend implementing a more rational demand curve for capacity, with prices declining to zero as the magnitude of capacity excess becomes large… Moving to a competitive capacity auction, combined with efficient energy and ancillary services markets, will provide efficient investment incentives to develop the least-cost mix of resources, including baseload, peaking, uprates, demand response, deferred retirements, and new generation..."*
>
> - Brattle Group submission to the Review, p.v

> *"An auction process, in order not to destabilise the Reserve Capacity Mechanism to the point of not functioning, would have to include provision for any capacity year's Reserve Capacity Price to be paid for 10 years to capacity that has succeeded to win in an auction. Introducing market price signals this way would 1) substantially align the Reserve Capacity Price to supply-demand conditions, and 2) preserve the stability of the Reserve Capacity Price payment mechanism to investment that has been made to minimise the cost of capital in project financing and refinancing..."*
>
> - Perth Energy submission to the Review, p.20

> *"An administratively-determined capacity price benefits from simplicity over market mechanisms but is unlikely to ever result in an efficient price for capacity. This is because administratively-determined prices are unable to respond dynamically to changes in the supply and demand for capacity, and as such do not provide accurate signals for investment..."*
>
> - CCI submission to the Review, p.19-20

4.2.2. Bilateral contracts

All bilateral contracts will be declared and participate in the auction, however a declared bilateral source of capacity will be deemed to have a zero offer price. Offers of capacity that have a bilateral contract may be paid a capacity price by the contracting counterparty and not by the market while an offer of capacity that does not have a bilateral contract will receive the price determined through the auction process. An alternative approach with a similar outcome would be for all capacity to receive the clearing price, with bilateral contracts acting as financial contracts for difference.

There are two options for the capacity price determined through the auction process:

- The auction clearing price; or
- The pay as bid price.

The auction clearing price would determine one price for capacity based on the highest successful price bid for required (accredited) capacity, whereas the pay as bid price would see each successful bidder receiving the capacity price for the volume of capacity they bid into the auction. Studies of capacity and energy auctions in other jurisdictions have investigated the relative effectiveness of clearing price versus pay as bid prices at delivering lower cost outcomes. Although pay-as-bid models might be expected to produce lower cost because some bidders receive prices below the clearing price, studies contend that changes in bidding behaviours under the pay-as-bid model reduce their efficiency as bidders seek to place their offer as close as possible to what they believe the clearing price is likely to be. [44]

The conclusion from this work is that pay-as-bid auctions are unlikely to deliver better outcomes than clearing price auctions and may have adverse consequences for market efficiency including inefficient plant dispatch, disincentives for demand response and disincentives for investment in baseload and other low variable-cost technologies, potentially leading to the development of an inefficient generation mix.

The capacity auction included in this option will provide the clearing price for all accredited generation capacity rather than provide the differentiated capacity price that would be developed under a pay-as-bid model.

4.2.3. The quantity of capacity required

Under the Reformed WEM option, the Independent Market Operator will determine the quantity of capacity required by the market.

In the case where the sum of capacity contracted through bilateral contracts is insufficient to meet the Reserve Capacity Requirement, the Independent Market Operator will procure sufficient capacity to meet the Reserve Capacity Requirement through the staggered capacity auctions.[45]

The Independent Market Operator will determine the Individual Reserve Capacity Requirement of each market participant in a manner broadly similar to the current approach. Market participants that are load serving entities but have contracted more capacity than required can submit this capacity in the auction as a seller[46] or trade this capacity through a secondary trading mechanism, either over the counter or perhaps through an administered mechanism such as a bulletin board.

The risk of the Independent Market Operator over-forecasting the Reserve Capacity Requirement or any market participant over-stating their own requirement will be mitigated by the staggered capacity auction commencing three years in advance of the capacity year on a staggered basis such that a market participant can acquire some or all of their capacity requirement closer to the commencement of the capacity year.

The most significant difference between the design of the current capacity mechanism and the reformed capacity mechanism is the means by which the price of capacity is determined,

[44] Including a report produced for the New York Independent System Operator titled: *Uniform-pricing versus Pay-as-Bid in Wholesale Electricity Markets: Does it make a difference.*

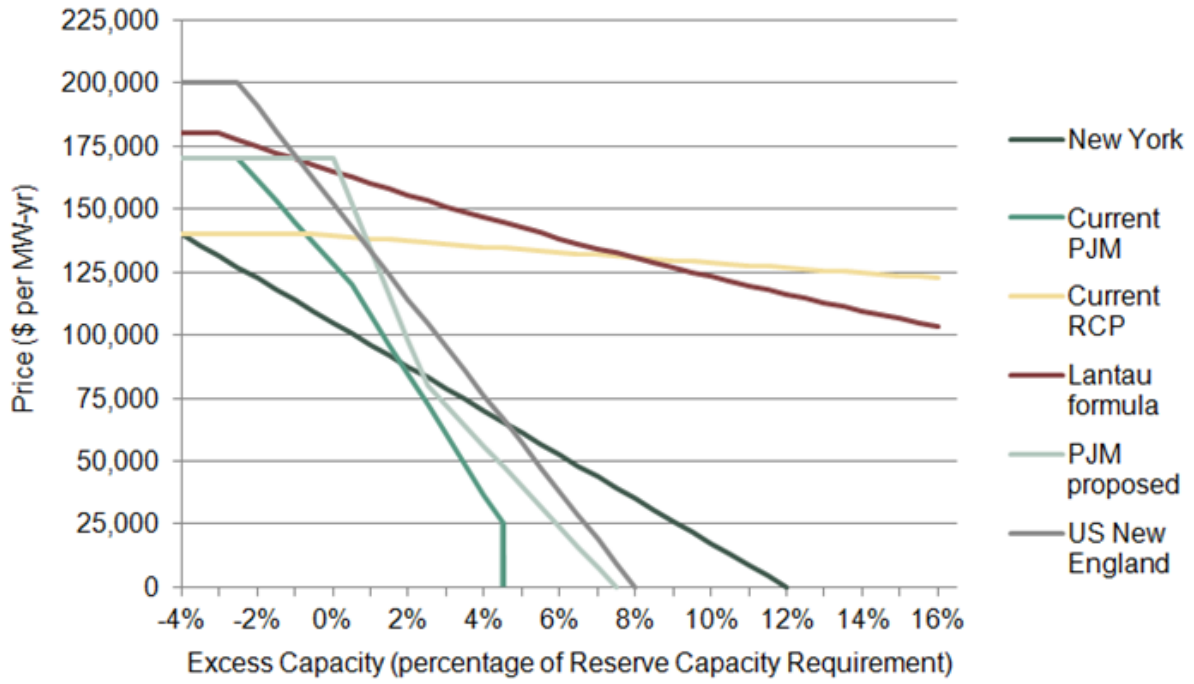
[45] In practise, the quantity procured through the auction process may be slightly different to the reserve capacity requirement determined by the IMO. The imposition of an administered demand curve permits the volume procured to move a little around the target quantity, resulting in less volatility in the auction price.

[46] This would require an equivalent adjustment to the total quantity procured.

moving from an administratively determined price to a technology neutral competitive auction process.

Figure 19 compares some administered price and demand curves from various capacity mechanisms.

Figure 19: Capacity price curves

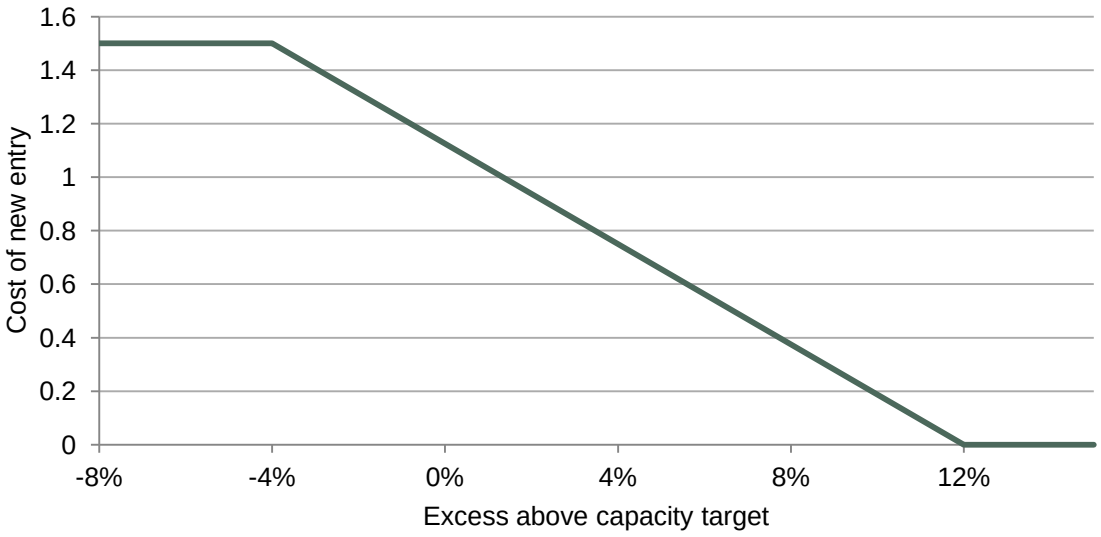


Source: Brattle Group data provided to the Electricity Market Review.

Figure 19 shows how the loose relationship between required capacity, available capacity and the Reserve Capacity Price inherent in the current WEM capacity mechanism supports a significantly higher capacity price in circumstances of excess capacity than do other markets, particularly those that maintain capacity auction mechanisms such as the Pennsylvania-New Jersey-Maryland (PJM) market (current or proposed), the New York market and the New England market.

The proposed demand curve for the Reformed WEM option borrows features from other curves proposed or operating in other capacity mechanisms. The part of the curve setting the maximum cost of new capacity at low or deficient levels of excess capacity is borrowed from the proposed curve in the PJM. Capping of the capacity price at zero at a particular level of excess capacity is borrowed from the New York curve.

Figure 20: Maximum capacity price curve for Reformed WEM capacity mechanism



Source: Public Utilities Office.

4.2.4. The WEM reliability criteria

In section 2.5.4 above, the reliability criteria currently applied in the WEM was described and the outcome from its application was compared to the outcome arising from the NEM reliability criteria, which uses a level of 0.002 per cent unserved energy as its target. The calculation showed the NEM reliability criteria, if applied in the WEM, would result in approximately 687 MW less capacity required than the criteria currently applied in the WEM.

Peak system demand on the SWIS for 2013-14 was 3,702 MW but the reserve capacity requirement was set in 2011-12 at 5,312 MW and the Independent Market Operator registered capacity credits totalled 6,132 MW[47] for the capacity year. The characteristics of demand on the SWIS and the fact it is an isolated system may mean that a reliability standard different to that applied in the NEM is appropriate but a Reserve Capacity Requirement of more than 1,600 MW, or 43 per cent, greater than the actual peak demand is a very high, and expensive, level of reserve.

The choice of a new reliability criterion requires some careful analysis of the implications of a changed standard. This would be done as part of the detailed design for the Reformed WEM option, if it is selected.

The quantity of capacity required by the market will be based on a reliability standard that will be subject to scrutiny from a reliability panel comprising representatives of the Independent Market Operator, the Public Utilities Office and the Economic Regulation Authority.

4.2.5. Capacity forecasting and the entry of block loads

Electricity demand has proven to be difficult to forecast since the WEM commenced in 2006. This is exacerbated by the fact the demand forecast can be significantly affected by the

[47] Summary of Capacity Credits assigned by facility for the 2011 reserve capacity cycle (for the capacity year running from 1 October 2013 to 1 October 2014) http://www.imowa.com.au/docs/default-source/Reserve-Capacity/capacity-credit-information/summary-of-capacity-credits-assigned-by-facility-for-the-2011-reserve-capacity-cycle-(8-july-2014).pdf?sfvrsn=0.

inclusion of block loads. A block load is typically a large industrial or mining project with a high demand for electricity.

As part of the current capacity mechanism, the Independent Market Operator forms a view based on a range of evidence, as to whether a block load is likely to enter the market requiring capacity. However, this assessment is based on the likelihood of entry and not necessarily a financial commitment to proceed.

The decision to include the block load in the Reserve Capacity Requirement exposes existing customers to the cost of the capacity procured for it. In the event the block load fails to develop, it is existing customers that incur this capacity cost. This is very different to the way in which an electricity supply contract would be acquired for such load in an energy-only market or how a utility would supply such a customer. In both of these cases electricity would only be procured after the decision had been made to proceed. If the project required a commitment to supply before its board had made the decision to proceed then a deposit or bank guarantee would be sought. This is a sound and typical commercial practice.

The Reformed WEM option includes a different treatment of block loads than that presently included in the Reserve Capacity Mechanism. Block loads will only be included in the Reserve Capacity Requirement after they have made the decision to proceed with their project. The projects will then be required to procure their own capacity. This may be self provided via the development of a new generation source or through an arrangement with an existing supplier to develop a new generation source or supply from a supplier's existing portfolio.

This is intended to prevent the Independent Market Operator securing capacity for projects before they have made the commercial decision to proceed and thereby running the considerable risk that consumers will be left with the bill for unnecessary generation capacity.

4.2.6. Demand-side management

Different generation technologies have different abilities to provide reserve on the system. Generation capacity is required to be available without limit when a dispatch order is provided by System Management, while demand-side management is only required to dispatch between 24 and 48 hours in any capacity year and is only dispatched as a last resort after all dispatchable capacity in the balancing merit order that is able to meet demand has been dispatched. Despite the unequal availability levels of different technologies, the current capacity mechanism pays all capacity the same price.

The reformed capacity mechanism should require all capacity to be available when called to be dispatched.

The risk of dispatching individual demand-side participants in a manner contrary to the contractual terms they have agreed with the demand-side management aggregator should be managed by the demand-side management aggregator through the manner in which they bid demand-side management capacity into the market.

All capacity in the market will be required to make balancing merit order submissions and the dispatch instructions in the existing Market Rules will need to be revised to reflect the revised treatment of demand-side management as more readily dispatchable capacity.

4.2.7. Market features

A reduction in gate closure time and the development of a real-time energy market would form part of the Reformed WEM option. Participants would be able to see prices as they are formed in each half hour period and know the half hourly price as soon as the period finished.

The reduction of gate closures to closer to real-time and the provision of real-time information to participants and market institutions will improve market efficiency by improving the consistency between dispatch and pricing and allowing price bids to reflect, as closely as possible, the real-time operation of the system taking into account any constraints or outages that may affect the merit order of dispatch.

Requirements for transparency regarding rebids[48] should be introduced. All participants and market institutions should receive information in real-time for each trading interval on system demand, dispatch and pricing, bids from each facility (or unit, if possible) and demand-side management and adjustments needed to manage network constraints or outages.

Further reforms will require all capacity to make facility related balancing merit order bids and remove the right of Synergy, or any of the portfolios formed through the restructure of Synergy's portfolios, to make portfolio balancing merit order bids. This would be coupled with the development of a spinning reserve market that is subject to competitive forces as opposed to being an obligation imposed on Synergy.

Co-optimising the ancillary services market with the load following requirements in the market is expected to reduce the cost of such services to the market and enable the more efficient development of competition for the provision of these aggregated services, which are presently treated as separate services.

4.2.8. Stakeholder comments: the Reformed WEM Option

Almost unanimously, market participants accepted that changes were required to the design of the current capacity mechanism.

A large proportion of respondents advocated for the adoption of a capacity auction, similar to that proposed in this option, if the Reserve Capacity Mechanism is to be retained.

The Independent Market Operator expressed concern about an auction-based capacity mechanism. Capacity auctions have required a number of administrative measures to mitigate risks related to price volatility and market power. Judgement needs to be exercised in setting key design parameters but this is not greatly different to the judgement required in the current administered Reserve Capacity Price formula.

The Independent Market Operator's submission to the Review contended that capacity auctions have typically worked better in larger, more competitively structured markets. The market dominance of Synergy represents a significant impediment to the introduction of a capacity auction.

Both the Reformed WEM and the NEM Energy-only options could not be introduced unless Synergy's generation portfolio is restructured into multiple competing portfolios.

[48] Such as those in the NEM Rules clause 3.8.22(c)

4.3. The NEM Energy-only option

The NEM Energy-only option involves the SWIS moving to NEM-style energy-only market arrangements.

In the NEM, the Australian Energy Market Operator (AEMO) conducts a centrally-coordinated dispatch process that pools generation on the basis of price bids into the market and delivers required quantities of electricity from the pool to wholesale consumers. For each dispatch interval in an energy-only market, the marginal generator sets the energy clearing price paid to all generators for the energy they provide in that interval. As demand increases, the clearing price rises to reflect the higher price bid by the marginal generator.

Energy-only markets have a relatively high price cap - the cap in the NEM at present is $13,500 per MWh. Wholesale prices tend to be volatile, reflecting the underlying volatility in generation costs. Participants use contracts of various kinds to manage the risks associated with this price volatility, which ensures that this volatility does not affect retail prices on a day to day basis. Contracts between generators and retailers are financial hedges, the most common form being a contract for difference whereby the generator contracts to pay the retailer the difference if the pool price is above the contract strike price and the retailer contracts to pay the generator the difference if the strike price is below the pool price. The contracts apply regardless of whether the generator is generating or the retailer is consuming the contracted amount. Various forms of hedge arrangement are used providing price stability and protection for buyers from price spikes.

If demand is increasing, periods of higher prices become more frequent providing an incentive for new capacity to enter the market.

The NEM framework applies to the wholesale electricity market and system operations, transmission and distribution network regulation and, most recently, to retail market regulation through the National Energy Customer Framework arrangements. The NEM framework encompasses market design, physical systems, and a legal, regulatory and governance framework.

In the context of the SWIS, there are significant benefits in adopting all the aspects of the NEM, rather than attempting to pick certain parts without others. Western Australia would be adopting a well-constructed, established and tested market framework that is known to work effectively. Selecting only some parts of the framework would require extensive and detailed testing to ensure that the remaining provisions are workable and effective. However due diligence will be needed to establish that the NEM regime will provide competitive and reliable energy in the SWIS and to identify necessary derogations.

The reform package for the NEM Energy-only option comprises:

- Adoption of the NEM legislation and National Electricity Rules, including the network access regime, in the SWIS with appropriate derogations for the Western Australian market.
- Provision of financial risk management instruments to improve liquidity and tradability in the market.
- Adoption of the NEM institutional and market governance arrangements, including market operation and regulation.

4.3.1. Implementing a NEM Energy-only market in the SWIS

In assessing the suitability of a NEM-style energy-only market in the SWIS the Review has identified the following pre-requisites which need to be met:

- The SWIS must be of a sufficient size to support the number of separate and viable participants needed for a competitive market and the separate generators must be prevented from merging in the future to the detriment of competition.
- Financial instruments should be available to all participants to assist in managing their market risks.
- The Western Australian Government's current powers for managing the electricity system in the event of a major infrastructure failure or outage should be maintained.

These prerequisites are addressed in turn below.

4.3.1.1. The size of the SWIS

Whether the SWIS is too small to support an energy-only market depends in part on the market composition needed to make such a market work efficiently. If the market has a structure with one major generator supplying more than half the market then an energy-only market is not a suitable market as it would confer too much market power in that generator.

Chapter 3 of this report discusses competitive industry structures in greater detail. Some of that analysis is summarised here.

Energy-only markets require a minimum number of competing independent generators, typically four or five, to be competitive. Whether the market is too small therefore depends on whether it can support four or five independent portfolios that would be commercially viable.

Commercial viability in such markets depends on being able to manage generator risk. While hedging contracts and financial risk management products can be used for this, generators will also seek to manage their risk physically by being able to have sufficient uncontracted capacity in their own portfolio to support their position in the event of an unplanned loss of one of their units.

On the basis of the mix of generating capacity in Synergy's existing portfolio it appears plant could be separated into three balanced portfolios and that each could become a viable and competitive market participant.

The existing privately-owned assets in the generation market, including the Alinta portfolio, would be sufficient to make two or more generation portfolios with baseload, mid merit and peaking plant.

The Australian Competition and Consumer Commission indicated to the Review that it considers four or five competitive generator portfolios would provide the basis for a competitive market and that the wholesale electricity market in Western Australia is big enough to sustain such a competitive market.[49] In this context, the Australian Competition and Consumer Commission views a market as big enough to sustain competition if participants would be able to hedge their generation capacity up to N-1 (where N is the

[49] Personal communication between the Steering Committee and ACCC, 5 September 2014.

number of generation units in the portfolio).[50] Further, the Australian Competition and Consumer Commission indicated that, if an energy-only market is established with a competitive industry structure, it would monitor future merger and acquisition activity and intervene if it held the prospect of materially reducing the level of competition.[51]

Similar sized electricity markets to the WEM have moved from systems served by one vertically integrated government-owned utility into competitive energy-only markets.[52]

Market arrangements in Singapore and New Zealand suggest that small electricity markets can operate effectively with an energy-only market. Both of these markets were of a similar size and structure to the SWIS when they introduced an energy-only market mechanism. Potential generator market power has been managed through the disaggregation of the dominant generation portfolio and restrictions on and monitoring of pricing behaviour. In both markets, there are at least four major generation portfolios, alongside smaller generators.

In both Singapore and New Zealand, excess generation capacity is placing significant downward pressure on wholesale prices. In Singapore, excess capacity and weak wholesale prices have contributed to the retirement of older, less efficient generation facilities. This allocation of risk heightens incentives, contributes to economic efficiency, including dynamic efficiency, and is likely to be in the long term interests of consumers.

Both markets have developed specific arrangements, such as a reserve trader function, to procure reserve generation capacity if necessary but it has not been required, even when the hydro power dependent New Zealand system underwent a severe drought from 2008 to 2010 and again in 2012.[53]

Both the Singapore and New Zealand markets have measures in place to monitor and if necessary intervene in market pricing processes to minimise strategic bidding behaviour in the immediate lead up to a given trading interval.

4.3.1.2. Availability of financial instruments

Prices in energy-only markets are necessarily volatile reflecting at times relatively large changes in the cost of supply as demand changes or unexpected plant outages cause step changes in supply. This level of volatility is an important feature of the market but both generators and retailers need to manage the risks arising from this.

Retailers have fixed price contracts with their customers and need contracts with generators that give them wholesale price stability. Generators provide price stability by providing two way hedges against agreed strike prices. One of their main business risks is an unplanned unit outage that exposes them to large hedge payments.

Typically, generators manage this physically by leaving enough capacity uncontracted to cover their largest unit outage (the so-called N-1 strategy). Both retailers and generators also resort to a range of other financial strategies which are based on one-way and two-way hedge contracts and combinations of options and hedges.

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[50] Ibid.

[51] Ibid.

[52] Wholesale Electricity Market Case Studies, Sapere, September, 2014.

[53] Electricity Authority of New Zealand, Electricity market performance: A review of 2012. Page 33.

In a market with active retail competition and churn in retailer loads it is important that generators and retailers can buy and sell the quantities and negotiate contract terms that allow them to manage their business risks effectively.

The Australian Stock Exchange provides a market for such products based on regional prices in the NEM and on prices in the New Zealand electricity market. Australian Stock Exchange Australian electricity futures and options are standardised and centrally cleared financial contracts. They are structured as cash-settled contracts for difference (CFDs) against the New South Wales, Victorian, Queensland and South Australian regional reference prices in the NEM.

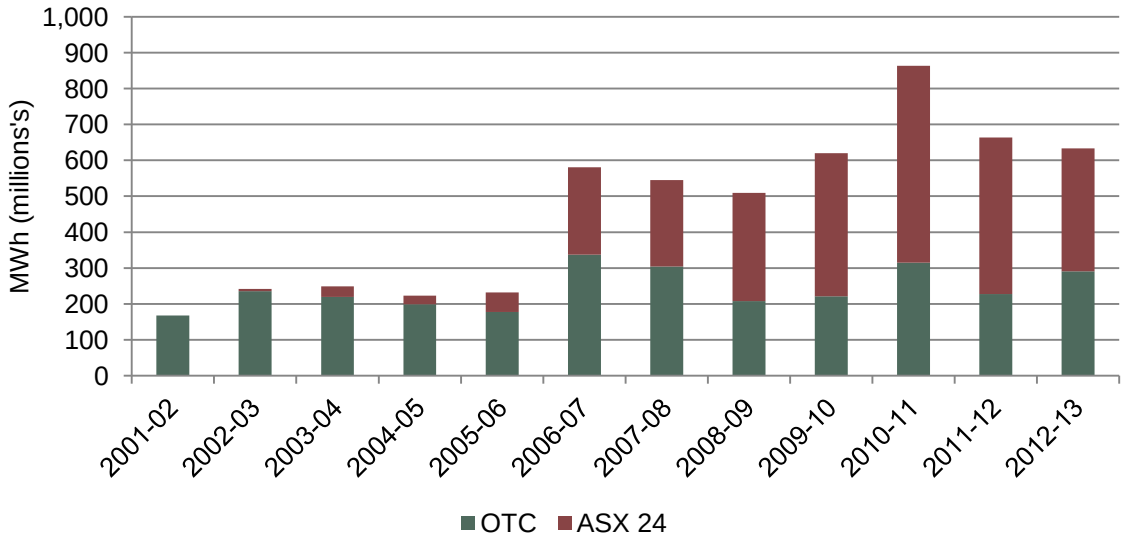
Australian Stock Exchange New Zealand electricity futures and options are standardised and centrally cleared financial contracts, structured as CFDs against two grid reference nodes (Otahuhu and Benmore) in the New Zealand electricity market.

The Australian Stock Exchange has a range of existing products based around the NEM and the regional reference prices developed in that market. If the SWIS became an unconnected region of the NEM the Australian Stock Exchange has indicated to the Review that it would consider offering such products based around Western Australian regional reference prices.

Electricity contract trading has developed over time in the NEM with volumes of trade growing and a gradual shift from over-the-counter trading to the futures market.

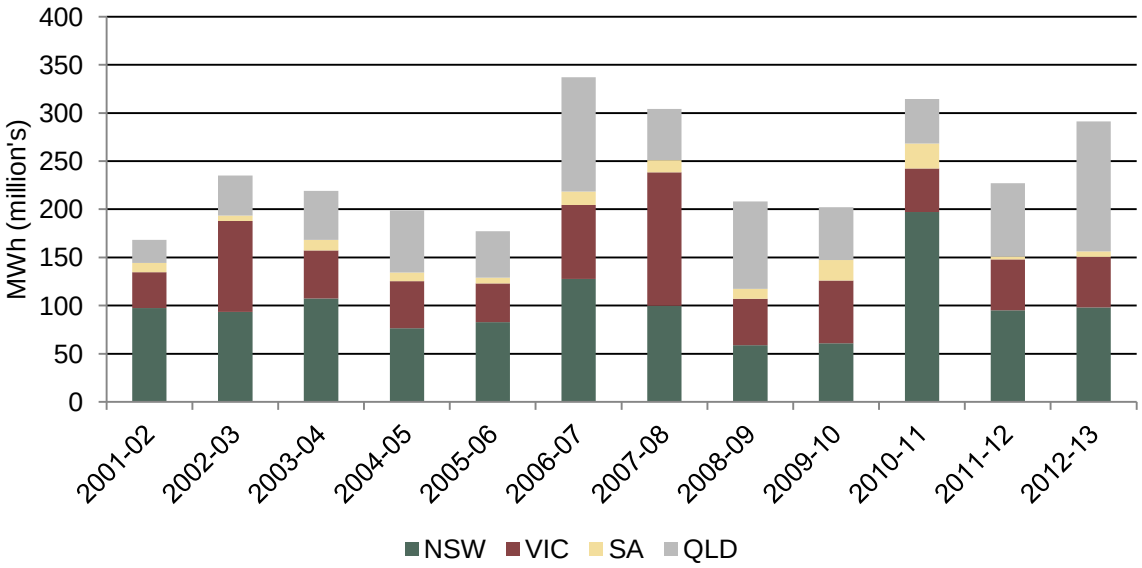
Figure 21 below shows the total annual volume of electricity contracts written across the market. Futures contracts only tend to develop once markets have reached a degree of maturity. In the NEM, the futures market contracts became fully established in 2003-04 with futures contracts exceeding over-the-counter contract volumes from 2008-09. The market currently trades three to five times the underlying physical product sold through the NEM, indicating that the contract market is liquid enough to support regular trading. Figure 22 shows only over-the-counter contracting, by region. The volume of over-the-counter contracting has stabilised in recent years and has been overtaken by futures traded.

Figure 21: NEM electricity annual contract volumes by type



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Figure 22: NEM electricity annual contract volumes by region



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

It may also be desirable for over-the-counter products to be available to market participants. The Review has held a meeting with the Australian Financial Market Association which has developed standard templates for a range of typical electricity market contracts so that they can be sold and traded as an over-the-counter product.

The Australian Financial Markets Association is an industry association and would help facilitate trades with standard products by making their standard contracts available in the SWIS.[54] The Australian Financial Markets Association also undertakes industry training in risk management using such contracts and financial products.

On the basis of these discussions it is the view of the Review that suitable financial instruments would be made available to market participants to manage risk in the event that the SWIS became an unconnected region of the NEM.

4.3.1.3. Management of the electricity system in emergency situations

The Western Australian Government currently has powers under three Acts of Parliament if required in the event of an electricity supply emergency. These are:

- *Emergency Management Act 2005:* When there is an identified need to access extraordinary emergency powers available within *Part 6* of this Act the Coordinator of Energy as Hazard Management Agency or the State Emergency Coordinator, can consider the need to make an Emergency Situation Declaration. Additionally, the declaration of a State of Emergency by the Minister for Emergency Services empowers the State Emergency Coordinator to authorise officers with specified powers to manage the situation. The powers under this Act are not energy-specific, but rather relate to general emergency management activities (evacuation, powers of entry and similar).

[54] Personal communication between the Review and members of the Electricity Committee of AFMA, 5 September 2014.

- *Energy Operators (Powers) Act 1979:* The emergency powers under this Act are the main statutory mechanism to respond to severe threats to a network. The powers, specific to the management of the distribution system, enable both the system operator and the Minister for Energy to take measures to prevent a system failure and mitigate effects of a disruption.
- *Fuel, Energy and Power Resources Act 1972:* The Governor of Western Australia may declare a State of Emergency and delegate responsibilities to the Minister for Energy. Upon the declaration of a State of Emergency, the State is able to draft emergency regulations to treat the consequences of an emergency. This Act takes precedence over other legislation and is very broad in scope. The emergency regulations could be used to control both consumption of electricity and to manage the consequences of a serious electricity supply disruption.

All states that participate in the NEM have similar emergency powers, and these are not diminished by involvement in the NEM.

Emergency powers in the NEM are handled under the NEM Emergency Protocol. The Protocol mainly concerns communication between the state government concerned and the Australian Energy Market Operator when that government considers it necessary to exert its powers under emergency legislation. It requires the state to give notice to the Australian Energy Market Operator and other jurisdictions of its resort to emergency powers including where it wishes the Australian Energy Market Operator to assist in managing the emergency where it believes other states may be affected. If the Australian Energy Market Operator believes a state's emergency powers may be needed, the Protocol also handles communications between the state representative and the Australian Energy Market Operator.

Other jurisdictions are unlikely to be affected by a declaration of an emergency in Western Australia as it would be an unconnected region of the NEM. Communication will mainly be with the Australian Energy Market Operator, especially if the Western Australian Government wishes it to help to manage the emergency.

Derogations from other NEM Rules would be considered if the SWIS becomes an unconnected region of the NEM. Derogations are exemptions from various provisions in the National Electricity Law and National Electricity Rules which allow, amongst other things, transitional measures to allow governments to maintain existing commitments to industry participants and customers in early stages of the market. Areas where derogations might typically be considered include:

- Price cap setting.
- Certain functions of Economic Regulation Authority.
- The setting of the reliability criteria and the continued operation of the Reserve Trader function.

4.4. Stakeholder comments: the NEM Energy-only option

Stakeholder views on the NEM Energy-only option were mixed. The Independent Market Operator raised concerns about the ability of peak demand on the SWIS to send the requisite price signals to encourage new investment under an energy-only market scenario.

ERM Power, Synergy and the Electricity Retailers Association of Australia advocated for an energy-only market.

> *"The NEM is a proven mature market which has delivered efficient market outcomes in both the Retail and Wholesale space. Adoption of the NEM market framework, inclusive of the governance framework, would see further efficiency gains within the WEM… [F]ollowing the structural separation of Synergy there is nothing particularly unique about the Western Australian market that justifies a separate market mechanism…"*
>
> - ERM Power Submission to the Review, p.2

On balance, Synergy concluded that the adoption of a NEM market design in the SWIS is likely to lead to improvements that are not available under existing market arrangements provided it is accompanied by: [55]

- Significant structural reform to Synergy…and further consideration of the ownership arrangements for at least some segments of the current Synergy business.
- Regulation to control and mitigate the exercise of market power, if necessary.
- Establishment of an effective and liquid derivatives (hedging) market that allows for market participants to adequately protect their financial exposure.
- Consideration of the impact (additional costs and processes) of prudential obligations and other regulatory change in a NEM market.
- Agreement of the derogations necessary to ensure the success of adopting the NEM structure in the Western Australian environment.

AGL's submission argued for stability in the market and cautioned against fundamental change at the risk of market stability. Origin Energy urged similar caution:

> *"Reform to the existing capacity market design is necessary given its current tendency to over-deliver investment at a high cost for customers; this is not sustainable in the long term. However, we seek to dissuade the Committee from considering a fundamental wholesale market design change at a time when regulatory stability and investment certainty will be critical for timely and effective structural industry reform and electricity retail competition…"*
>
> - Origin Energy Submission to the Review, p.1

4.5. Comparison of options

ACIL Allen conducted modelling out to 2030 to assist in the assessment of the options against a modelled status quo.

The projection of the status quo was designed to provide a baseline by which the two options could be compared; it was not intended to provide a detailed forecast on the future of the Western Australian energy industry. In determining the model assumptions wherever possible exogenous inputs were kept consistent in order to allow a clear view of the operation of the three markets.

Without reform to both the industry structure, through the restructuring of Synergy's generation portfolio into multiple competing portfolios, and the market mechanism (particularly the Reserve Capacity Mechanism), the industry will continue along its present

[55] Synergy submission to the Review, p.8.

path, leading to higher costs, higher tariffs and higher government subsidies. The Western Australian Government will also continue to be required to underwrite major new investments in generation, as it has done to date.

4.5.1. Modelling assumptions

A number of assumptions have been made in order to compare outcomes and isolate the effects of particular market designs in the results. Appendix 2 provides more detail on the input assumptions for the modelling.

In all three cases (base-case, high and low demand) it was assumed that the forecasts for each year are accurate, so that capacity mechanisms bring the appropriate volume of capacity into the market. Forecast error is not, therefore, a reason for the difference in outcomes between the options.

The modelling also assumes that policy and macroeconomic settings as well as the capital costs of new plant remain the same for the duration of the forecast period. This includes exchange rates and tax rates, which affect the cost of new plant, as well as current settings for carbon pricing and renewable generation subsidies. While it is unrealistic to assume that all of these parameters will remain constant, these are typical assumptions when market simulation modelling is being used to compare particular market features. Removing other sources of variability helps to isolate the causes of different outcomes and allows clear comparisons to be made.

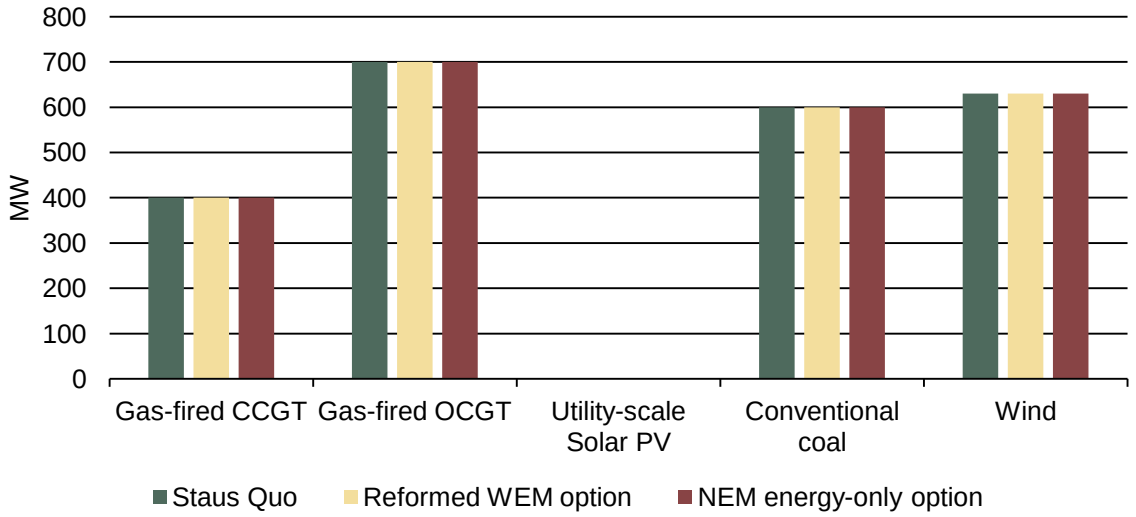
The quantity and type of new entrant capacity in the three scenarios is the same although the timing of new entry varies between the scenarios according to the different incentives provided by a capacity mechanism and an energy-only market. The modelling assumes in all three scenarios that new plant can enter the market on the basis of its projected revenue and generation costs only (taking Renewable Energy Target subsidies into account in the case of wind energy). It does not take network connection costs into account, which may be an important consideration in the future, particularly in the case of wind generation on more remote parts of the network and the case of all generation which would be subject to deep connection charges under the status quo scenario.

All of the new entrant plants in all three scenarios are energy producing, an outcome which again does not conform to the reality of new entrant performance on the SWIS in the past. The capital expenditure for the baseline investment in new plant is $6.5 billion in nominal terms.

The differences in outcomes for wholesale prices and tariffs between the scenarios do not include additional capacity costs arising from demand forecasts that have exceeded outcomes, a considerable source of excess cost in the past and, in reality, most likely in the future. The differences between the scenario results are due only to the increased cost associated with the acquisition of capacity in the status quo and Reformed WEM option, slightly offset by the higher pool prices in the NEM Energy-only option.

The status quo results are also likely to differ from reality as the modelling assumes plant enters when it can meet or exceed a threshold rate of return and exit when it reaches the end of its economic life or its output has fallen to a non-viable level. It does not take into account the effects of the capacity mechanism in keeping plant open, or refurbishing old plant, past its economic life and keeping open more capacity than is necessary to meet a portfolio’s demand.

Figure 23: Entrant plant by plant type - baseline scenario



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

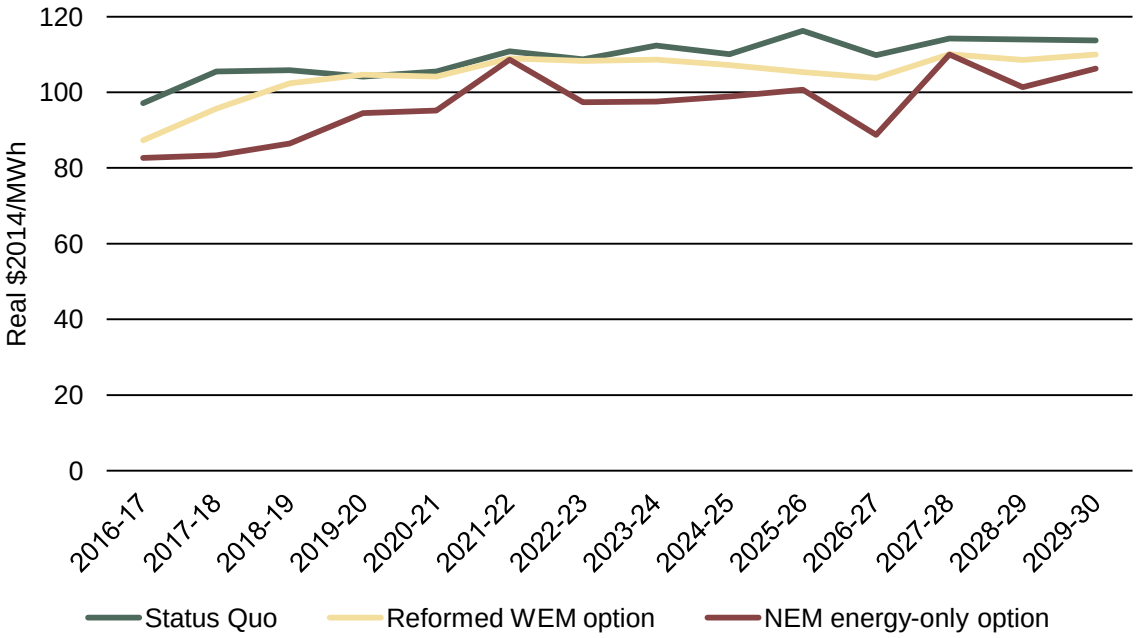
The initial entry of wind generation is driven by the Large-scale Renewable Energy Target requirement and high Western Australian energy prices compared to the east coast, which makes wind generation investment in Western Australia more attractive. Plant continues to enter as required to meet the growing demand forecast in the form of two combined cycle gas turbines.

From 2025 through to 2030, the growing demand combined with an increasing gas price sees the entry of new coal. In reality, it is most likely at that time that new baseload coal plant would be unable to enter without carbon capture and storage. Also, changes in capital costs by that time will probably make other generation technologies competitive, particularly if the costs of some renewable energy technologies continue to fall. However, the intention of this study is to look closely at the effects of different market mechanisms, not technology or renewable energy policy changes, so, as noted above, these inputs have been kept constant.

4.5.2. Wholesale energy price

The comparative modelling shows that the energy price, including capacity cost under the status quo and the Reformed WEM option, is lower under the NEM Energy-only option across all three demand scenarios, as seen in Figure 24.

Figure 24: Annual average wholesale price for all options, baseline line demand.



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

The prices under the status quo and the Reformed WEM option are largely influenced by the capacity price, which closely follows the cost of new entry. The NEM Energy-only option price will naturally increase to the cost of new entry, as seen in the period from 2019 to 2021 and then adjust down as new build enters the market adding more supply.

The NEM Energy-only option has the lowest overall cost for the forecast period, as shown in Table 3, an average of 11 per cent lower across the three scenarios compared to the status quo.

Table 3: Total Net Present Value cost from 2016 to 2030 (real $2014 prices)

Scenario	Low Case ($b)	Baseline ($b)	High Case ($b)
Status Quo	$14.02	$22.23	$26.16
Reformed WEM option	$13.88	$21.44	$25.43
NEM Energy-only option	$11.98	$20.08	$23.74

Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

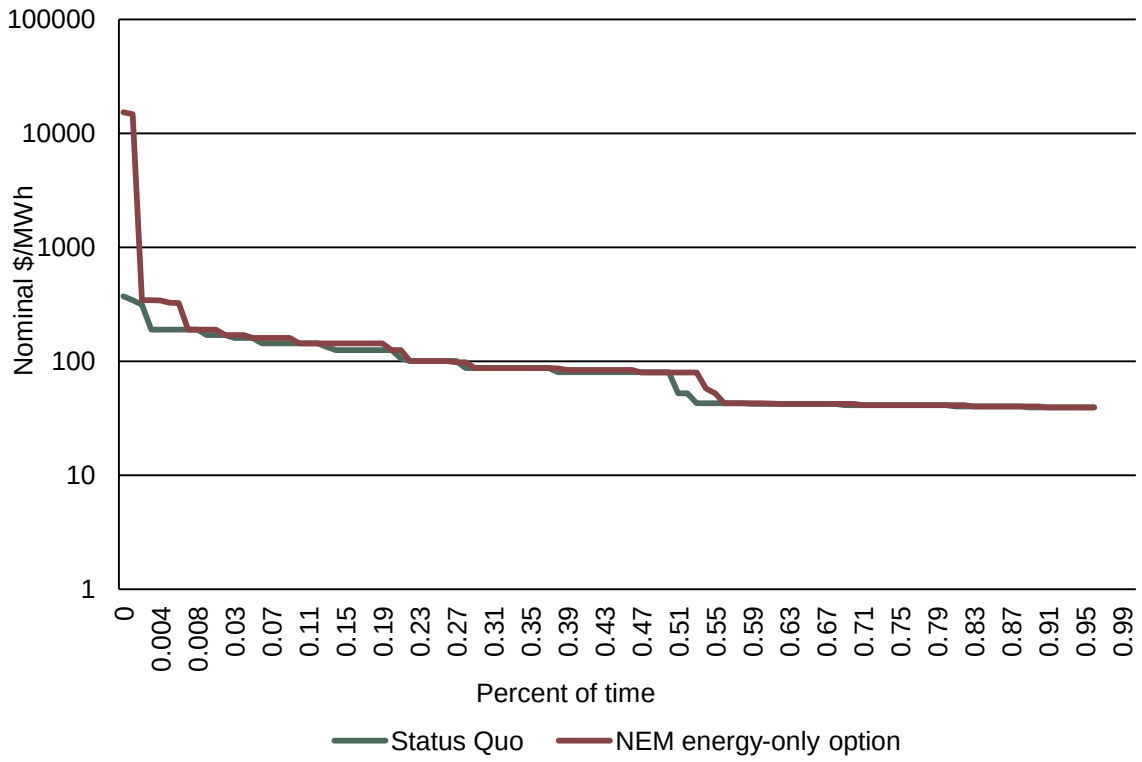
Comparing the results of the baseline projection of the status quo against the NEM Energy-only option shows a reduction in the capacity cost of $6.3 billion in net present value terms. This is offset by a higher energy price under the NEM Energy-only option with an increase of $4.2 billion in net present value terms compared to the status quo. This remains consistent across the high and low scenarios where the savings achieved by not having a capacity mechanism are higher than the resulting increase in energy price, leading to a net lower cost.

The energy price in the NEM Energy-only option is on average 25 per cent higher than the status quo, due to the increased price cap and the freedom to bid above short run marginal cost when the market allows. The energy-only pool reflects the higher costs of supply during

high demand periods, providing a clear incentive for generators to be available during peak demand events.

Figure 25 shows the price duration curves for the status quo and the NEM Energy-only option projections for the year 2020.

Figure 25: 2020 price duration curves (nominal $/MWh)



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Note: Y axis is a logarithmic scale.

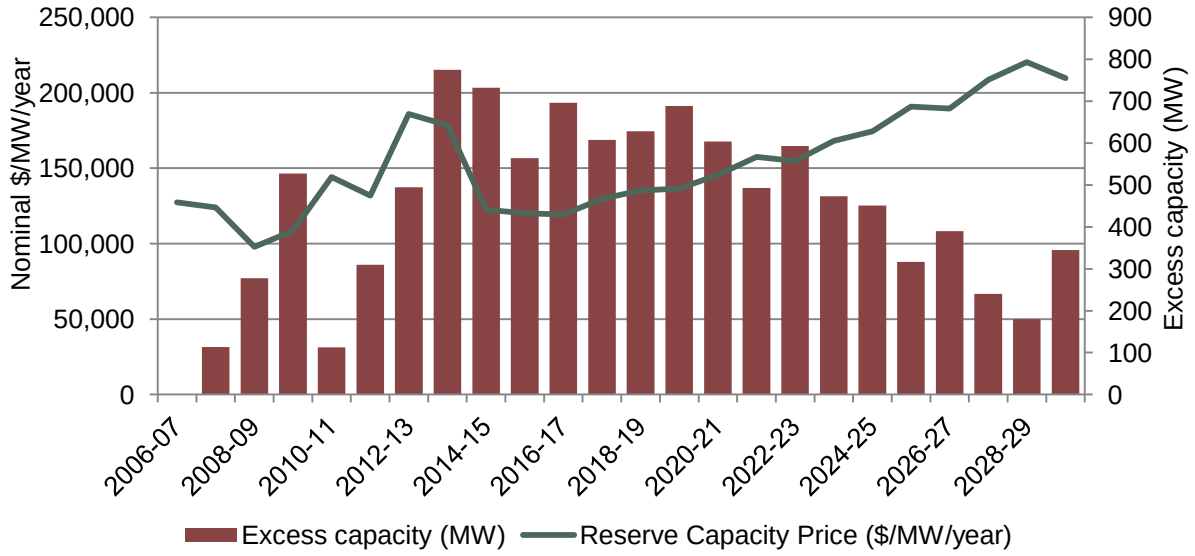
4.5.3. Reserve Capacity Mechanism

The status quo and Reformed WEM options both include a capacity mechanism. The status quo includes the assumption that the Reserve Capacity Price is calculated using the methodology outlined in market rule change RC_2013_20. This proposes two fundamental changes:

1. The Reserve Capacity Price is able to move up to 10 per cent above the Maximum Reserve Capacity Price when 97 per cent of the Reserve Capacity Requirement has been fulfilled.
2. The slope of the reserve capacity price adjustment factor at -3.75 instead of the current -1 when adjusting the Reserve Capacity Price for excess capacity.

The modelling suggests that under the status quo the WEM will continue to see a large volume of excess capacity (500-700 MW) above the Reserve Capacity Requirement for a large portion of the modelling outlook, reducing in the later years to around 100 – 400 MW, as shown in Figure 26.

Figure 26: Projected Reserve Capacity Price – Status Quo baseline case

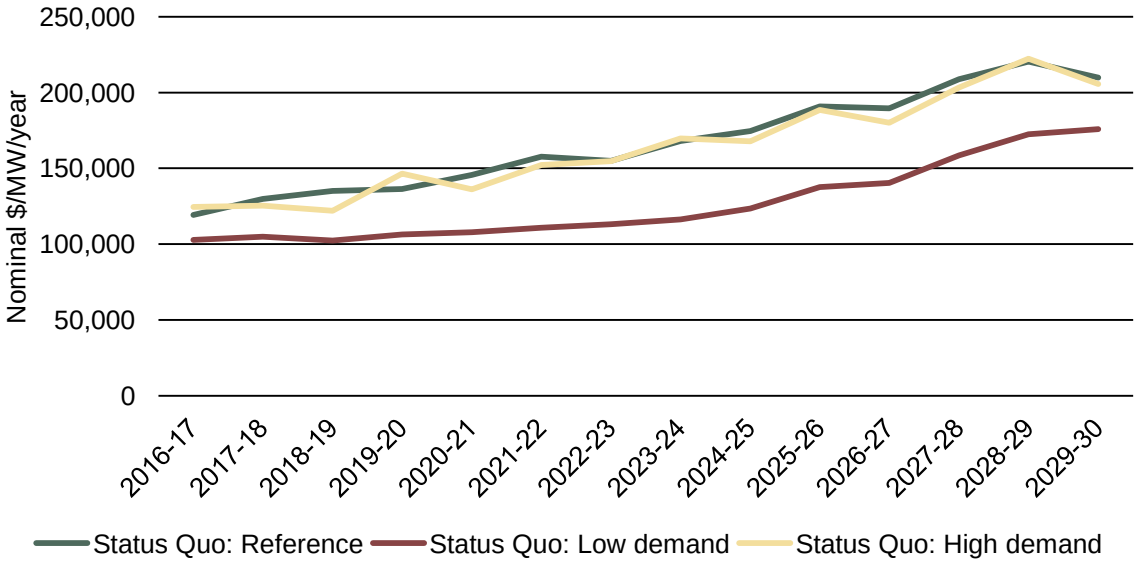


Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Note: results to 2015-16 are actual as determined by the IMO. The modelling assumes that the IMO implements the revised reserve capacity price adjustment mechanism as proposed in rule change RC_2013_20 from 2016-17 onwards.

The different demand scenarios demonstrate some of the problems arising from the status quo approach to capacity pricing and acquisition. The price outcome in the high demand scenario is very similar to the base-case as a result of the Reserve Capacity Price being based on the cost of new entry, demonstrating that the status quo capacity mechanism is unable to reflect changing consumer demand. The low demand scenario sees a reduction in price due to a falling demand. However all existing capacity would still qualify for capacity payments, providing no incentive to retire plant. Figure 27 shows the results of the Reserve Capacity Price for the three demand cases.

Figure 27: Reserve Capacity Price outcomes for three demand cases



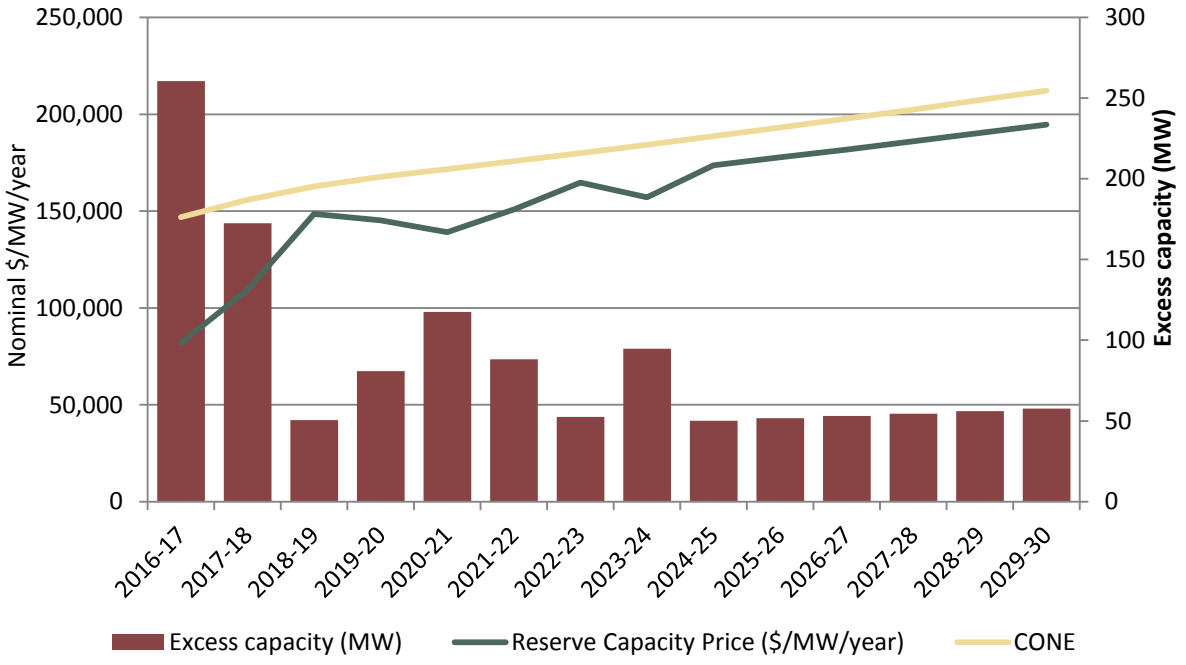
Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Reformed WEM option modelling included a reformed capacity mechanism utilising an auction to determine the Reserve Capacity Price. The auction process was held over three years leading into the capacity year, with 60 per cent, 30 per cent and 10 percent of capacity accredited in the respective years. The auction was designed to minimise forecast error and allow adjustments to the Reserve Capacity Requirement as more accurate data becomes available. A decision was made to limit demand-side management's ability in the auction to the last 10 per cent due to demand-side management requiring a shorter lead time compared to new build projects.

ACIL Allen modelled participant behaviour for the auction using game theory and assumed no regulatory restrictions on bidding price. Under this framework each competing portfolio would seek to maximise its net revenue position until the Nash equilibrium is found. Nash equilibrium is reached when each portfolio has achieved their best position taking into account the positions of all the other portfolios.

The modelled outcomes for the auction show a sustained reduction in excess capacity as shown in Figure 28. The Reserve Capacity Price on average is $9,975 per MW per year lower under the Reformed WEM option than the status quo.

Figure 28: Projected Reserve Capacity Price and excess capacity – Reformed WEM option baseline



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

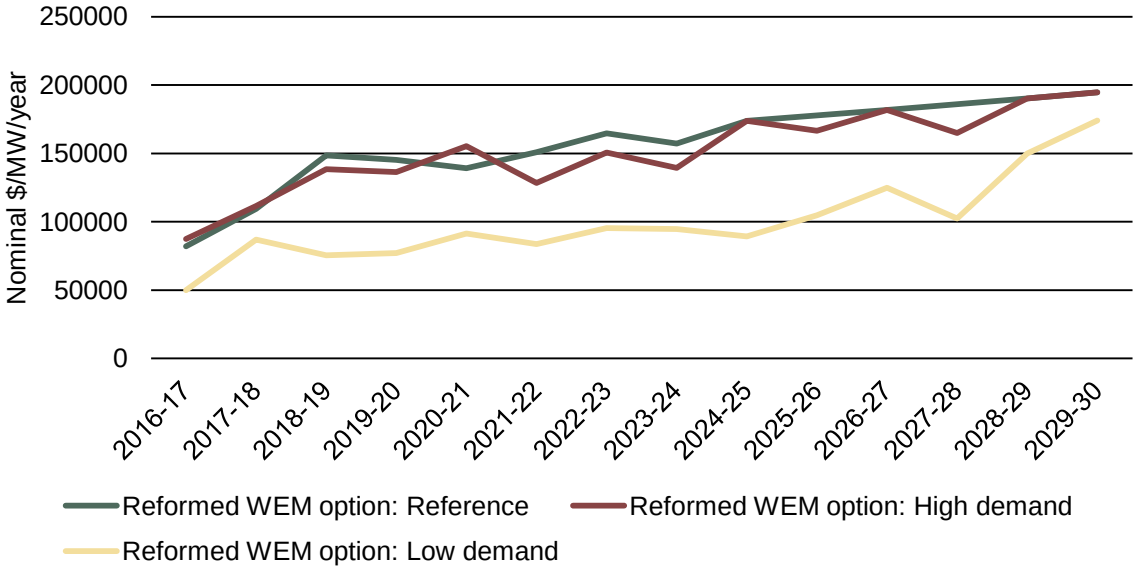
Note: CONE refers to the cost of new entry for a 160 MW open cycle case turbine.

The auction outcomes are dependent on the level of competition. With the decision to exclude demand-side management from the first two auction cycles, the depth of competition is reduced and just enough generation capacity is left to meet the requirement. This, combined with market participants withholding capacity from the auction in order to increase the price, saw the price approach the cost of new entry each time. The price in the

third auction was much lower due to higher competition as a consequence of demand-side management inclusion.

Figure 29 shows the results of modelling different Reformed WEM option auction outcomes with different demand projections. Under the high demand scenario the reserve capacity price is generally similar to the baseline. Under the low demand scenario the capacity prices were lower due to a lower demand.

Figure 29: Capacity price outcomes with different demand projections – Reformed WEM option



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

As noted in section 4.4.1 above, one of the modelling assumptions is that the forecast upon which capacity acquisition is based proves to be correct in every year. Given outcomes over the period since the WEM commenced in 2006 this is unlikely to be the case every year.

Table 4 shows the effect of different levels of forecasting error on the Reserve Capacity Price and energy prices.

Table 4: Impact of forecast error as percentage of Reserve Capacity Requirement on reserve capacity annual cost ($million) ($2014)

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
2016-17	5.6	11.3	16.9	22.6	28.2	33.9	39.5	45.2	50.8	56.5
2017-18	6.1	12.3	18.4	24.6	30.7	36.9	43.0	49.1	55.3	61.4
2018-19	6.4	12.8	19.2	25.6	32.0	38.4	44.8	51.2	57.6	64.0
2019-20	6.4	12.9	19.3	25.7	32.1	38.6	45.0	51.4	57.9	64.3
2020-21	6.8	13.6	20.4	27.2	34.0	40.8	47.6	54.4	61.2	68.0
2021-22	7.3	14.6	22.0	29.3	36.6	43.9	51.2	58.6	65.9	73.2
2022-23	7.1	14.3	21.4	28.6	35.7	42.9	50.0	57.1	64.3	71.4
2023-24	7.7	15.4	23.1	30.8	38.5	46.2	53.9	61.6	69.3	77.0
2024-25	8.0	15.9	23.9	31.9	39.8	47.8	55.8	63.7	71.7	79.7
2025-26	8.7	17.4	26.0	34.7	43.4	52.1	60.8	69.4	78.1	86.8
2026-27	8.6	17.2	25.8	34.3	42.9	51.5	60.1	68.7	77.3	85.9
2027-28	9.4	18.8	28.2	37.7	47.1	56.5	65.9	75.3	84.7	94.1
2028-29	9.9	19.8	29.7	39.6	49.5	59.4	69.3	79.2	89.1	99.0
2029-30	9.4	18.8	28.2	37.6	46.9	56.3	65.7	75.1	84.5	93.9
Total	107.5	215.0	322.6	430.1	537.6	645.1	752.7	860.2	967.7	1,075.2

Source: ACIL Allen “WEM and NEM Comparison: Report to the Electricity Market Review”.

4.5.4. Electricity costs

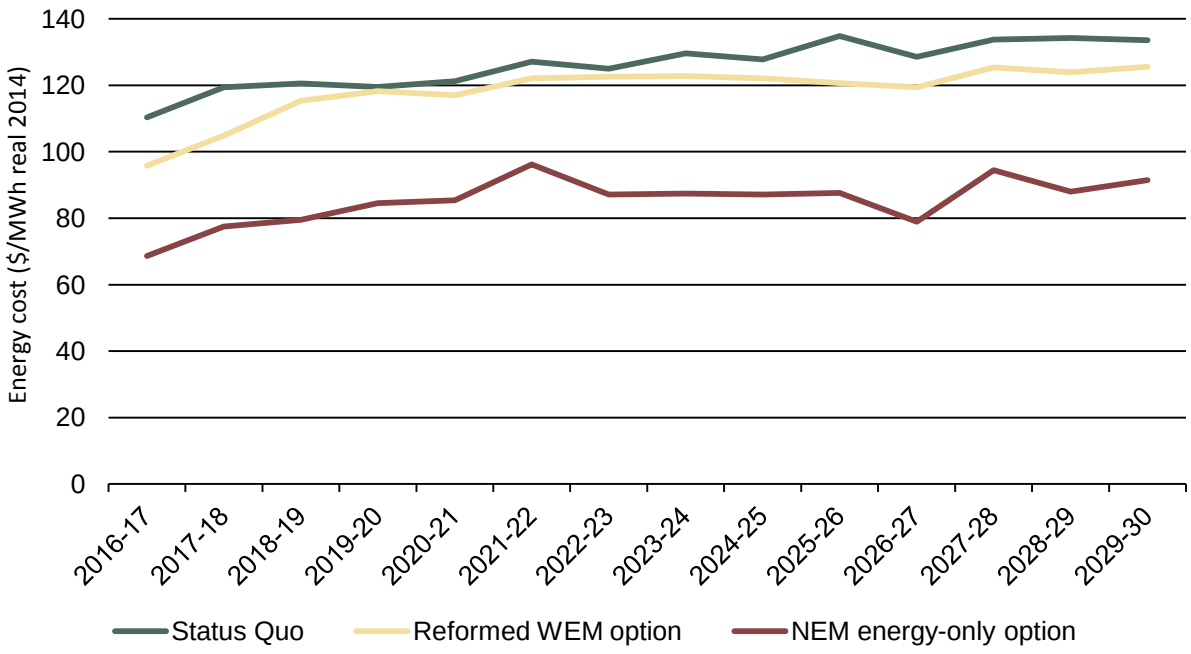
The modelling indicates that retaining a capacity mechanism, even when assuming perfect foresight, results in higher costs than an energy-only market. The extra cost of the capacity payments transfers value from consumers to generators. This transfer is more than enough to compensate generators for the loss of revenue they suffer from the imposition of a price cap on the balancing market.

The modelling also indicates that end user tariffs will be lower under the NEM Energy-only option and deliver substantially greater benefits than the status quo or Reformed WEM option. Modelling results were converted into estimates of current tariffs, given their load shapes. This calculation was carried out for three different tariff classes A1 (non contestable), L1 (small business) and L3 (large business). The expected aggregate cost savings for consumers serviced by these three tariff classes under the NEM Energy-only option compared to the status quo is on average around $250 million per annum, or $1.96

billion in net present value terms. Savings under the Reformed WEM option are approximately $50 million per annum, or about $410 million in net present value.

Figure 30 shows the modelling results for the A1 tariff class. The NEM Energy-only option has the greatest impact on the A1 tariff class as a result of the absence of a capacity mechanism, which attributes a high proportion of the total capacity cost to consumers on this tariff.

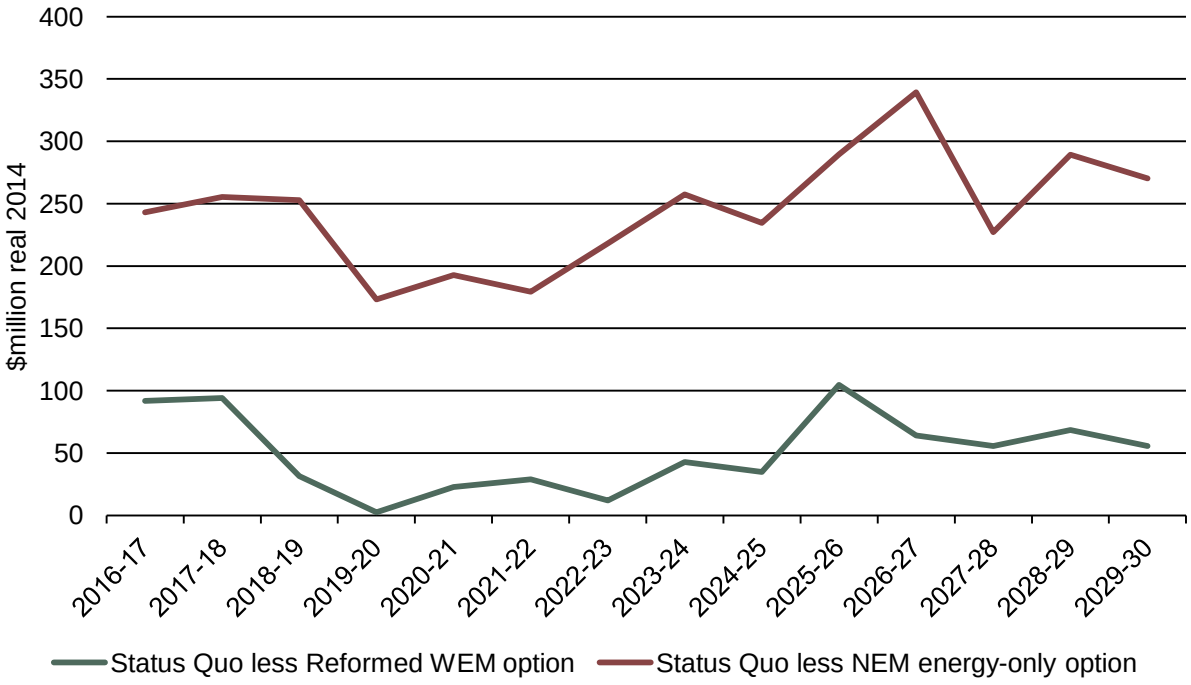
Figure 30: A1 Tariff class per unit energy cost – Baseline case



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

L1 and L3 tariffs in the NEM Energy-only option are also lower than both the status quo and Reformed WEM option, again resulting from cost savings from the elimination of the capacity mechanism. Figure 31 shows the estimated savings for the three tariff classes for both options relative to the status quo.

Figure 31: Tariff savings A1, L1 and L3 – baseline case



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

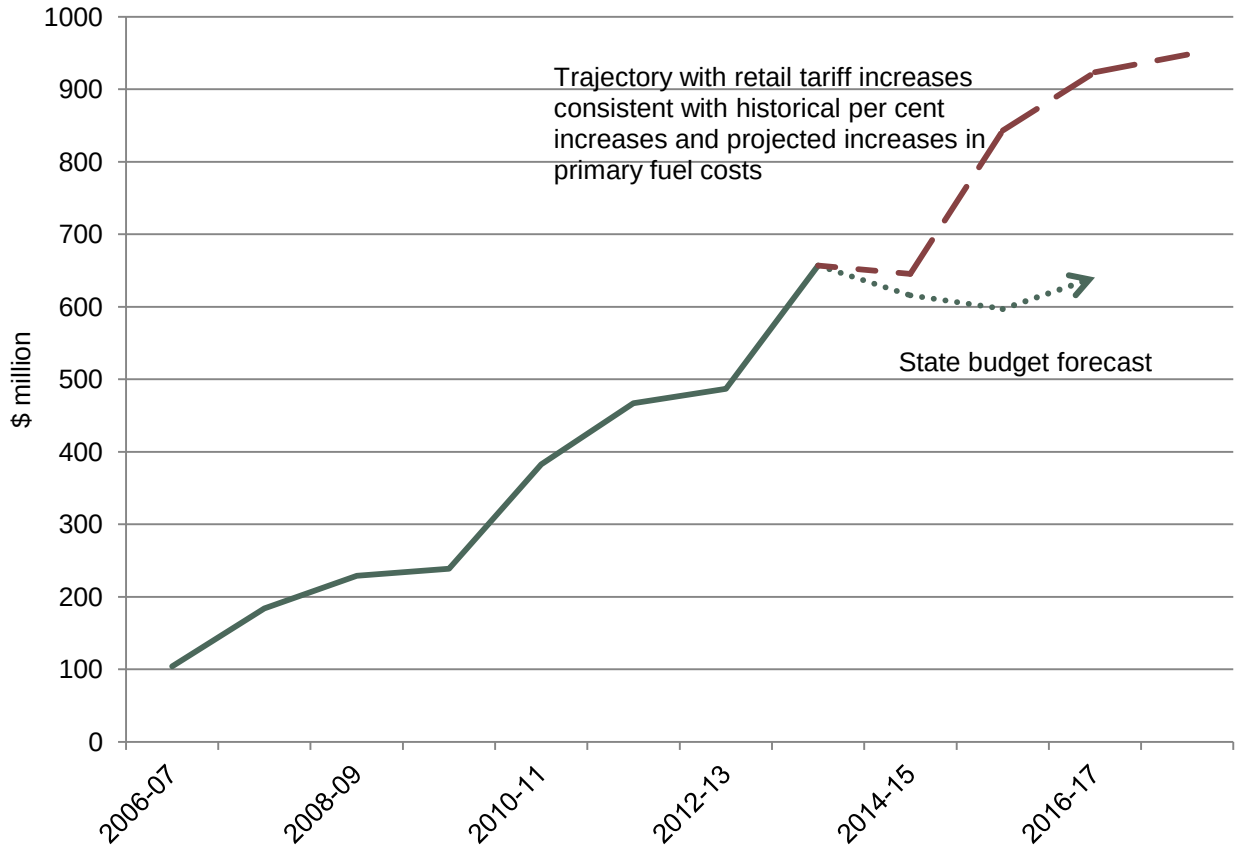
4.6. Impact on government

Residential retail customers in the SWIS are shielded from the full impact of high costs through a retail operating subsidy to Synergy known as the Tariff Adjustment Payment.

The value of this subsidy has increased substantially since it was introduced in 2009-10 from $167.2 million to a forecast $510.3 million in 2013-14,[56] despite very large increases in electricity prices over the same period. Overall subsidies to the industry (including the Tariff Equalisation Fund paid to Horizon Power, introduced in 2006) are more than $600 million a year. The operating subsidy is currently forecast to be at least maintained at similar values in coming years (and may actually increase, despite increases in electricity prices) totalling more than $2.4 billion in these four years on a business-as-usual case, as shown in Figure 32.

[56] Financial statements for the Electricity Retail Corporation trading as Synergy for 6 months to 31 December 2013 and financial statements for the Electricity Generation and Retail Corporation trading as Synergy for 6 months to 30 June 2014.

Figure 32: Potential future trajectories of the retail electricity subsidy ($ million)



Source: State Budget forecast, Public Utilities Office analysis.

Figure 32 also shows the outcomes of high level analysis of the operating subsidy undertaken specifically for the Review. This forecast incorporates a number of changes that have occurred since the compilation of the State Budget Forecast.

The Review's forecast provides an insight into the sensitivity of the budgeted operating subsidy to changes in underlying cost parameters and represents a possible scenario. While outcomes may vary from Figure 32, there is a risk that the Western Australian Government may face higher subsidies in the future. For example:

- The price of fuel for generation is a significant contributor to the total cost of electricity supply. The costs of mining coal in the Collie Basin are likely to increase as seams become narrower and deeper and the Review has used a price for coal which reflects the increase recently negotiated by Synergy in October 2014.
- The Review forecast has incorporated a scenario that Synergy sales decline by 5 per cent. This reflects assumptions of a higher uptake rate for rooftop solar photovoltaic panel installations and Synergy losing market share in the contestable market due to competition arising from excess energy in the market.
- Network cost projections are higher reflecting the potential for a higher regulated rate of return in the next access arrangement determination.
- The retail tariff increases at a rate equal to the consumer price index, which is lower than the seven per cent annual increase in tariffs assumed in the State Budget forecast.

The lack of competition in both the wholesale and retail electricity markets means that there are currently limited incentives to contain cost increases or indeed to lower the very high costs recently experienced in the generation sector. These costs are passed through to non-contestable customers and to the Western Australian Government through the operating subsidy.

As well as requiring ongoing operating subsidies, industry and market arrangements in the SWIS will, if maintained, require the Western Australian Government (via Synergy) to continue to be the primary investor or underwriter of future investment in generation. All of the major investors in the Australian electricity industry consulted by the Review said that they would not invest in the SWIS as independent market participants as either generators or retailers under the present industry structure and the current high level of government subsidies.

Without reform to both the industry structure, through the restructuring of Synergy's generation portfolio into multiple competing portfolios and the market mechanism (particularly the Reserve Capacity Mechanism), the industry will continue along its present path, leading to higher costs, higher tariffs and higher government subsidies. The Western Australian Government will also continue to be required to underwrite major new investments in generation, as it has done to date.

Modelling of the total cost of supply associated with each of the market design options considered (performed by ACIL Allen) formed the basis for the high level impact assessments within this paper. In undertaking the modelling, assumptions were made as to the competitive incentives that were likely to arise, the resultant market behaviours (particularly bidding strategies in the spot markets for electricity) and efficiency gains.[57] A brief summary of the expected benefits of reform are provided below.

ACIL Allen adopted a four-stage approach to the modelling:

- Determination of the potential impacts of reform on the cost structures and behaviours of the market participants. This was a high-level analysis based on information provided by the Review and from studies of the NEM with regard to the NEM Energy-only option.
- Adjustment of behavioural variables to reflect the different incentives under each reform option.
- Optimisation of the contracting/bidding strategies of each entity in the market to maximise profits. Bidding strategies were optimised on a portfolio basis.
- Comparative analysis of results to determine potential costs and benefits of reform.

Potential gains in efficiency were assumed to arise from:

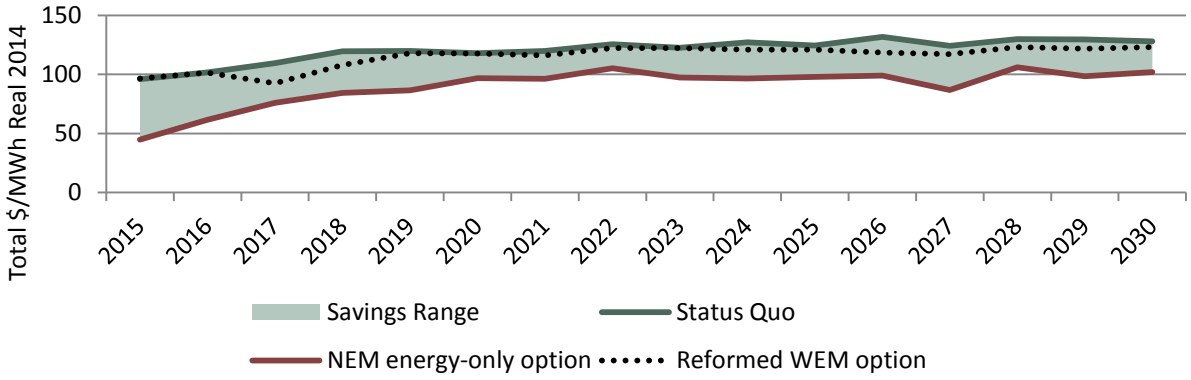
- Improved availability of generating plant to levels observed in other reformed markets (the NEM).
- Reduced operating and maintenance costs to levels observed for similar sized operations in other reformed markets (the NEM).
- More efficient dispatch of generating plant.
- Over the longer term, introduction of least-cost options for new electricity generation capacity.

[57] The modelled scenarios and associated assumptions are described in detail in the report from ACIL Allen.

The benefits of the reform options were measured as changes in total costs compared to the status quo. As shown in Figure 33, the modelling indicates that both options can deliver cost savings, with the NEM Energy-only option delivering the largest benefit.

The benefits under the NEM Energy-only option are estimated to be in the range of $50 per MWh greater than those delivered under the status quo. These are average reductions, with particular customers and tariff types receiving greater or lesser reductions depending on the structure of pricing for the customer segment and the customer's underlying load profile.

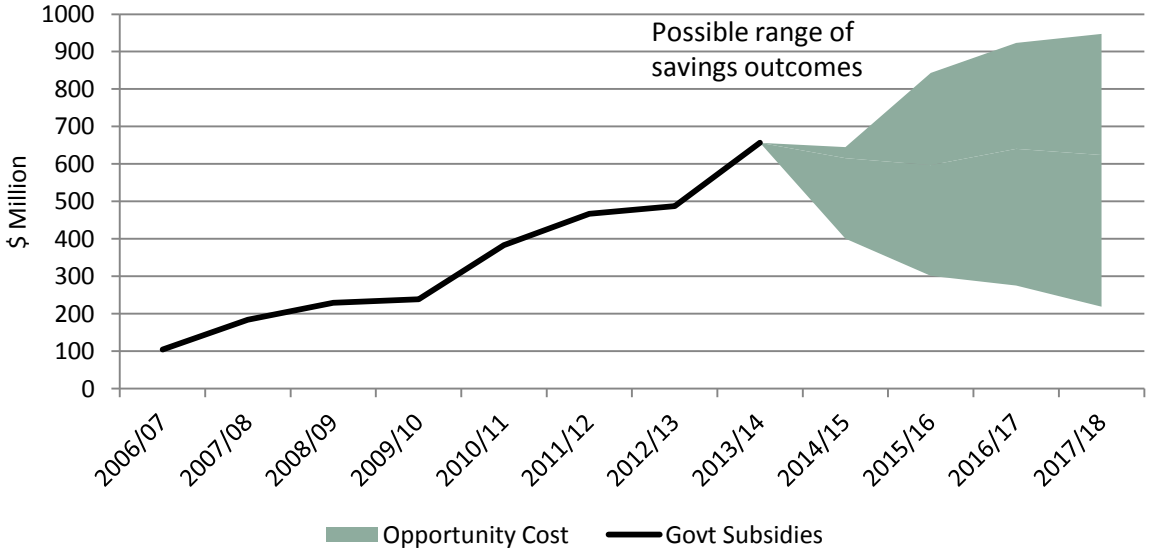
Figure 33: Estimated Total Cost Savings ($ per MWh Real 2014)



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

Figure 34 below shows the forecast combined impact of a series of reforms currently being progressed by the Western Australian Government as well as the impacts of the proposed reforms under the NEM Energy-only option, which is seen as being the better option in terms of the scope for delivering sustainable efficiency benefits to the industry. The reforms currently being progressed include the merger of Synergy and Verve Energy and efficiency targets imposed on Government entities in relation to planned operating and capital expenditures.

Figure 34: Forecast Subsidy



Source: ACIL Allen "WEM and NEM Comparison: Report to the Electricity Market Review".

The interrelatedness of the reforms in the current and proposed reform package make it difficult to identify the discrete benefits from specific reform activities, however, the reduction in the subsidy cost to the Western Australian Government could be as great as $750 million per annum by the end of this decade, when compared to the no-change outlook shown in Figure 32.

4.7. Findings

- The design features of the current WEM (particularly the Reserve Capacity Mechanism) have been a major contributor to the high cost of electricity generation in the SWIS. The Review has considered two options for a new market mechanism for the SWIS.
- The first option is to substantially change the existing market arrangements while retaining a capacity plus energy wholesale electricity market in Western Australia. This Reformed WEM option embodies the following principal reforms to the current market arrangements:
    - A revised Reserve Capacity Mechanism that utilises a capacity auction to acquire capacity from generation businesses with the intention that the price paid is based on a more competitive process.
    - A detailed technical review of the current method for determining the reliability criterion for the SWIS which determines the amount of generation capacity that is to be procured to meet reliability standards.
    - An enhanced energy market mechanism to promote greater competition between generation facilities by individual facility bidding and transparent real time pricing in the market.
- The second option is for the SWIS to become an unconnected region of the NEM. This NEM Energy-only option involves fully adopting the energy-only market arrangements of the NEM together with the National Electricity Rules governing the energy market, regulation of electricity networks and retail arrangements. Operation of the wholesale electricity market would shift from the Independent Market Operator in Western Australia to the Australian Energy Market Operator.
- The Reformed WEM option would involve fewer changes to the current market arrangements than the NEM Energy-only option. It would retain the same market manager and similar regulatory arrangements. The major changes to the market arrangements could occur through the existing process for changes to the WEM Rules.
- Combined with the reforms to industry structure and full retail contestability, the Reformed WEM option would deliver a more competitive market than the status quo. The retention of a capacity mechanism would mean that there would still be incentives for the inefficient use of plant and to keep plant open only to collect capacity payments but these incentives would be countered by competitive wholesale and retail markets. The improved energy market is intended to result in a more competitive and transparent market allowing electricity retailers to minimise their costs of wholesale energy purchases.
- The NEM Energy-only option is a step change from existing market arrangements, although it involves applying the well-tested market arrangements that have been in operation in the NEM for more than 15 years.

- Modelling of electricity market outcomes under the two reform options indicates that both options would produce benefits over the existing wholesale electricity market arrangements. Energy costs are projected to be about 6 per cent lower under the Reformed WEM option and about 30 percent lower under the NEM Energy-only option over the period to 2030 than under the current wholesale electricity market arrangements.
- Total cost savings for electricity customers are estimated at approximately $50 million per annum under the Reformed WEM option and $250 million per annum under the NEM Energy-only option.
- The comparison of the two options for reform of the wholesale electricity market indicates clearly that retaining the capacity plus energy market in Western Australia results in higher costs than moving to the energy-only market arrangements of the NEM. The reason for this is that the extra impost on consumers arising from the capacity payment results in a transfer of value from consumers to generators. This transfer is more than enough to compensate generators for the loss of revenue they incur from the imposition of a price cap in the balancing market. This extra cost in a capacity market occurs even if the Independent Market Operator's forecasts for the capacity requirement are always correct. If there are forecasting errors, as there have been in recent years, the relative cost of a capacity mechanism increases.
- The Review considers that reforming the wholesale electricity market to adopt the market arrangements of the NEM provides the greatest opportunity to achieve the Review's Objectives. The reasons for this are as follows:
    - The price of electricity generation under this option will be lower than it will be under the Reformed WEM option as it will not include an explicit additional payment for capacity and nor will generation costs be affected by the accuracy of the Independent Market Operator's forecasts.
    - Lower electricity costs will result in less upward pressure on residential tariffs and will allow the Western Australian Government a better opportunity of lowering its current cost exposure to the sector.
    - The Western Australian Government can ensure that the market has a mechanism in place to maintain a continuous safe level of reserve capacity. This could be through the maintenance of a reserve trader role. This can be put in place before the State enters the NEM in the form of a derogation to the National Electricity Rules.
    - The NEM Energy-only option is the low risk option. The NEM is a stable well-governed market in which the market institutions perform to a high standard at a relatively low cost. It is a developed national capability which Western Australia can now take advantage of.
    - The Western Australian Government would retain important powers in its electricity industry as a member of the NEM. In particular, the Minister for Energy's powers to administer the market or intervene in other ways in the event of an emergency would remain.
    - Similar markets have commenced in Singapore and New Zealand when they were of a similar size to the SWIS and had a similar if not a lesser number of competing generators than is being recommended in this Review. They have maintained sufficient competition to ensure market-based outcomes without the need for intervention or a capacity payment.

- The NEM operating in the SWIS would attract national institutions, such as the Australian Stock Exchange, and national energy companies, such as Origin and AGL, supporting new investment and competition.

5. Network arrangements

5.1. Introduction

The network component of the electricity supply chain is an important element of a well functioning electricity market. Networks not only transport electricity from generators to consumers but also have an important role in facilitating effective competition in wholesale and retail markets and in enabling secure and reliable energy supply at lowest total system cost.

The analysis of cost components in delivery of electricity services in Chapter 2 of this report indicated that network tariffs in the SWIS are not high in comparison with other Australian electricity systems and are at the lower end of charges when compared to similar low density networks covering large distances. Accordingly, the Review has not involved a detailed examination of costs of network services but rather addressed opportunities for reform of network regulation to improve efficiency in the delivery of network services.

The specific areas of the network regulatory arrangement considered in this chapter are:

- The management of network constraints to allow efficient connection of generators to the transmission network and minimise the need for expensive network augmentations.
- The ability of Western Power to offer a standalone generation solution where it is a more cost-effective means of providing electricity services than a network connection.
- The regulation of network tariffs to ensure that efficient price signals are sent to electricity retailers and customers.
- Western Power's access to capital funds to support future investment in the network.
- Safety regulation of the electricity network.
- Adoption of advanced metering technology.

5.2. Transmission access and congestion

5.2.1. Constrained versus unconstrained generator access

The transmission network facilitates electricity flow from generators through the high voltage powerlines to the distribution network which connects supply to homes and businesses.

The Electricity Networks Access Code 2004 (the Access Code) requires Western Power to develop Technical Rules that contain the standards, procedures and planning criteria governing the construction and operation of its electricity transmission and distribution networks. [58]

There are generally two types of network access available to generators seeking connection to the network. Connection can either be on an unconstrained basis where the generator has firm access at all times up to its maximum operating capacity, or on a constrained basis where the generator has non-firm access and can be constrained in its ability to dispatch if the network is congested.

[58] See generally Chapter 12 and Appendix 6 of the *Electricity Network Access Code 2004* dealing with Technical Rules.

Unconstrained access means that the network is built to connect generation without any limitation under normal operating conditions of the network. Generators will not be turned down or constrained-off to prevent overloading the network under a normal operating state. In contrast, a constrained network is typically not built to accommodate load growth, thereby requiring generators to compete for access with a possibility that new generation will be unable to be dispatched when the network becomes congested.

Many generators in the SWIS have firm access as they are connected on an unconstrained basis. This type of connection was provided because at the commencement of the WEM in 2006, there was sufficient capacity in the transmission network to generally provide unconstrained access. However, as demand on the SWIS has grown, increasing demand for access from new generators seeking to enter the market has created some challenges in balancing network investment with market benefits. That is, the cost of network augmentation required to connect new generation to the system outweighs the benefits that could be delivered through the connection of new low-cost, high-efficiency generation. Continuing to provide unconstrained access to generators will require investment to augment transmission network capacity.

In the past, industry participants and the regulator have expressed concern that the unconstrained access approach is not ideal. Maintaining unconstrained access could create inefficiencies in generation connection and can lead to overinvestment in the network. For example, the Economic Regulation Authority in recent years has noted that while an unconstrained network approach facilitates simpler operation of the power system and the wholesale market, it does not serve the Market Objectives[59] for the following reasons:

- Unconstrained access does not promote the economically efficient supply of electricity because it is likely to cause investment in assets that may have a low utilisation.
- Unconstrained access creates a barrier to competition, as new entrant generators must pay costs of network augmentation.
- It is not clear that unconstrained access minimises the long term cost of supply, in the sense that the requirement may provide more reliability than customers are willing to pay for through increased electricity prices.[60]

The Australian Energy Market Commission also called for changes to the network planning approach in the SWIS in its 2009 report on the Review of Energy Market Frameworks in light of climate change policies.[61] The Australian Energy Market Commission noted that unconstrained access could to lead to inefficient over-investment in the transmission network and it may be more efficient to allow some congestion to occur than to augment the network.[62] There is, however, currently no market mechanism to facilitate the management of constraints in a cost-effective manner.

[59] The Wholesale Electricity Market Objectives as in the *Electricity Industry Act 2004.*

[60] Economic Regulation Authority, 2010 Wholesale Electricity Market Report to the Minister for Energy, June 2011, p. 25.

[61] Australian Energy Market Commission, *Review of Energy Market Frameworks in light of Climate Change Policies, Final Report*, 30 September 2009, pp.137-148.

[62] Australian Energy Market Commission, *Review of Energy Market Frameworks in light of Climate Change Policies, Final Report*, 30 September 2009, p.140.

Another concern is that the potential inefficiencies of unconstrained access are further exacerbated by excess generation capacity. For example, Alinta in its submission to the Review states that:

> *"[T]he issue of constrained vs. unconstrained network access is driven by over-capacity and inefficiency in the capacity mechanism as opposed to the provision of access rights per se. Should the WEM contain an optimal mix of generation without significant redundancy, unconstrained access would support co-optimised transmission and generation investment..."*
>
> - Alinta submission to the Review, p.74

In more recent times, Western Power has had to develop measures that manage the constraints of connecting generators to parts of the network that have limited spare capacity and weigh up the risks of undertaking further investment to augment the network to continue to provide access on an unconstrained basis.

Western Power has sought to manage emerging network capacity constraints in several ways.

- Western Power has offered connection through non-reference[63] connection services. Offering non-reference services allows Western Power to by-pass the requirement to offer unconstrained access as part of its reference service.
- Western Power has established a Competing Applications Group process for generators seeking connection in similar locations under their Applications and Queuing Policy as part of their current Access Arrangement. This process allows Western Power to develop the most economically efficient network expansion for connecting multiple generators, rather than managing expansion individually. Typically generators in a Competing Applications Group seek to be connected to Western Power's network on a non-firm basis with their generation output affected by a common constraint.
- Western Power has also negotiated access agreements with new generators connecting under a run-back scheme[64] that enables System Management to constrain off generators automatically in the event of planned outages or unplanned contingencies.

These developments mean the Western Power Network has become a semi-constrained network. Although new generators are being connected with some binding constraints, others who were connected much earlier continue to have unconstrained access.

5.2.2. Effectiveness of existing approaches to managing network congestion

Congestion in network capacity is not necessarily inefficient. There are occasions when the costs of increasing network capacity to alleviate congestion will exceed the benefits.

[63] Non-reference services are a covered service under the *Electricity Networks Access Code 2004* which is not a reference service. Current Western Power reference services provide unconstrained network access.

[64] A run-back scheme is implemented when a generator agrees with Western Power to have non-firm or constrained access to the network. A run-back is a fast acting automated scheme designed to reduce the output of a generator under defined contingency events (e.g. network outages) to ensure the secure and compliant operation of the network.

However, increasing network congestion undermines the incentives for new generators to invest and compete in the market.

The run-back schemes in the SWIS have some drawbacks and may not offer the most cost-effective long-term solution to managing network congestion. Run-back schemes have been implemented with bespoke systems that operate on an individual basis. The management and prioritisation of a growing number of these systems would be extremely complex and may become impossible to manage with existing systems or additional network constraint tools, a matter currently being investigated by Western Power.

While run-back schemes do not necessarily comprise a persistent constraint on merit-order dispatch of generators, they can result in a high-cost generator being dispatched before a low-cost new generator in situations of network congestion. In its submission to the Review, the Independent Market Operator noted that:

> *"Runback schemes and the generation constraint arrangements being proposed by Western Power through the [competing applications group] process have the potential to override price-based economic dispatch outcomes and increase costs for consumers. For example, if two generators are located behind a single constraint, such arrangements may result in the higher cost generator being given preference over the lower cost generator on the basis of specific conditions contained within confidential network connection contracts or its relative contribution to the constraint..."*
>
> - Independent Market Operator submission to the Review, p.55

System Management contends that there is no impediment to changing the access regime, provided that security issues created as a result of constrained connections remains manageable and the information remains transparent to the market. System Management notes that the current segmented approach has created some difficulty and ambiguity for System Management in performing its functions and that where constraints do exist, a review of the design of the market may be required to accommodate a fully constrained network. An approach could be adopted to encourage competition and ensure the lowest cost solution is available to System Management to resolve network constraints when dispatching.[65]

The Competing Applications Group process also does not present a long term solution. The number of generators in the Competing Application Groups indicates that network congestion is increasingly affecting Western Power's ability to facilitate new unconstrained connections, and the cost of funding major network augmentation negatively impacts the business cases of prospective generators.

In October 2013, the number of applicants seeking a connection to the Western Power Network included 76 proposed generation projects totalling 6,183 MW, comprising:

- 35 applicants proposing to connect in the Northern Region.
- 39 applicants proposing to connect in the Southern Region.
- 2 applicants proposing to connect in the Eastern Region.[66]

[65] System Management submission, p 5-6.

[66] Western Power, *Annual Planning Report*, 2013, p.15.

According to Western Power's 2013 Annual Planning Report, it has placed these applicants in Competing Applications Groups, noting that the Northern Region of the network has no capacity to support any new generation as a reference service, while in the Southern and Eastern Region generation connections can only be offered as a non-reference service with non-firm access via run-back schemes.[67]

The connection of new generators through run-back schemes suggests there is not much appetite from new generators to pay deep augmentation charges for unconstrained access. It also indicates that Western Power may be unwilling to take the financial risks of network augmentation by relying on the regulatory tests (such as the New Facilities Investment Test) in its Access Arrangement to recover the cost of augmentation from all network customers.

5.2.3. Options to address network congestion

While it appears that neither unconstrained access nor the application of run-back schemes has resulted in significant additional costs for generators and electricity customers to date, the long term effectiveness of solutions implemented by Western Power and System Management to deal with network congestion is limited. As new generators seek access in the future, Western Power will have to either explore other ways of offering constrained access or to invest in the network.

Under the existing network arrangements, the fundamental issue will be who should bear the costs of the network augmentation where future generation connections affect the network's capacity to maintain unconstrained access to some generators.

In order to maintain unconstrained access to those generators with rights to it, Western Power would require generators that seek access later to pay deep connection charges that will influence the decision to pursue their generation investment. This may adversely affect new generation investment decisions even if it would be economically efficient to have new generation capacity.

If the network regulatory framework does not provide a sustainable means to resolve network constraints, the costs of having unconstrained access coupled with inefficient generation dispatch will contribute to higher electricity costs. Unless a formal framework is put in place, deep connection costs will act as a disincentive for new generators to connect.

Several submissions to the Review have proposed adopting a uniformly applied constrained network model, or some other model of uniform access rights. This would limit the compromise to merit-order dispatch of generation plant when the network is congested and remove the advantages of incumbency for generators.[68]

By contrast, Alinta supports retaining the existing network access arrangements because of firm access rights that have arisen from unconstrained access. Alinta also argues that the current approach provides appropriate discipline and locational signals to generators:

> *"The ability to be provided with a level of certainty regarding long run transmission access and available transmission capacity is critical to securing new investment and avoiding stranded assets. This certainty is relied upon by existing investors..."*

[67] Wester Power, *Annual Planning Report*, 2013, pp.102-106.

[68] APA submission, p. 2 IMO submission, p 6; Sustainable Energy Now submission, p 13; WA Independent Power Association submission, p.5-6.

- Alinta submission to the Review, p.75

One solution to these issues would be to adopt a constrained access model consistent with the national network regulation regime under the National Electricity Rules. The benefits of moving the network regulatory framework to the national framework are discussed more generally in Section 5.8.

The transition of unconstrained access rights into a constrained access model would be one of the matters for the detailed design and implementation phase of the Review. However, in the interim, there are measures that Western Power can take to reduce uncertainty for generators, including:

- Ending current unconstrained access rights for un-used generation sites.
- Ending current unconstrained access rights for existing generators at the time of retirement of plant.
- Identifying and pursuing opportunities for investment in the transmission network on the basis of the market benefits of resolving network congestion.
- Ensuring that run-back arrangements embodied in access contracts for generators include change-of-law provisions that allow a change in the regulatory regime to provide for constrained access if this is desirable.

5.3. Obligation to connect customers to the network

Western Power has a statutory obligation to connect customers to the network and maintain a network service.[69] In practice, this means that Western Power must maintain the geographical coverage of the network as it currently exists and invest in the replacement and augmentation of assets as necessary to meet the loads of customers within the network.

This statutory obligation to maintain supply to customers in some regional areas is creating an emerging cost burden for Western Power in maintaining and replacing aging network assets. As a consequence of maintenance and investment requirements as well as an obligation on Western Power to have uniform network tariffs for all types of residential customers regardless of their geographic location, there will be an increasing network cost borne by all electricity customers.

Improving technology and decreasing costs of stand-alone electricity generation could reduce this cost burden and provide the same or improved quality of electricity services.

Some submissions made to the Review supported initiatives to substitute stand-alone power generation for network connection in regional areas where this would be more efficient.[70]

Western Power is in the early stages of evaluating the potential to use small stand-alone power systems as an alternative to expensive network upgrades.

There are some regulatory barriers to Western Power substituting stand-alone generation for network connection:

- The obligation for Western Power to supply customers currently connected to the distribution network or at a location serviced by the existing distribution network.[71]

[69] *Electricity Industry (Obligation to Connect) Regulations 2005*, section 4 and section 7.

[70] Sustainable Energy Now submission, p 13; The Hon Robin Chapple MLC submission, pp. 6-7.

[71] *Electricity Industry (Obligation to Connect) Regulations 2005*, section 4 and section 7.

- Western Power's inability to compel a customer to use a stand-alone electricity system.

Although not a regulatory barrier, there is a view that Western Power is limited in its functions to only providing network services, and hence is unable to provide stand-alone electricity systems.[72]

In order to avoid the cost of maintaining and replacing network assets in regional areas, these barriers would need to be removed. In addition, a regulatory framework would need to provide for substitution of stand-alone electricity systems for network assets.

5.4. Cost reflectivity of network tariffs

The structure of network tariffs is important to achieving efficient outcomes in retail electricity markets because the cost of providing network services is driven by the way in which customers use the network. Efficient use of the network and efficient investment in network assets is promoted if consumers are provided with clear price signals about the cost their electricity consumption imposes on the network. For network tariffs to be effective as a signalling mechanism, consumers need to be able to relate their usage decisions to the price they pay.

The value of the discrepancy between the network costs caused by an individual consumer's behaviour and the network charge paid by that consumer has recently been examined by the Australian Energy Market Commission. The Australian Energy Market Commission found that many distribution network businesses do not have cost reflective network tariff structures, resulting in some consumers currently paying more than the costs caused by their usage. Other consumers, in particular those that use a greater proportion of their energy at peak times, pay less than the costs caused by their usage. This is because existing network tariffs with flat rate structures or inclining block tariffs over-recover for off-peak use of the network and under-recover for peak use.[73]

For example, one of the findings concerned the extent to which network tariff structures play a role in influencing the network benefits from rooftop solar photovoltaic panel installations. It found that households with solar panels could reduce network costs considerably by facing those panels west. However under simple network tariff structures households have no incentive to do so because the benefits are greater from facing them north even though north-facing panels generate less energy at peak times when network benefits would be greatest.

Concerns over the inefficiency of network tariff structures for small-use customers have also been raised in submissions to the Review.[74]

The Australian Energy Market Commission is currently proposing a change in the National Electricity Rules relating to pricing of distribution services to include more prescriptive

[72] *Electricity Corporations Act 2005*, section 42.

[73] Australian Energy Market Commission, *National Electricity Amendment (Distribution Network Pricing Arrangements) Rule 2014*, Draft Rule Determination, 28 August 2014, pp i-ii.

[74] Community Electricity submission, p 24; Simcoa submission, p 6.

requirements for pricing of network services for small-use customers. The change includes the following requirements:[75]

- Each network tariff must be based on the long run marginal cost of providing the service, which includes the future network costs that are incurred by using more energy, or the costs that would be saved by using less energy, having regard to the timing of that energy use.
- Network tariffs must be structured in a way that encourages consumers to use network services when the value of the service is greater than the cost, and discourages use when the cost of the network service is greater than the value obtained.

5.5. The need for better metering technology

Appropriate metering technology must be in place to enable time-of-use cost reflectivity of network tariffs and to underpin competition in the retail electricity market. At present, meters for most small-use customers are based on outdated technology than can only measure total consumption.

The submission from Western Power noted that advanced meters were:

> "[*A]n enabler for structural change to the industry and the only effective way to implement peak pricing in network tariffs. They also support more innovative tariffs and improve the information available to customers, retailers and network providers to manage energy use and costs*…"
>
> - Western Power submission to the Review, p.10

Advanced meters such as interval meters and smart meters can offer much better ways to capture and send signals about the network and retail costs caused by a consumer's usage.

Two reforms to the provision of metering assets and metering services could improve outcomes in the retail electricity market:

- Adoption of advanced meters for all small-use customers; and
- Innovation in the provision of metering assets and metering services.

Advanced meters enable more efficient management and operation of the distribution network, retail market competition and innovation in retail electricity services. In particular, smart meters:

- Enable critical peak pricing in network tariffs which provides incentives for customers to reduce peak demand and reduces investment requirements and costs for network and generation capacity.
- Enhance the attractiveness of innovative technologies, including PV systems, other distributed generation and battery systems.
- Enable the network service provider and retailers to develop innovative retail products and price structures that better meet consumer demands and will drive cost efficiencies in the electricity supply chain.

[75] Australian Energy Market Commission, *National Electricity Amendment (Distribution Network Pricing Arrangements) Rule 2014*, Draft Rule Determination, 28 August 2014, pp iv-v.

Western Power is currently the owner of metering assets for small-use customers and provider of metering services. Metering assets and metering services could be provided on a competitive basis by the private sector.

Several submissions to the Review have supported implementing, or at least further exploring, competitive provision of metering assets and services.[76] This includes a detailed submission from a supplier of metering assets and services in the New Zealand electricity market (Vector Limited) describing successful arrangements in New Zealand for competitive provision of metering services and a roll out of advanced meters.[77]

Opportunities exist for an advanced meter rollout to be undertaken within a framework of competitive provision of metering assets and services. Such an approach is already being considered in the NEM. The Australian Energy Market Commission is currently assessing a rule change proposal from the Council of Australian Governments' Energy Council to expand competition in metering and related services through enabling more customers to choose whether they want advanced meters under the National Electricity Rules.[78]

5.6. Adequacy of access to capital funds

An adequately capitalised and funded network business is essential for an efficient electricity supply chain and market. The Review has explored alternative sources of capital funding for the government-owned network business.

At present, funding for capital expenditure by Western Power is derived predominantly from debt funding together with a relatively small proportion of equity funding by the Western Australian Government. Debt held by Western Power affects the net debt position of the Western Australian Government. Accessing alternative sources of capital funds could reduce the effect funding Western Power's investment program has on the State's net debt position and reduce the extent to which the debt position of Western Power places downward pressure on the State's credit rating.

The funding options that could support this objective are:

- Full privatisation, involving selling the network business in its entirety.
- Partial privatisation, under which a percentage of shares in Western Power would be sold, which may involve the State retaining a controlling or non-controlling ownership percentage.
- Privatisation of a segment of the business, such as the metering business or transmission business or the distribution business.
- Competitive procurement of new network infrastructure where ownership is retained by the private sector.
- Private sector equity injections under bespoke arrangements, such as hybrid securities, whereby the private-sector investor provides funds for investment but the State retains full ownership.

[76] Alinta Energy submission, p 66; Australian Pipeline Trust submission; Energy Networks Association submission, p 3; Energy Retailers Association of Australia submission, p 3; Vector Limited submission, pp 2-3.

[77] Vector Limited submission, p 2.

[78] COAG Energy Council, *Expanding competition in metering and related services*, rule change proposal to the Australian Energy Market Commission, October 2014.

All of these models for securing private investment for the network business have been applied, or are being considered, for utility assets in other Australian jurisdictions. It appears that there is a pool of private funds such as superannuation funds that could be applied to investment in the electricity network.

5.7. Safety regulation

The Review has considered the arrangements for safety regulation of network activities in the SWIS. This consideration has been in the context of the current regulatory obligation imposed on Western Power by the safety regulator (EnergySafety, within the Department of Commerce) for the replacement and reinforcement of wood poles. There are concerns over whether the substantial investment required to comply with this order represents an efficient investment of capital funds for the purposes of meeting standards and community expectations for network safety.

Having regard to a consultant's report commissioned for the Review to examine the regulatory arrangements for network safety,[79] the Review finds that the regulatory arrangements are largely consistent with best-practice regulatory arrangements. However, there is one area in which the Review finds that regulatory arrangements do not accord with best practice. Safety regulation is not undertaken within a clear performance based regime that places the onus and responsibility on the regulated business to determine how it will manage the safety of its operations, subject to requirements for transparency, reporting and the high-level oversight of the safety regulator. The absence of the performance based regime is exemplified by the existing EnergySafety order for the replacement and reinforcement of wood poles, which does not address the risks presented by old wood poles relative to other network risks and does not allow for flexibility to direct safety investment to assets, operations and locations on a risk-assessment basis so that the payoff from investment (in terms of reduced safety risk) is maximised.

This deficiency would best be remedied by adopting a safety case regulatory regime for network safety, which is consistent with best practice safety regulation for large and technically complex industrial activities where the technical capability for effective and efficient safety management lies in the regulated business. A safety-case regime is based on the principle that regulation is limited to the broad safety goals to be attained and the operator of the regulated facility develops the most appropriate investments and operating practices to achieve these goals.

EnergySafety is in the process of establishing a regulatory regime based on the safety case approach through proposed *Electricity (Network Safety) Regulations*. Consistent with the safety case regulatory model, the proposed regulations set out duties and obligations relating to safety for network service providers and provide for financial penalties to be imposed for failure to comply with its provisions. The principal provisions of the regulatory regime are:

- A mandatory requirement for network operators to have and comply with an Electricity Network Safety Management System conforming to an Australian Standard (AS 5577 – 2013 Electricity Network Safety Management Systems).
- The requirement for network operators to publish network safety objectives.

[79] Energy Market Consulting Associates, October 2014, WA Electricity Market Review: Review of Energy Safety Regime.

- The requirement for network operators to report network safety outcomes.

The Review considers that the Government should support these proposed regulations and the adoption of the safety-case model of regulation of the Western Power Network.

5.8. Adoption of the national framework for network regulation

The Review has considered the case for transferring the current Access Code to the national framework applying in the NEM under the National Electricity Law and the National Electricity Rules.

The network regulatory framework in the NEM offers distinct advantages that the Access Code does not. For example, the connection framework for generators in the NEM through the National Electricity Rules is a much simpler process by having a constrained network access model that provides better incentives for generators and transmission businesses to make efficient investment decisions.

The national framework is capable of dealing with emerging issues through the institutional governance arrangements that include a continual process of review and improvement. The Australian Energy Market Commission is the independent rule maker for energy markets, including amending the National Electricity Rules through a transparent public consultation process. The new regulatory framework established by the Australian Energy Market Commission in 2012 provides greater scope to the Australian Energy Regulator to adapt its approaches to the nature of the business it is regulating. The new rules also clarify the powers of the regulator to benchmark and publish information on the relative efficiency of electricity network businesses and change how the rate of return (cost of capital) is set.

The National Electricity Rules are in the process of being improved by the Australian Energy Market Commission to require distribution network businesses to focus on the structure of network tariffs and set pricing levels that better reflect the costs of providing network services to individual consumers.

Implementing some of the features of the NEM network regulatory framework in a piecemeal fashion would make the current Access Code complex and create uncertainty in the regulatory framework. A better approach would be to apply the network regulation elements of the National Electricity Rules to Western Power's network access regime. This would enable Western Australia to benefit from the considerable body of research and regulatory reforms undertaken by the Australian Energy Market Commission which addresses many of the issues apparent in the SWIS, including dealing with network congestion, efficient pricing of network services and cost effective and efficient provision of metering services.

5.9. Findings

- A constrained access model offers the best approach for managing network congestion. The run-back schemes and network constraint approaches developed by Western Power and System Management will become increasingly complex to implement and may affect efficient dispatch of generators.
- Moving from the existing hybrid unconstrained access model will require a transitional process that addresses current generator rights. The following measures would help in providing flexibility in implementing a uniform constrained access model for generation:

  - Ending current unconstrained access rights for existing generators at the time of retirement of plant.
  - Ensuring that run-back schemes embodied in access contracts for generators include change-of-law provisions that accommodate changed regulations to provide for constrained access.
- The regulations should allow the use of stand-alone electricity systems if they are a cheaper and more effective way of serving customers than network connection.
- Network tariffs should reflect the costs of providing services to give price signals allow customers to make informed decisions about the energy services and technologies they use.
- Advanced meters should be rolled out to support competition and innovation in the retail electricity market and enable more efficient pricing of network and retail electricity services. This can be done through private investment in a competitive market for metering assets and services.
- The Access Code should transfer to the national framework applying in the NEM under the National Electricity Law and the National Electricity Rules.
- Safety regulation should adopt the safety case model giving Western Power the responsibility of achieving clear safety objectives. The Western Australian Government should support initiatives by EnergySafety to introduce a best practice regulatory regime through the proposed *Electricity (Network Safety) Regulations*.
- There are several possible ways of funding investment in the electricity network. These include private ownership and operation of some or all of the network, private investment and joint private-public ownership.

6. Regulatory and institutional arrangements

This chapter provides an assessment of the effectiveness of the institutional and regulatory arrangements in delivering the Review objectives. Specifically, the Review has examined:

- The organisational arrangements for System Management and the Independent Market Operator.
- The governance and process for amending the market rules.
- The role and functions of:
  - The Economic Regulation Authority; and
  - The Public Utilities Office.
- The option of transferring to the regulatory and institutional arrangements of the NEM.

As part of the option of adopting the NEM regulatory and institutional arrangements, the Review has also considered the case where the Western Australian Government retains the current design of the WEM (i.e. under the Reformed WEM option) but transfers other aspects of the regulatory framework to the national framework, such as network regulation under the National Electricity Law and National Electricity Rules (discussed in Chapter 5), including the regulatory functions being undertaken by the Australian Energy Regulator.

6.1. Overview of current arrangements

6.1.1. Roles and responsibilities in the SWIS

The roles of the existing market and industry institutions are as follows:

- The Independent Market Operator administers and develops the market rules and procedures for the WEM. It also operates the Short Term Energy Market, the Balancing Market and the Reserve Capacity Market. The Independent Market Operator also administers and operates the Gas Services Information for natural gas in Western Australia including the Gas Bulletin Board and the Gas Statement of Opportunities.
- System Management has the responsibility for operating the electricity power system to maintain security and reliability in the SWIS. It is a ring-fenced entity of Western Power. System Management operates and controls generator facilities, transmission and distribution networks and large customer retailer supply management including demand-side management.
- The Economic Regulation Authority is the independent regulator responsible for economic regulation of Western Power's electricity transmission and distribution networks. It also issues licences to entities generating, transmitting, distributing or retailing electricity. In addition to these functions, the Economic Regulation Authority has a role in monitoring the behaviour of market participants in the WEM and reporting to the Minister for Energy about the effectiveness of the market.
- The Market Advisory Committee is an industry and consumer group convened by the Independent Market Operator to provide advice on changes to market rules and procedures.
- The Public Utilities Office provides energy policy advice to the Minister for Energy. It also provides advice to the Minister to assist in discharging the role of shareholder of the state-owned electricity market entities such as Western Power and Synergy. The

Public Utilities Office also supports the performance of the statutory functions of the Coordinator of Energy under the *Energy Coordination Act 1994*.

6.1.2. Roles and responsibilities in the NEM

The oversight of the NEM institutional and regulatory framework is the responsibility of the COAG Energy Council (formerly Standing Council on Energy and Resources and Ministerial Council on Energy). This national scheme is achieved across the participating jurisdictions through a cooperative intergovernmental agreement called the Australian Energy Market Agreement and an applied law scheme, where each jurisdiction enacts legislation that applies the law of one leading jurisdiction. The lead jurisdiction for the national energy law is South Australia.

The current institutional arrangements and associated allocation of roles and responsibilities in the NEM are as follows:

- The Australian Energy Market Operator operates and administers the wholesale electricity exchange and registers participants (i.e. market operation), manages generator dispatch and maintains system security (i.e. system operation), manages retail contestability processes and produces a suite of system planning information.
- The Australian Energy Market Commission administers the rules for system and market operation and assesses rule change proposals.
- The Australian Energy Regulator oversees and enforces compliance with the rules by system participants and determines prices for electricity network services.
- Industry participants (i.e. the generators, transmission networks and distribution networks and retailers) are responsible for the day to day activities associated with producing and delivering electricity to customers.

Jurisdictional governments maintain responsibility for setting electricity supply policy, such as the reliability standards that inform system operation and system planning activities, energy safety and jurisdictional network licensing conditions and obligations. More recently, the introduction of the National Energy Retail Law has seen some jurisdictions modify or apply derogations from certain provisions of the National Energy Retail Rules.

The allocation of responsibility for activities and functions in the NEM reflects the application of the following four governance principles adopted by the intergovernmental Energy Reform Implementation Group in 2007: [80]

- Avoiding actual or perceived conflicts of interest. In general this requires separating responsibilities for policy making, regulating or rule administration and service delivery.
- Ensuring a clear and efficient allocation of responsibility for policy functions, supervisory functions (i.e. system planning and system and market operation) and regulation.
- Ensuring appropriate levels of independence, with responsibility for supervisory functions not given to an entity with a profit motive.
- Ensuring appropriate levels of accountability and transparency so the entities that are responsible for a function are held accountable for their performance and the

[80] Energy Reform Implementation Group, *Energy Reform: Making Australia's Energy Markets Work Better*, January 2007, p.120.

outcomes, including through the release of information on the requirements of functions and performance.

As a consequence, the most important feature of the NEM arrangements is that the governance structure is clearly separated between the market and system operations, economic regulation and compliance monitoring and rule-making which are managed by the Australian Energy Market Operator, the Australian Energy Regulator and the Australian Energy Market Commission respectively.

This governance structure has been developed to support the goal of economic efficiency in electricity supply by providing independence and transparency of processes and ensuring that the entities involved in operating, planning and regulating the electricity system and market are accountable for their role in supplying electricity.

Another distinct feature is that there is clear documentation in legislation of what each entity is responsible for and the process they are to follow to carry out their respective tasks. The National Electricity Law and the supporting National Electricity Rules establish a robust compliance monitoring framework to provide effective oversight of the performance of tasks against the requirements of the rules.

6.2. Assessment of existing arrangements in the SWIS

The existing regulatory and institutional arrangements have worked reasonably well in developing the SWIS market from its infancy. These governance arrangements were introduced at a time when the focus of the Western Australian energy market was on securing sufficient generation capacity to meet rising electricity demand.

It is now worth reconsidering these arrangements and whether they remain fit-for-purpose.

Stakeholder submissions to the Review indicated that some aspects of the current arrangements need to be improved. There was general consensus among stakeholders that:

- The lack of communication and co-ordination between the Independent Market Operator and System Management in market operation and system planning is inefficient.
- The governance process for the Independent Market Operator in the market rule change process is not a best practice regulatory model with potential for bias in the rule change decision-making.
- An independent regulator should set electricity retail tariffs in a transition to implementing full retail contestability.

6.2.1. Role of the Independent Market Operator and System Management

The functions of market operation, system operation and system planning are regulatory and supervisory in nature but they can have a significant effect on the cost of supplying electricity. These functions concern the reliability, security and operation of the power system as a whole rather than the interests of an individual electricity business:

- Market operation involves oversight of wholesale and retail market parameters and day to day operation of the wholesale exchange (i.e. actions and interactions of buyers and sellers of wholesale electricity) so that the market efficiently balances supply and demand.

- System operation involves oversight of the technical parameters and the day to day operation of the power system to achieve the required reliability, quality and safety standards (i.e. the system routinely operates within the technical envelope). System operation is supported by the day to day management of network control and operation activities of the network business.
- System planning underpins system operation and market operation by identifying the electricity supply infrastructure investments needed to achieve the expected price and reliability levels and by providing independently determined planning information for use by industry participants, regulators and the government.

The current institutional arrangements split these functions between the Independent Market Operator and System Management. The Independent Market Operator undertakes market operation and system planning functions, while System Management, as a ring-fenced entity of Western Power, controls the system operation functions.

This split of functions and the independence of System Management from Western Power have been questioned by some industry participants. During consultation, some stakeholders raised a potential conflict of interest and possible influence by Western Power in System Management's operation. An additional problem with the separation of the market operator and system operator is the different incentives and obligations that arise when the electricity system is in a high risk or emergency operating state.

Currently, System Management receives the balancing merit order for dispatch from the Independent Market Operator but not the prices associated with each generation facility in the merit order. This means that System Management does not have the information to consider the commercial implications of a decision to dispatch plant out of the balancing merit order. Furthermore, System Management does not have any incentive or obligation to minimise the extent to which it varies the dispatch instructions out of the merit order in these instances.

The recent failure of the bus tie transformers at the Muja power station terminals provides an example of the importance of System Management taking into account balancing merit order. It also highlights the extent to which the perception of independence of system operation is essential.

Failure of two bus tie transformers at Muja terminals resulted in the SWIS no longer operating within the normal operating state for system security. Under the market rules, once System Management has determined the SWIS is in a high risk or emergency operating state, they are empowered to take the necessary action to address the situation consistent with good electricity industry practice.

During the bus tie transformer failures, System Management relied on out-of-merit order dispatch instructions (with settlement through the balancing market) to manage network constraints. System Management's obligations do not enforce the requirement to assess the financial impact of out-of-merit order dispatch against the financial impacts of other constraint mitigations and may therefore result in inefficient outcomes. In contrast, in the NEM system operation, market operation and system planning are integrated and is the responsibility of the Australian Energy Market Operator. It operates according to clear rules administered by the Australian Energy Market Commission, with input from industry participants (e.g. operating data). The Australian Energy Regulator has oversight of the

performance of system and market operation activities of the Australian Energy Market Operator and system participants (i.e. generators and transmission network businesses).

Many submissions to the Review called for System Management's separation from Western Power and operating either as an independent entity or merging with the Independent Market Operator.[81] For example, the Economic Regulation Authority in its submission stated that: [82]

> *"...continuing concerns regarding the governance arrangements for the WEM have been raised by stakeholders, including the system manager and network operator, both directly to the [Economic Regulation Authority] and in submissions to proposed rule changes by the [Independent Market Operator]...The [Economic Regulation Authority] agrees the rule making process and independence of System Management are weaknesses in the current governance structure..."*
>
> - Economic Regulation Authority submission to the Review, p.4

Bluewaters also supported System Management merging with the Independent Market Operator. In its submission, it stated that:

> *"...outcomes driven by System Management's activities would be more efficient if aligned with the market operator's expertise and objectives...System Management and the Market would benefit from the more progressive nature of [Independent Market Operator]'s culture in evolving their activities, processes and systems over the coming years..."*
>
> - Bluewaters Submission to the Review, p.10

Importantly, System Management itself acknowledges that the current arrangement creates some difficulties in establishing its independence in the market. It notes in its submission:

> *"Compounding the issue is the lack of clarity in the current legislation regarding the independence of System Management from the remainder of Western Power...there is little practical guidance in the legislation as to the structural arrangements that are required to be implemented for the purposes of ensuring System Management's independence from Western Power in the market..."*
>
> - System Management submission to the Review,p.10

System Management suggests that changing its current structural arrangement would be a step that could be taken to minimise any possible perception of bias or discriminatory behaviour in favour of Western Power over other market participants.[83]

6.2.2. The rule making process

The Independent Market Operator is responsible for maintaining and developing the market rules to ensure that the market operates in an economically efficient manner. In this role, the Independent Market Operator proposes rule changes, assesses proposed rule changes for consistency with the WEM objectives (with advice and assistance from the Market Advisory

[81] Alinta Energy submission, pp 76, 81; Integrated Management Services submission, p. 2; ERA submission, p. 4; Bluewaters submission, p.10.

[82] ERA submission, p. 4.

[83] System Management submission, p. 10.

Committee), consults on proposed rule changes and makes a final decision on whether the rules will be amended.[84]

The current role of Independent Market Operator in the rule making process has been criticised by many stakeholders. Submissions to the Review expressed concern that there is an inherent conflict of interest if the market operator is also the rule maker with the ability to propose its own rule changes.[85]

Perth Energy, for example, stated:

> *"...the [Independent Market Operator] cannot be a rule maker and rule operator at the same time. This represents a severe conflict of interest. The situation has led to rule changes that have gone against the recommendation or conclusion of debate at the Market Advisory Committee level. This in turn has caused some loss of confidence in [Independent Market Operator] processes..."*
>
> - Perth Energy submission to the Review, p.33

Alinta Energy also expressed similar views on the rule making process, noting:

> *"...the current structure imparts several potential conflicts of interest on the [Independent Market Operator] which acts to compromise the [Independent Market Operator]'s position and work agenda on select issues, contrary to several principles of good governance. The market would be better served if the [Independent Market Operator] was consolidated to focus on market operations…"*
>
> - Alinta submission to the Review, p.81

The Independent Market Operator on the other hand, disagrees with the contention that the current structure results in a perceived conflict of interest. In its submission, the Independent Market Operator states that many measures are in place to ensure its activities and decision-making functions are performed in a manner which is independent, transparent and consistent with WEM objectives. [86]

In contrast to Perth Energy's view on the interaction of the Independent Market Operator and the Market Advisory Committee, the Independent Market Operator in support of its rule change processes states that where "the [Independent Market Operator] intends to propose a change, its usual practice is to seek the advice of the Market Advisory Committee on the proposal prior to formally submitting it into the rule change process."[87]

It is not unreasonable to conclude that where a single body has the responsibility for rule making and the ability to propose rule changes, together with responsibility for market operation decisions, it faces a potential conflict of interest.

The Independent Market Operator's responsibilities in relation to its rule making function and ability to propose rule changes present a potential conflict of interest between the management of the operational priorities and the market interest concerns of rule-making.

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[84] A subset of market rules are protected provisions, and these rules require Ministerial approval to amend or remove.

[85] See for example, Alinta Energy submission, p.81; Bluewaters submission, p.8; WA IPA submission, p. 12; REMCo submission, attachment 6; Perth Energy submission, pp.8,32; ERA submission, p.4;

[86] IMO submission, p. 78.

[87] Ibid, p. 79.

Since the WEM commenced in 2006, the Independent Market Operator has processed over 160 rule changes[88] and of these, over 60 per cent of the rule change requests were proposed by Independent Market Operator itself.[89]

By contrast, the Australian Energy Market Commission is responsible for rule making in the NEM, involving accepting rule change proposals from system and market participants, assessing the proposal against the requirements of the National Electricity Law and how it contributes to achieving the National Electricity Objective and then making or not making the rule. An important limitation on the Australian Energy Market Commission's ability to make the rules is that it is precluded from proposing any rule changes itself (other than minor rule changes that correct a minor error or make a non-material change to the rules).[90]

If the Reformed WEM option is pursued, the role of rule maker should be separated from the market operator. While the market operator could propose rule changes, it would not be the decision maker. This role would need to be undertaken by a body that has:

- Experience in public consultation processes.
- The capability to undertake policy analysis work in a transparent and predictable manner.
- Limited self interest in the outcomes of market rules.

This structural change would more closely align the institutional arrangements with those existing in the NEM without the need to transfer functions to the NEM regulatory agencies.

Setting up a new regulatory body to oversee the rule change process would be costly. The WEM is sufficiently small to not warrant additional regulatory agencies with associated funding pressures and where possible, existing bodies should be utilised to streamline roles and responsibilities.

The Review finds that a rule making committee made up of the Chair of the Economic Regulation Authority, the Coordinator of Energy (from the Public Utilities Office) and the Chair of the merged Independent Market Operator /System Management (or their respective nominees) would provide a potentially less conflicted alternative.

6.2.3. Independence in retail tariff setting

Currently, the Western Australian Government approves retail tariffs and some stakeholders have called for retail tariff setting to be undertaken by an independent body as part of the implementation of full retail contestability.

In its submission, Alinta Energy states that the introduction of full retail contestability should occur when a level playing field for all participants has been achieved and a framework put in place to ensure independent price regulation. It goes on to state:

> *"Alinta considers that the most important precursor to [full retail contestability] is an independent body to set tariffs which will facilitate competition, driving prices to efficient levels. As the incumbent retailer is State Government owned, the State Government itself should not be responsible for setting prices, given the*

[88] IMO submission, p. 80.

[89] Based on rule change information available from the IMO's website: http://www.imowa.com.au/home/electricity/rules/rule-changes.

[90] Section 91(2) of the National Electricity Law.

> *perceived conflict of interest. The responsibility for the regulation of prices should be granted to an independent body…"*
>
> - Alinta submission to the Review, p.60

Similarly, the Energy Retailers Association of Australia also supported independent retail tariff setting as part of a phased approach to full retail contestability. It states in its submission:

> *"…an independent body [should] be established to assist development of [full retail contestability]. As part of its charter this independent body should be given responsibility to set regulated prices that introduces a pathway to cost reflectivity..."*
>
> - Energy Retailers Association of Australia, p.2

In eastern Australia the introduction of full retail contestability has been accompanied by a period of retail price regulation by a jurisdictional pricing regulator:

- In New South Wales, retail price regulation was undertaken by the Independent Pricing and Regulatory Tribunal.
- In Victoria, the Essential Services Commission of Victoria oversaw price regulation and monitoring.
- In South Australia, the Essential Services Commission of South Australia had this role.
- In Queensland, the Queensland Competition Authority has set regulated retail tariffs and will in future move to a monitoring role.

Having a pricing regulator at arm's-length from government is important in encouraging private sector retailers to participate in the retail market. It allows them to have confidence that the tariff regulation process will be transparent and allow efficient costs to be reflected in the retail tariffs.

In the SWIS, removing the contestability threshold to implement full retail contestability will mean that retailers other than Synergy will be exposed to tariff regulation if they compete for previously non-contestable customers. If retail tariffs continue to be set by the Western Australian Government it is very likely to deter new entrant retailers from competing in this retail market.

In addition, as noted by some stakeholders, independent retail tariff setting would provide a staged transitional pathway to deregulating the retail market in the future. For example, the Energy Retailers Association of Australia suggests that an appropriate time following the introduction of full retail contestability:

> *"...a competition review is conducted to assess the level of effective competition in the market. A logical next step where effective competition is in place is to introduce price deregulation in the form of market monitoring, a path followed by state jurisdictions in the NEM..."*
>
> - Energy Retailers Association of Australia, p.3

A staged transition to full retail contestability through independent retail tariff regulation to full deregulation would also mean that there is a less perception of sovereign risk and intervention in the market from government.

6.3. Institutional arrangements under the NEM Energy-only option

- The institutional arrangements for this option include the Australian Energy Market Operator undertaking the day to day management of the market, the Australian Energy Market Commission managing the governance of the market, giving consideration to the efficient operation of the market and processing proposed rule changes and the Australian Energy Regulator having responsibility for the regulation of transmission and distribution. The Economic Regulation Authority would regulate retail prices until there is sufficient retail competition and can move to a price monitoring role.
- As discussed in Chapter 5, the current NEM institutional arrangements are considered fairly mature and stable. Since the formation of the NEM Tasmania has been successfully incorporated as a new region and the Northern Territory is in the process of moving its electricity market to the national framework as an unconnected region of the NEM.
- The adoption of a NEM Energy-only option would involve the adoption of NEM institutions. The Australian Energy Market Operator would undertake the day to day management of the market and the Australian Energy Market Commission would manage the governance of the market, giving consideration to the efficient operation of the market and processing proposed rule changes. The Australian Energy Regulator would undertake the regulation of the transmission and distribution networks.

6.4. Findings

- Retaining the existing market design necessitates retaining the Independent Market Operator as the market operator. There is a clear need for the Independent Market Operator to operate in a closer working relationship with System Management. This can be achieved by merging the entities or by contracting System Management to the Independent Market Operator so that it works under the Independent Market Operator's direction. The Review finds the technical dispatch of the power system needs to be brought closer to the economic scheduling of generators. The management of constraints, payments made to generators running out of order, the management of ancillary services together with the day-to-day operation of the market need to be handled with the Independent Market Operator and System Management working closely together as an independent system operator.
- Under this approach, all staff would report to the merged entity's board, with System Management being clearly separate to Western Power management. To enhance the separation of System Management from Western Power, the merged entity's control room staff would need to be physically separate from Western Power to the extent possible.
- The governance structure of the merged entity would involve effective financial oversight to keep market fees to an efficient level and commercial and technical expertise in the operation of the market. Some proportion of industry ownership of the merged entity should be investigated in the design phase. For example, the Australian Energy Market Operator is 40 per cent owned by the industry it serves and the remainder is owned by government.

- The current role of Independent Market Operator as the rule making body with the ability to propose rules and oversee market operations is not regulatory best practice. Separating these two functions avoids the potential for a conflict of interest to arise where roles are combined. Conflicts can arise where there are incentives and opportunities for a rule maker to develop the rules in a way that:
    - Limits its own risk and accountability as rule administrator, to the detriment of the market objectives.
    - Unnecessarily expands its administrative powers, scope of activities or increases its costs.
- If the Reformed WEM option is pursued, the role of rule maker should be separated from the market operator. While the market operator could propose rule changes, it would not be the decision maker. This role would need to be undertaken by a body that has:
    - Experience in public consultation processes.
    - The capability to undertake policy analysis work in a transparent and predictable manner.
    - Limited self interest in the outcomes of market rules.

  This structural change would more closely align the institutional arrangements with those existing in the NEM without the need to transfer functions to the NEM regulatory agencies.
- Setting up a new regulatory body to oversee the rule change process would be costly. The WEM is sufficiently small to not warrant additional regulatory agencies with associated funding pressures and where possible, existing bodies should be utilised to streamline roles and responsibilities.
- The Review finds that a rule making committee made up of the Chair of the Economic Regulation Authority, the Coordinator of Energy (from the Public Utilities Office) and the Chair of the merged Independent Market Operator /System Management (or their respective nominees) would provide a potentially less conflicted alternative.
- The task of setting regulated retail electricity tariffs should be undertaken by the Economic Regulation Authority. Over time, as retail competition improves, price regulation should evolve from a tariff setting to a price monitoring function. For retailers operating in the NEM to enter the retail market in the SWIS, they need to be assured that an independent regulatory body separate from government is setting the rate of regulated retail tariffs with reference to efficient costs. Submissions have emphasised the importance of having a transparent regulatory tariff setting process.
- If the NEM Energy-only option is pursued, the current NEM institutional arrangements can be incorporated as they are mature and stable.

7. Transition, sequencing and implementation costs

7.1. Introduction

Fundamental changes to both the industry structure and the market mechanisms will require a detailed and well co-ordinated effort from a specially formed implementation group. This group may manage the:

- Restructuring or divesting of Synergy's generation assets into a number of separate portfolios.
- Introduction of full retail contestability.
- Changes to the framework for subsidies and concessions.
- Introduction of new access codes and regulatory systems for the network.
- Enacting legislation for changes to the WEM or adoption of the NEM.
- Design and application of transition measures to take the SWIS from its current architecture to a new one without disruption to services.

The introduction of either a changed or new market is dependent on restructuring Synergy and the introduction of full retail contestability. Without a competitive industry structure, neither the Reformed WEM option nor the NEM Energy-only option would be viable.

7.2. Implementation

The following steps need to be undertaken regardless of which market mechanism is selected:

- Establish a project team to define each of the restructured portfolios.
- Establish a retail implementation team with responsibility for developing full retail contestability and the retail market code, including retailing of gas, the timetable for its introduction, the handling of government subsidies and charges such as Tariff Adjustment Payment and the Tariff Equalisation Contribution.
- Commence work on the adoption of the NEM chapters of the Rules governing transmission and distribution, including connection and regulation.

The steps required for implementation of market mechanisms differs between the two options.

7.2.1. Reformed WEM option

- Establish an implementation team to develop the new design for the Reserve Capacity Mechanism, the balancing market real-time dispatch mechanism and the review of the reliability criteria for the WEM.
- Make changes to market institutions and regulation of the WEM, including instituting a new rule change mechanism, initial regulation of the retail market by the Economic Regulation Authority, the combination of the Independent Market Operator and System Management.
- Develop transition mechanisms for the introduction of new Reserve Capacity Mechanism and pool. Consider whether transition assistance may be necessary.

7.2.2. The NEM Energy-only option

- Examine the NEM Rules to ensure they are fit-for-purpose in the SWIS, identify those where the Western Australian Government may wish to negotiate derogations and

follow through with the Australian Government and the Australian Energy Market Commission. Develop drafting guidelines for new electricity legislation for Western Australia.

- Establish the Australian Energy Market Operator in Western Australia to establish the SWIS as an unconnected region of the NEM, begin the commissioning of its own systems and specify the systems required by generators and assist in their implementation and training.
- Establish contracts and a risk management market in the SWIS to support the NEM. Develop training and support systems for participants.
- Manage transition of the current market across to the NEM ensuring system reliability and consistent performance.
- Consider the case for transitional assistance for participants who have a case based on a legal or implied obligation for future payments. Develop mechanisms for their transition into the new market.

7.3. Transitional arrangements

A transitional arrangement is defined here as any combination of legal, commercial, regulatory, institutional or financial measures designed to reallocate risks, change obligations, change funding flows or alter functions, with the purpose of facilitating the transition to, and realisation of, benefits from a reform option that gives rise to the case for compensation. The case for compensation will be judged against a set of principles that assess whether, and how much, compensation is appropriate.

7.3.1. Capacity compensation

To varying degrees, the owners of capacity in the SWIS may claim a right to compensation. Such claims should be considered in the light of:

- The definitive or arguable legal right to such compensation.
- The pragmatic determination of how the absence of compensation would adversely affect the interests of the State as a location for private sector investment arising from sovereign risk.
- An evaluation of reasonable treatment of investments under the circumstances and market rules that were applying at the time the investment in capacity was made.

The principles that these claims may be assessed against include:

- Changes in the risk exposure directly attributable to the reforms. If risks were inherent when investments were made a market participant would not be eligible for compensation. For example, where investment has been underpinned by the Reserve Capacity Price which is by design subject to change.
- Where reform creates exposure to new risks, costs or uncertainties that would not otherwise have arisen.
- The extent to which the investment can generate alternative market related revenue streams or can provide demonstrable realisable value to the market.
- The nature and extent of the impact of moving to a new market design on the investment.
- Remaining economic life of the asset.
- Sunk costs.

- The performance of similar investments in other electricity markets as a benchmark for future likely performance.
- The implications that an absence of transitional arrangements would have on sovereign risk.

7.3.2. The move to a constrained network access model

Dispatch of generation under a constrained network access model takes account of the prevailing constraints and simultaneously considers the merit order of dispatch. It is important that the merit order is taken into account to resolve network constraints at minimum cost. The market costs of not dispatching on the basis of a generator merit order may be much greater than the cost of implementing a constrained network.

Various factors will influence claims for compensation, including:

- The payment of deep connection costs in the past. Western Power has indicated that the sum of deep connection costs made to remove network constraints is approximately $40 million, most of which was paid by private generators.
- The ownership of the generation assets affected by the transition to a constrained network access model. It might be expected that Synergy, in the event that it is an affected party might not be given leave to seek compensation from the Western Australian Government.
- The nature of the access right in the connection agreement between Western Power and the connected entity.

The amount of compensation that may be appropriate could be determined as:

- The loss of revenue less short run marginal cost from un-served energy as a result of the introduction of network constraints.
- A lump sum based on the net present value of future losses from the introduction of network constraints. This would be difficult to calculate as it would require a forecast of future system load profiles, new generator connections, periods of binding constraints, energy prices at time of binding constraints, a market model including all generators new and existing, including forecast bids and quantities.

Compensation could be built into the settlement regime in the new market design and paid over the terms of existing contracts. These contracts will eventually expire at which point the market would complete the transition to a fully constrained system.

A move to a constrained access model would be a complimentary reform to introducing facility bidding as a universal requirement for all parties making balancing merit order submissions in the market as opposed to the current circumstance where Synergy makes a portfolio submission. These dual reforms are complimentary due to the manner in which the balancing merit order is formed, whereby constraints and economic dispatch are solved simultaneously.

7.4. Changes to industry structure

The restructuring or divesting of Synergy's generation assets would have repercussions for the commercial contracts held by the current entity which would need re-assignment.

7.4.1. Change in law and assignment clauses.

Commercial contracts typically contain change in law and assignment provisions to protect the contracting parties. Synergy's fuel, energy and capacity procurement contracts will require detailed evaluation to identify the effects of restructuring the generation portfolio and changes to the market mechanism.

The restructuring or divesting of Synergy's generation assets may have the effect of changing the contract counterparty which would trigger the assignment clause in all the contracts that Synergy has executed. In most cases it would be expected that as the changed entity remains a government-owned corporation its credit worthiness would remain unchanged.

It is possible that some contracts for fuel or services may need to be allocated across a number of portfolios, while changes to quantities contracted may open the possibility for re-negotiation of other parameters, such as price. The transition process should consider such opportunities and seek to restrain any negotiations to the minimum necessary to effect assignment to the new entity.

7.4.2. Full retail contestability

The introduction of full retail contestability will require legislative amendments to remove the constraints imposed under the *Electricity Corporations Act 2005*. It will also be necessary to determine the best legislative mechanism to use. These mechanisms may include:

- An electricity retail market Scheme under the *Energy Coordination Act 1994*.
- A code or codes under the *Electricity Industry Act 2004* to provide requirements for electricity full retail contestability.
- The national regime through the National Electricity Law and National Electricity Rules.

In implementing full retail contestability, Western Power will need to make enhancements to existing systems and business processes. The extent of these changes depends on the demand of the market for detailed data and the level of customer churn between retailers.

An important consideration in the transition to full retail contestability is the determination of the retailer-of-last-resort. In other jurisdictions where government has continued to own retail businesses the retailer-of-last-resort has typically been provided by that government-owned entity. This is likely to be the case in the SWIS.

7.5. Market design reform

The Review has considered two market design options, a Reformed WEM option and a NEM Energy-only option. In the period before either of these designs can be implemented the transition to the new market must be managed to ensure that:

- The reserve margin requirements of the market are maintained or optimised and the market continues to be adequately serviced with generation capacity.
- Retailers can reasonably enter into supply arrangements with customers that straddle the period of the transition to the new market design.

The Reformed WEM option will require the development of bespoke mechanisms for the market, including new rules for a capacity auction and the harmonisation of demand-side

management with other forms of capacity and a new real-time market dispatch engine. This process is likely to take some time, perhaps two to three years.

The Reformed WEM option would be largely implemented with changes to the market rules with some need to change the existing legislative framework that operates in the SWIS. The NEM Energy-only option would require legislative changes. However the NEM Energy-only option is based on well tested, robust mechanisms that could be running in a relatively short period of time given that its systems and market institutions, the Australian Energy Market Operator, Australian Energy Market Commission and the Australian Energy Regulator are already operating in the NEM.

In the cases of both a Reformed WEM option and the NEM Energy-only option a transition path would be needed. This will involve the estimation and maintenance of a safe reserve capacity level.

7.5.1. Vesting contracts

Vesting contracts may be required to support the transition to a new market structure and mechanism. For example, contracts for energy sales to retailers could support a stable customer demand while full retail contestability is introduced. Vesting contracts could also be considered for peaking plants, vesting them with capacity contracts which support financial sustainability in the short-term.

7.6. Regulation and market governance

Both the Reformed WEM option and the NEM Energy-only option involve the same changes in regulation of the network - a move to the NEM access rules for both transmission and distribution and regulation by the Australian Energy Regulator. This may involve an extended transition period because of the processes required to be followed if the Australian Energy Regulator is to undertake this function.[91]

The length of each access arrangement is five years in the SWIS and the next reset is due in 2016. If this time is insufficient to manage the transition to the national regime, the length of the current Access Arrangement may be extended. If this is the case, Western Power may need to continue under the current Access Arrangement for one or two more years until the process can be transferred to the Australian Energy Regulator.

7.6.1. Reformed WEM

The Reformed WEM option involves moving to a constrained network access model which in turn requires that the final dispatch of the pool is made on both a technical and financial basis. This requires the System Manager to have access to information that needs to be factored into the dispatch decision.

In moving to a constrained network access model it would be sensible to combine the functions of System Management and the Independent Market Operator. Currently the Market Rules prevent sharing of specific information between System Management and the Independent Market Operator. For example, the Independent Market Operator is unable to provide System Management with the balancing merit order submissions, which limits System Managements ability to implement least cost solutions to network constraints. The

[91] For example, schemes and guidelines that the Australian Energy Regulator required regulated entities to adhere to, such as the service target performance incentive scheme, service standard guidelines and consumer engagement guidelines.

Reformed WEM option involves merging the two entities to create a single market and system operator, which would facilitate information sharing between the two entities to facilitate economically efficient dispatch within a safe operating state.

7.6.2. The NEM Energy-only option

The most significant part of the transition towards the NEM will be the rule by rule examination of each chapter of the national rules to ensure they are fit-for-purpose in the SWIS. In nearly all cases the examination and adoption of rules will be straightforward but there will be some matters where the Western Australian Government will seek variations to the national regime and will wish to secure derogations. This process includes the need for the Western Australia Government to be satisfied with the reliability standard applied to the system and the measures employed to ensure this standard is met. The Western Australian Government may also wish to ensure there is a protocol in place for dealing with market disruptions and that the emergency step-in powers of the Minister for Energy are recognised.

The Australian Energy Market Operator could be involved in the transition process within a few months of the decision to move to a NEM Energy-only market. The Australian Energy Market Operator could undertake planning and forecasting of requirements in the transition to the new market as well as establishing systems, assisting with generator bidding systems and helping in the transition to full retail contestability.

7.7. Sequencing

Many of the reforms considered by the Review are mutually dependent. The overall success of reforms arising from the Review is dependent on their sequencing.

Reducing the market dominance of Synergy is a threshold issue. Introducing new market mechanisms, such as the options considered in this Review, could be detrimental if the industry structure is not addressed first. Under the Reformed WEM option the higher price cap in the balancing pool and removal of constraints on Synergy's bidding would not lead to more competition and downward pressure on prices if Synergy remains in its present structure. Retention of Synergy as is could also see market power exerted in a capacity auction. If Synergy's generation portfolio is not restructured or divested then Synergy's participation in the auction should probably be regulated to ensure the market works effectively. In the NEM Energy-only option competition is critical and again, this move could not be contemplated without reducing the market dominance of Synergy.

Reducing the market dominance of Synergy would also be required before potential new entrants would consider investing as either independent generators or retailers. Investors in generation, either establishing a new facility or buying an existing one, would need to see the industry structure and the market mechanisms operating for some time before they could make an investment decision. New retailers would wish to see a market in which they could acquire competitively priced supply contracts and manage their risks in a transparent market.

Full retail contestability is also an essential step in realising cost reductions for customers, without which cost savings in the wholesale market are very unlikely to be passed through to all classes of customers.

Figure 35 and Figure 36 give indicative timelines for the processes needed to implement the Reformed WEM option and the NEM Energy-only option. These timelines are preliminary

only, and there are other approaches that could be taken to implement these options. The ultimate approach will need to be subject to detailed consideration.

7.8. Findings

- Transitional arrangements may involve compensation for entities that have made investments on the understanding that existing structures and market mechanisms would remain. For example, peaking generators who have made a decision to invest based on the basis of capacity payments may have some claim to compensation. Any compensation should be considered against carefully considered and transparent principles of the type described in this chapter.
- The move to the NEM Rules for regulation of the transmission and distribution networks will require a transition mechanism and the management of the transfer of unconstrained access rights to the new regime.
- In the cases of both the Reformed WEM option and the NEM Energy-only option a path would be needed to transition from the status quo to the new market mechanism. This will involve the estimation and maintenance of a safe reserve capacity level and the maintenance of contracts across the market supporting electricity supply to customers.

Figure 35: Timeline for Reformed WEM option

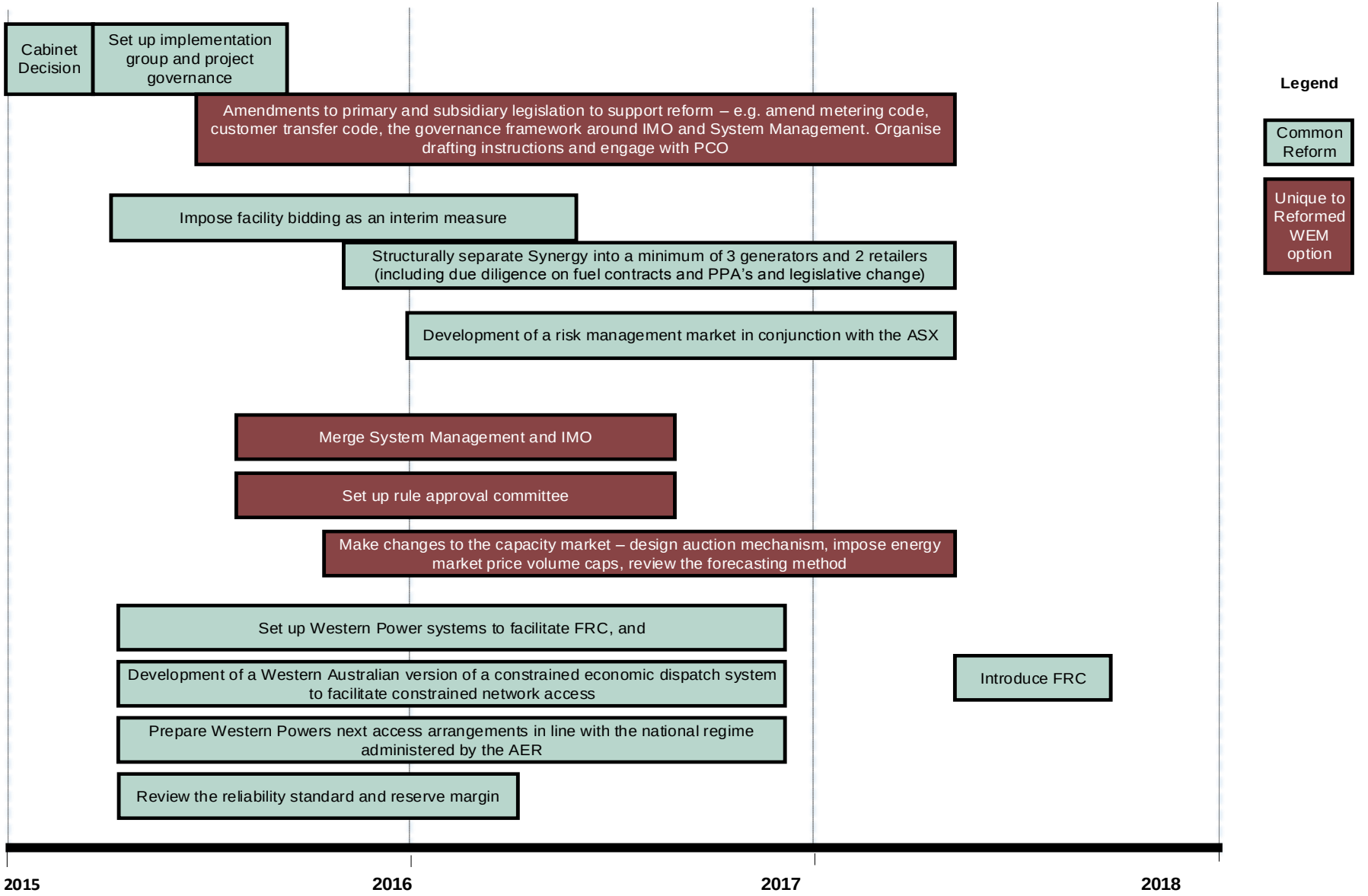
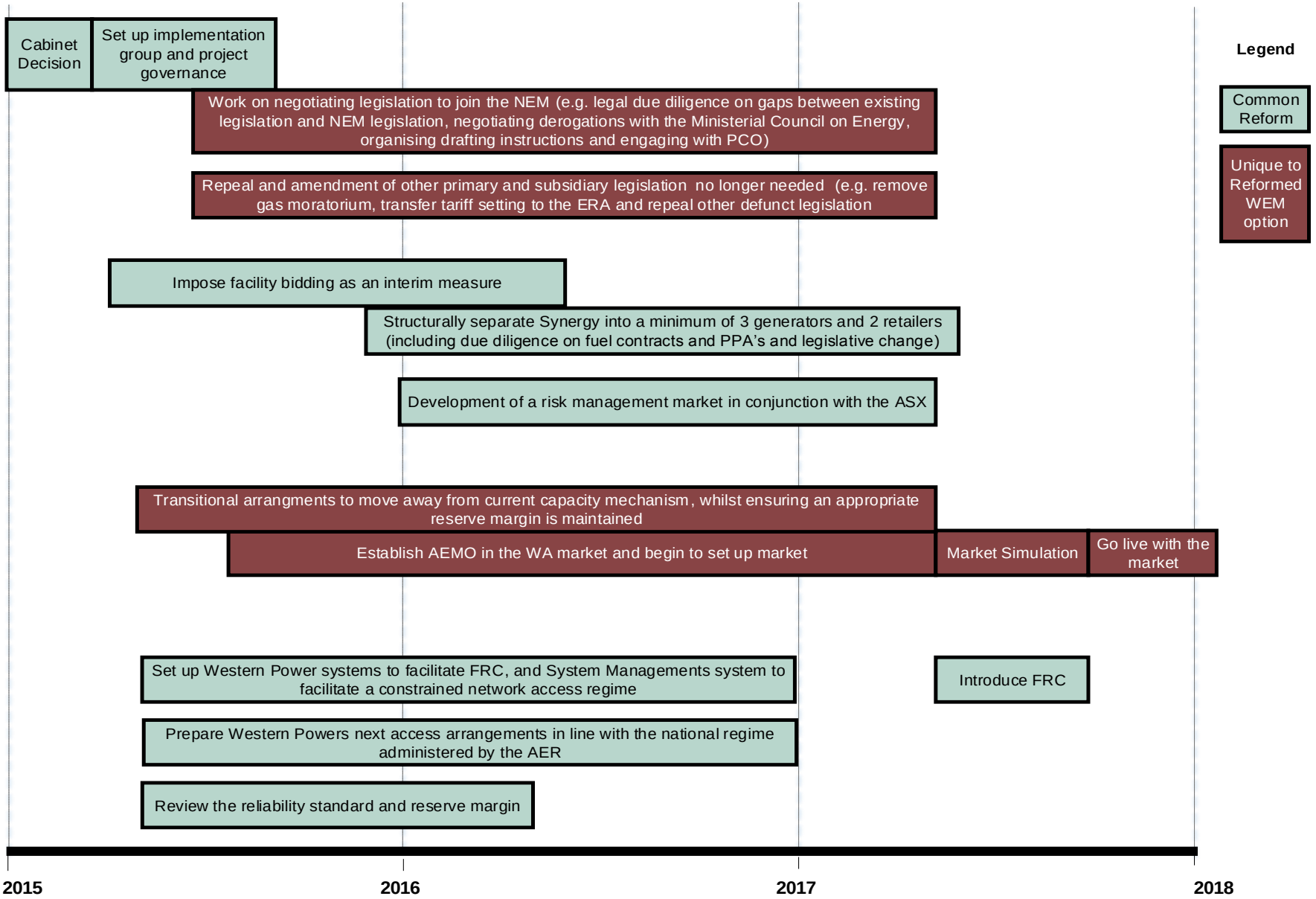


Figure 36: Timeline for the NEM Energy-only option



Appendix 1 – Terms of Reference

Phase 1 will identify the strengths and weakness of the current industry structure, market institutions and regulatory arrangements and develop options for reforms to better achieve the Electricity Market Review Objectives:

Phase 1 will comprise two stages.

Stage 1 – Strengths and weaknesses of current industry, market and regulatory arrangements

Stage 1 will consider whether the current industry structure, market institutions and regulatory arrangements facilitate achievement of Electricity Market Review Objectives. This will include consideration of the following matters.

- The parameters of industry structure, market institutions and regulatory arrangements and the behaviours of parties within the industry and market that have contributed to increases in costs of electricity services since disaggregation of Western Power Corporation in 2006.
- The strengths and weaknesses of the current industry structure in achieving the Electricity Market Review Objectives, having regard to:
  - the past industry-entry and activity of private sector investors and retailers;
  - the outlook for future entry of private investors and retailers into the industry under current industry and market arrangements;
  - the past business activities and business practices of the State-owned electricity corporations active in the South West Interconnected System; and
  - the Verve Energy – Synergy Merger and the regulatory framework to be put in place to limit potential for anticompetitive behaviour.
- The strengths and weaknesses of the current Wholesale Electricity Market in achieving the Electricity Market Review Objectives, having regard to:
  - the fundamental design of the Wholesale Electricity Market as a capacity-plus-energy market;
  - the design and practical functioning of the capacity market; and
  - the design and practical functioning of energy-trading arrangements, including bilateral contracting arrangements, the Short-Term Energy Market and the Balancing Market.
- The strengths and weaknesses of the current regulatory arrangements for the electricity sector in achieving the Electricity Market Review Objectives, including:
  - the institutional arrangements and performance of the bodies involved in the regulation of the electricity sector including the Public Utilities Office (formerly the Office of Energy), EnergySafety, Independent Market Operator, System Management and Economic Regulation Authority;
  - the regulatory framework for network access under the Electricity Networks Access Code 2004, and the practical outcomes of this framework in securing network access and enabling investment in generation;
  - the regulatory framework for consumer protection; and
  - the processes for amending regulatory instruments (including the Market Rules and related Codes, the Electricity Networks Access Code and consumer protection instruments) and the governance of these processes.

- The constraints and opportunities on industry participants arising from the characteristics of markets for primary fuels (coal and gas) in the South West of Western Australia.
- Any perceived barriers to entry to the Western Australian electricity market by large generation, networks and retail businesses active in the National Electricity Market.

Relevant inputs to Stage 1 include:

- Past reviews of the operation of the Wholesale Electricity Market, such as the Economic Regulation Authority's annual Wholesale Electricity Market Report to the Minister for Energy.
- Past investigations of industry structure, including the 2009 Verve Energy Review.[92]
- Past investigations of costs of electricity supply services, in particular the Public Utilities Office's final report on the drivers of increases in costs of electricity services in the South West Interconnected System.[93]
- The Independent Market Operator's past and current work program for the development of the Wholesale Electricity Market.[94]
- A paper prepared by the Merger Implementation Group for the Verve Energy – Synergy merger on issues in the Wholesale Electricity Market that need to be addressed as a result of the merger of Verve Energy and Synergy to facilitate:
  - continued operation of the wholesale electricity market; and
  - sustained private-sector investment in the electricity sector.
- The regulatory framework to be established to limit potential for anti-competitive behaviour by the Merged Verve Energy – Synergy business.[95]
- Australian and international developments in electricity markets and market design.

[92] Deloitte – Oakley Greenwood, *Verve Energy Review*, August 2009. http://www.imowa.com.au/f2875,2115624/VerveEnergyReview.PDF.

[93] Public Utilities Office, *Drivers of Increases in Costs of Electricity Services in the South West Interconnected System*, Final Report, August 2013 (pending publication).

[94] Independent Market Operator, Market Rules Evolution Plan: 2013-2016, November 2012. http://www.imowa.com.au/f5592,3200469/Market_Rules_Evolution_Plan_2013-2016_FINAL.pdf.

[95] Regulations are to be enacted before 31 December 2013 to allow commenced of the merged business on 1 January 2014.

Stage 2 – Options for industry and market reform

Stage 2 will define at a high level a set of options for reform of the industry structure, the wholesale electricity market and the regulatory and institutional arrangements that will better facilitate the Electricity Market Review Objectives. The purpose of stage two is to develop a range of options for reform, and to make recommendations for preferred options.

Options for reform should be developed having regard to the following matters.

Industry structure – Develop options for a competitive and commercially-viable generation and retail industry structure required to:

- establish the conditions necessary to attract major energy companies into the Western Australian electricity market;
- establish the conditions necessary to enable future major generation to be built by the private sector without government support or underwriting of investment by State-owned retail businesses; and
- protect, to the extent consistent with the Electricity Market Review Objectives, the value to the State of the currently State-owned electricity businesses and the assets of these businesses.

A range of generation and retail elements should be examined in developing options for industry structure including:

- gentailers;
- merchant generation;
- specialist retail businesses; and
- on-going participation in the market of State-owned businesses, either as stand-alone businesses or in partnership with private-sector participants.

Primary fuels market – identify opportunities and options for reform of coal and gas markets that are required to address any constraints that these markets present to achieving the Electricity Market Review Objectives.

Wholesale Electricity Market design – Develop options for reform of the fundamental design of the Wholesale Electricity Market including:

- considering whether the Electricity Market Review Objectives might best be achieved by a capacity-plus-energy market or energy-only market;
- if a capacity market were to be retained, then options for reform of the capacity market such that the security objectives of a capacity market are achieved at least cost;
- if an energy only market may support the Electricity Market Review Objectives, then the high level design features of an energy-only market; and
- if major changes to the capacity market were to occur or an energy-only to be developed, the potential options for transition to a significantly different market design.

Network access – Develop options for reforms to the regulatory arrangements for network access, including consideration of:

- "constrained" and "unconstrained" models of network access for generators; and
- potential benefits of greater alignment of the access regime with the access regime of the National Electricity Market.

Retail electricity market – Develop options for reforms to the retail electricity market, addressing:

- retail contestability thresholds;
- mechanisms for regulation of retail electricity prices;
- arrangements and mechanisms for concessions and subsidies; and
- the regulatory framework applying to the electricity retail market, for instance, in relation to metering, customer transfer arrangements and customer protection.

Institutional structures – Develop options for reforms to the institutional and regulatory structures for the electricity sector, including in relation to:

- the organisation arrangements for System Management and the Independent Market Operator and whether there are benefits to change of the current arrangements where System Management exists as part of the network business and the Independent Market Operator as a separate statutory entity;
- the policy advice and regulatory functions of the Public Utilities Office;
- the policy advice and regulatory functions of EnergySafety as they relate to the electricity sector and electricity market;
- the process for amending the Market Rules and the governance of this process; and
- the functions of the Economic Regulation Authority and whether regulatory functions should continue to be undertaken by a Western Australian regulatory agency, or whether some functions might better be undertaken by the Australian Energy Regulator.

Appendix 2 – Modelling assumptions

A2.1 Energy and demand

The Steering Committee provided ACIL Allen with projected tariff class half hourly loads for each tariff class as follows:

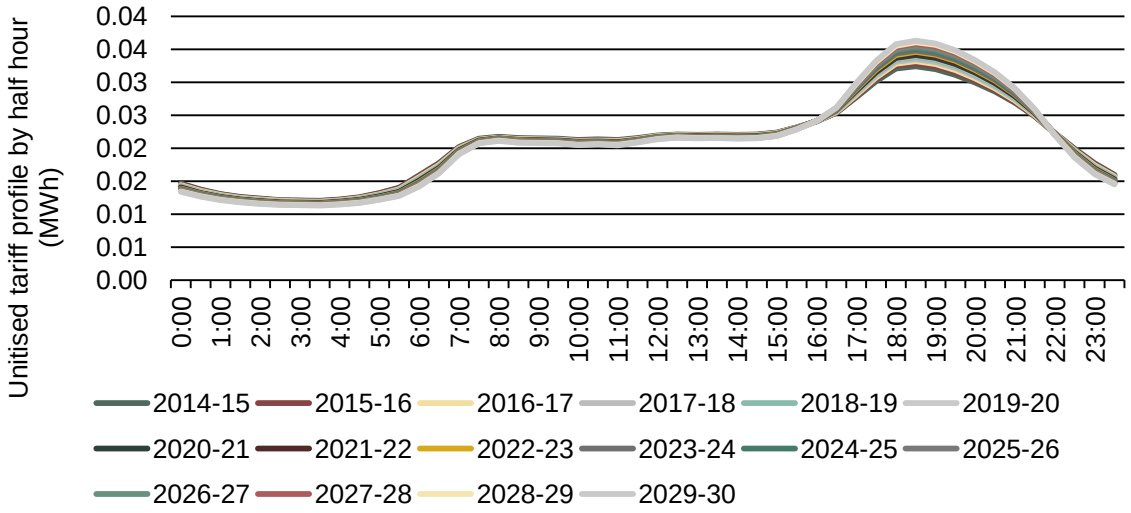
- A1: 2013-14 to 2018-19.
- L1: 2014-15 to 2018-19.
- L3: 2014-15 to 2018-19.

These profiles were extended to 2029-30 by ACIL Allen. This involved several steps:

1. The total half hourly solar rooftop embedded generation in each tariff class was calculated. The Independent Market Operator's projected global solar rooftop embedded generation assumptions were used for each year along with established daily generation profiles by month to construct half hourly profiles.
2. The global total was allocated to each tariff class in the proportions of eighty per cent to A1, five per cent to L1 and ten per cent to L3 reflecting the likely relative penetration of rooftop solar PV over the period studied. The remaining five per cent was assumed to be associated with other tariff classes. (Percentages are based on ACIL Allen historical analysis applied broadly to future tariffs).
3. The solar rooftop embedded generation calculated for each tariff class was added back to each tariff class to establish the tariff class half hourly native demands.
4. Each tariff class native half hourly demands was then grown consistent with the Independent Market Operator forecast peak, average and minimum demand growth for all years to 2029-30. These profiles reflect consumption in each tariff class including solar rooftop embedded generation.
5. Finally, the half hourly solar rooftop embedded generation calculated for each tariff class was subtracted from the native tariff class half hourly demands to establish the tariff class half hourly grid demands. These profiles reflect the average grid half hourly consumption for all consumers in the tariff class.

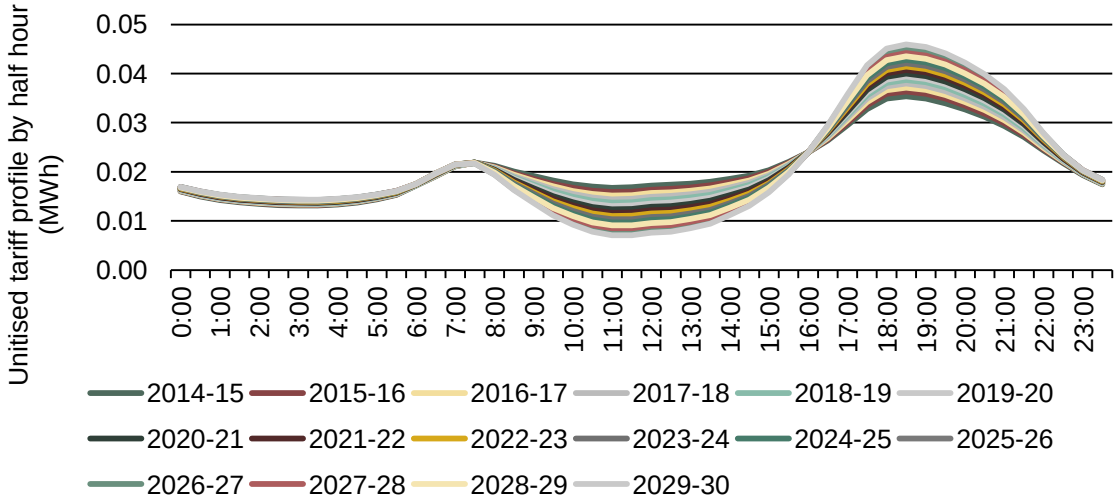
The resulting native and grid tariff daily profiles for the A1 and L3 tariff class and for each year are provided in section Figure A1 to Figure A4 below.

Figure A1: Tariff A1 native demand unitised profile by half hour (MWh)



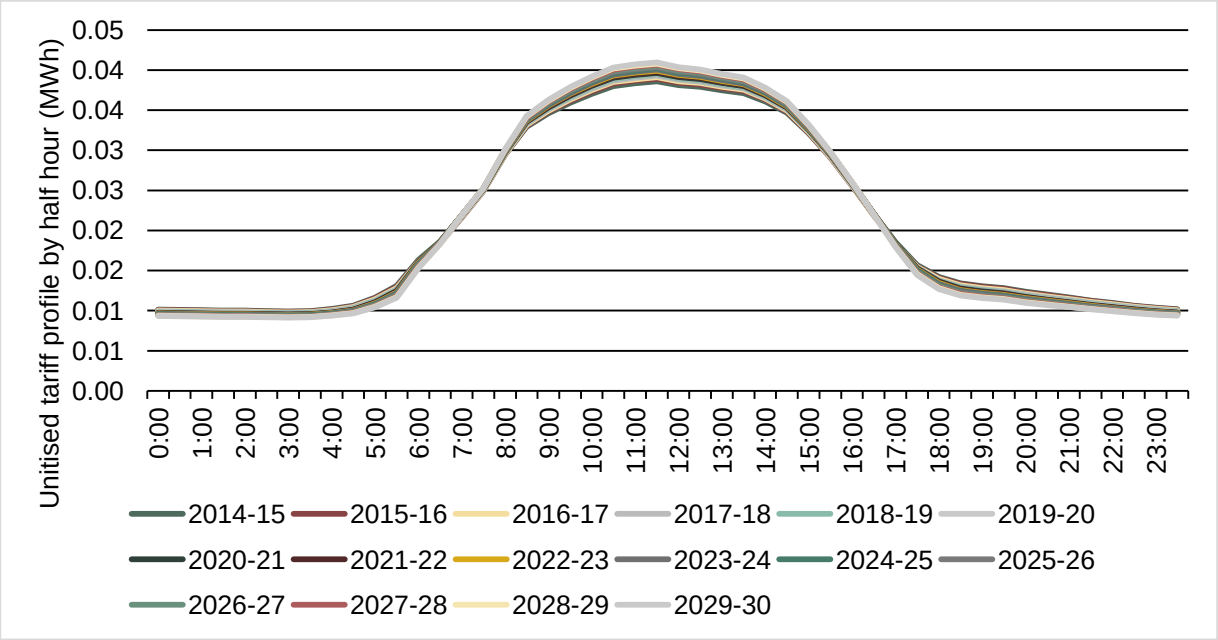
Note: Native demand is total customer demand including demand delivered by rooftop solar embedded generation.

Figure A2: Tariff A1 grid demand unitised profile by half hour (MWh)



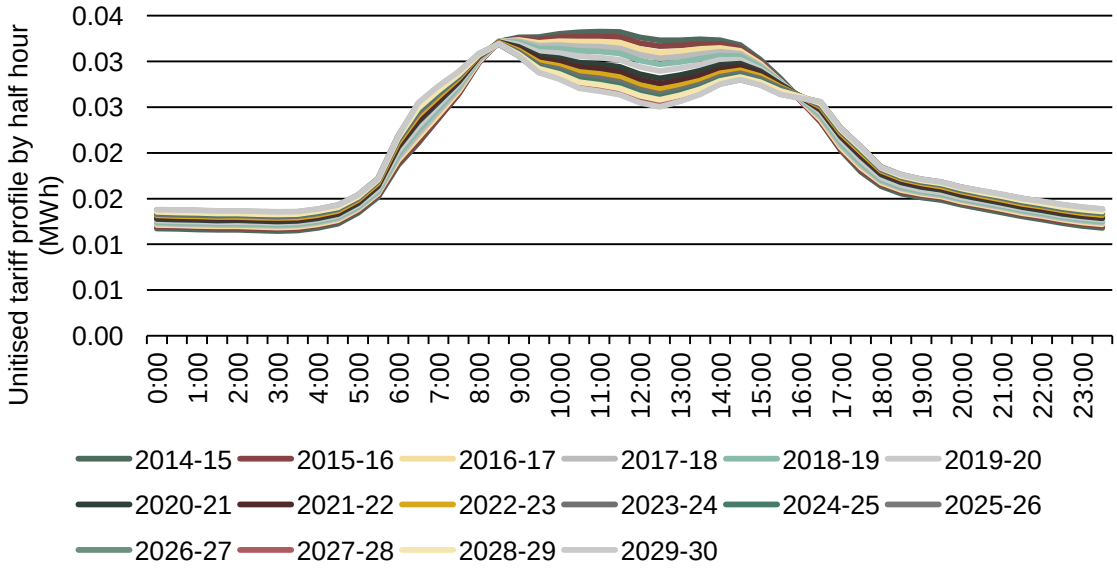
Note: Solar PV penetration is assumed to be 80 per cent of total IMO forecast.

Figure A3: Tariff L3 native demand unitised profile by half hour (MWh)



Note: Native demand is total customer demand including demand delivered by rooftop solar embedded generation.

Figure A4: Tariff L3 grid demand unitised profile by half hour (MWh)



Note: Solar PV penetration is assumed to be 10 per cent of total IMO forecast.

A2. 2 Fuel Costs

Table A1 shows the new entrant fuel price assumptions were used in the modelling.

Table A1: New entrant Fuel price assumptions ($2014/GJ)

	CCGT gas Perth	Peaking Gas Perth	Griffin coal	Wesfarmers coal
2014	7.74	9.74	2.1	2.14
2015	7.96	9.91	2.2	2.23
2016	8.13	10.04	2.3	2.33
2017	8.37	10.23	3.1	3.11
2018	8.67	10.48	3.13	3.14
2019	8.86	10.63	3.16	3.17
2020	8.9	10.63	3.19	3.2
2021	9.17	10.85	3.22	3.23
2022	9.27	10.91	3.26	3.27
2023	9.45	11.05	3.29	3.3
2024	9.45	11.01	3.32	3.33
2025	9.45	10.98	3.35	3.36
2026	9.45	10.94	3.38	3.39
2027	9.45	10.9	3.42	3.43
2028	9.45	10.87	3.45	3.46
2029	9.45	10.83	3.48	3.5
2030	9.45	10.8	3.52	3.53

A2. 3 New entrant costs

Table A2 shows the new entrant annualised fixed costs used in the modelling.

Table A2: Annualised fixed costs ($2014/kW/year)

	CCGT	SC - black coal	OCGT	Wind	Solar PV
2014	201	380	132	397	353
2015	202	382	133	386	338
2016	203	384	134	380	323
2017	206	388	136	377	312
2018	211	397	141	380	305
2019	214	402	144	377	295
2020	215	403	145	373	281
2021	215	403	144	367	272
2022	215	402	144	361	263
2023	215	402	144	354	254
2024	215	402	144	348	246
2025	215	402	144	342	237
2026	215	401	144	337	232
2027	215	401	143	331	226
2028	215	401	143	325	221
2029	215	401	143	320	215
2030	215	400	143	315	212

Appendix 3 - Glossary

IMO	Independent Market Operator
MW	Megawatt
MWh	Megawatt Hours
NEM	National Electricity Market
PJM	The Pennsylvania-New jersey-Maryland Interconnection, a regional transmission organisation in the US Eastern Interconnected Grid
SWIS	South West Interconnected System
WEM	Wholesale Electricity Market