

The background of the lower half of the page is a photograph of a wind farm and power lines, overlaid with a semi-transparent blue filter. On the left, several white wind turbines are visible, with their blades extending outwards. On the right, a series of high-voltage electrical transmission towers (pylons) are connected by power lines, stretching into the distance. The overall scene is set against a clear sky.

## Long Term Roadmap

February 2010

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## The Current Industry Situation

Western Australia's Wholesale Energy Market (WEM) was designed as an interim market to facilitate greater competition and encourage private investment in the generation and retail sectors of the electricity industry in the South West Interconnected System (SWIS).

The WEM is a key component of the electricity reforms, started in 2003, which included the disaggregation of Western Power into the four separate entities of Verve Energy (Generation), Synergy (Retail), Western Power (Networks) and Horizon Power (Regional Power). As part of the reform process, a fully independent market operator was established called the Independent Market Operator (IMO). The IMO is also responsible for maintaining and developing the rules and market related procedures that govern the operation of the WEM.

The WEM is a net pool electricity market, comprising a Reserve Capacity Mechanism where providers of capacity are paid for making available generation or Demand Side Management capacity, and an energy market where suppliers are paid for electricity produced and customers are charged for electricity consumed.

While the WEM provides markets for the trading of capacity and energy it does not include a market for the balancing of energy in real time. Balancing and Ancillary Services are essentially provided by Verve Energy which at market start had an 80 percent market share. This has been reducing so that by 2011/12, Verve Energy will be expected to supply approximately 57 percent of the capacity provided in the market.

It is important to note that the WEM reforms are a significant advance for markets in the state. No competitive market structures have yet been developed for gas or water. Additional electricity-related markets for financial derivatives or emissions have not yet been established in Western Australia.

The WEM has been successful in attracting private investment to fund new capacity on the SWIS. Currently the highest demand on the SWIS has been 3536 MW. In 2008 / 09, 4600 MW of capacity was contracted, with 1416 MW of this being delivered by private investment. Approximately 78 percent of this capacity has been traded bilaterally between market participants.

The WEM has also been successful in facilitating competition in the SWIS. As at the end of the 2008/09 Capacity Year the energy market, which is approximately 16.7 GWh per annum, had 15 generators and 11 market customers trading through the three market mechanisms of Bilateral, Short Term Energy Market (STEM) and Balancing arrangements.

In considering further reform of the industry there are a number of elements that are considered worthwhile maintaining from the interim market. For example, the procurement mechanism for reserve capacity has managed to promote new investment and competition in a market which needed additional capacity. Most successful transitions to market structures rely on an oversupply of capacity to promote competition.



## Why we have the Market that we have

The market design process was aimed at minimising the risks associated with the reform process by undertaking an evolutionary rather than revolutionary approach to market design. In developing the WEM, the goal was to facilitate greater competition and private investment by allowing wholesale purchasers of electricity, such as retailers, greater flexibility as to how, and from whom, the retailers could procure electricity.

The particular market model implemented in Western Australia was designed because:

- Participants were limited in experience in operating in a market;
- Participants were comfortable with bilateral contracting and wanted to maintain these arrangements as much as possible;
- The SWIS is a small, geographically isolated system that is not interconnected with any other electricity jurisdiction;
- Initially there were insufficient number and diversity of generators and retailers to provide competition;
- A number of existing participants were small in size and were expected to be financially vulnerable;
- Reliability was a significant objective for Government; and
- To allow for fairness for all technology and energy options.

A further and key objective during the development and implementation of the market model was to minimise the implementation costs of the wholesale market while maintaining its efficiency and effectiveness.

The resultant, and current, Market model involved a combination of:

- A bilateral contract market;
- A binding day ahead STEM;
- Balancing and ancillary services mechanisms; and
- A Reserve Capacity Mechanism.

Other circumstances taken into account were:

- Perceptions about market power proved to be very important for private investors. The generation business unit Western Power was retained as a single entity rather than being split into a number of generators as has been done in other states. The retail business unit was also be retained as a single entity rather than being disaggregated;



- A vesting contract was established to ensure an orderly opening of the market to competition. The vesting contract was designed as the key market power mitigation tool in the absence of fully developed competition in the market; and
- The Government had committed to maintain uniform tariffs across the State and to ensure price protection for customers.

The bilateral contract market:

- Extensive analysis during the market design process identified that using the existing physical bilateral contract market as the basis of a market for the SWIS was the right approach. The principal advantages of such a model were:
  - lower transition costs for all market participants;
  - lower wholesale price volatility than would be experienced in a pool based market (such as the National Electricity Market gross pool), since prices for most traded electricity would be based on long-term contracts; and
  - lower susceptibility to the exercise of market power.

The bilateral model was consistent with the circumstances identified as likely to prevail in the SWIS in the early years of the electricity market operation, in particular:

- Relatively few generation participants, with one dominant generator (Verve Energy) causing strong concerns about market power;
- One or two significant retailers, with Synergy initially the dominant retailer; and
- Relatively few and inexperienced electricity market participants.

### The need to set evolution priorities

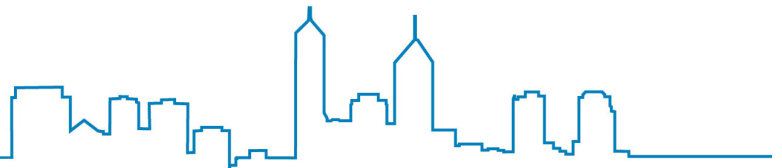
Since market start the IMO and Rule Participants have focused efforts on refining the Wholesale Electricity Market Rules (Market Rules) and ensuring that the Market Rules work as intended. To that end a significant number of rule changes have been proposed, developed and implemented. In 2008 a Market Rules Evolution Plan was developed through the Market Advisory Committee as focus began to shift to the future development of the WEM. A copy of the Market Rules Evolution Plan is available on the IMO Website<sup>1</sup>.

It is critical for the IMO and Rule Participants to actively consider how the WEM should evolve on a continuous basis. Important choices lie ahead. Rule Participants need to understand what the alternatives are and how individual and/or sector interests may be affected.

### Factors affecting Market evolution

The setting of WEM evolution priorities will be affected by a number of factors:

<sup>1</sup> <http://www.imowa.com.au/market-rules>



- Participant priorities;
- Resource availability (from Market Participants, the IMO and other Government and regulatory agencies). It is considered that most major reviews will need the input of a Working Group. This generally involves considerable time commitment from all involved; and
- External issues. Although these issues affect the WEM, the IMO has little direct control over externalities. These may include:
  - The economic outlook;
  - Fuel access for Market Participants;
  - Convergence of gas and electricity markets;
  - Transmission network access for Market Participants and role of transmission in the WEM;
  - Climate change policy developments;
  - Metering changes (power station revenue meters, wholesale off-take meters, smart meters at retail level);
  - Retail tariff restructuring;
  - Full retail contestability;
  - Industry structure issues; and
  - A single national market.

That said, it is necessary for any industry roadmap to consider these broader issues.

### Guiding principles for evolution

A number of guiding principles have been developed to assist in providing direction when assessing further reform. Any WEM evolution needs to be:

- **Economically Efficient:** The application of the efficiency criterion can often be challenging, especially in the context of structural decisions. In principal though, economic efficiency increases when there is an increase in benefits to society and market participants, relative to the costs.
- **Fair:** Fairness involves the equitable treatment of all Market Participants, regardless of their size, sector, ownership, and in particular, means equality of access to the WEM and the IMO's services.
- **Reliable and safe:** Changes should not generally have a negative impact on the reliability or safety of the WEM.
- **Transparent:** Changes must be made public and be easy to understand.
- **Robust:** Changes should add to the stability and coherence of the basic market design.
- **Enforceable:** Changes must be enforceable.



- **Practical:** The message reinforced by this criterion is that the WEM should develop on the basis of the needs of real world participants buying and selling electricity and related products and services. Clearly, there is a balance to be achieved between ‘practicality’ and ‘robustness’; consideration must also be given to the cost/benefit of any change.

The seven criteria listed above focus on the principles of market evolution and describe the qualities of a good design, or of a proposed change in the rules.

## Oates Review

In August 2009, a review of Verve Energy was completed which proposed the need for further reform. This review is known as the Oates Review. The review focused on the financial position of Verve Energy, with the key determinants being the vesting contract and the tariff structures. One policy outcome was the recommendation to develop an Energy Strategy, which is closely aligned to the industry roadmap concept presented here. A number of other Market based issues were also identified.

An implementation plan is currently under development.

## Structure of the Industry

### *History*

Like many other electricity jurisdictions throughout the world, the provision of electricity in Western Australia was the responsibility of a single, state-owned entity. As industrial business developed in Western Australia, so too did interest in opening bilateral and market-based outcomes. The first such step to market integration came with the Top-up and Spill (TUAS) market in June 2004, where a simple trading mechanism was overlaid on existing bilateral contracting arrangements. This simple design was intended to act as a precursor to further reform of the Western Australia electricity industry and was the result of the work of the Electricity Reform Implementation Unit (ERIU), which had been set up by the Office of Energy in early 2003 to manage the implementation of the ERTF recommendations.

The Western Australian Government established the Electricity Reform Task Force (ERTF) in August 2001 to investigate and make recommendations on further electricity reforms to be undertaken in the state. The WEM was designed in 2003/04 and is largely unchanged today.

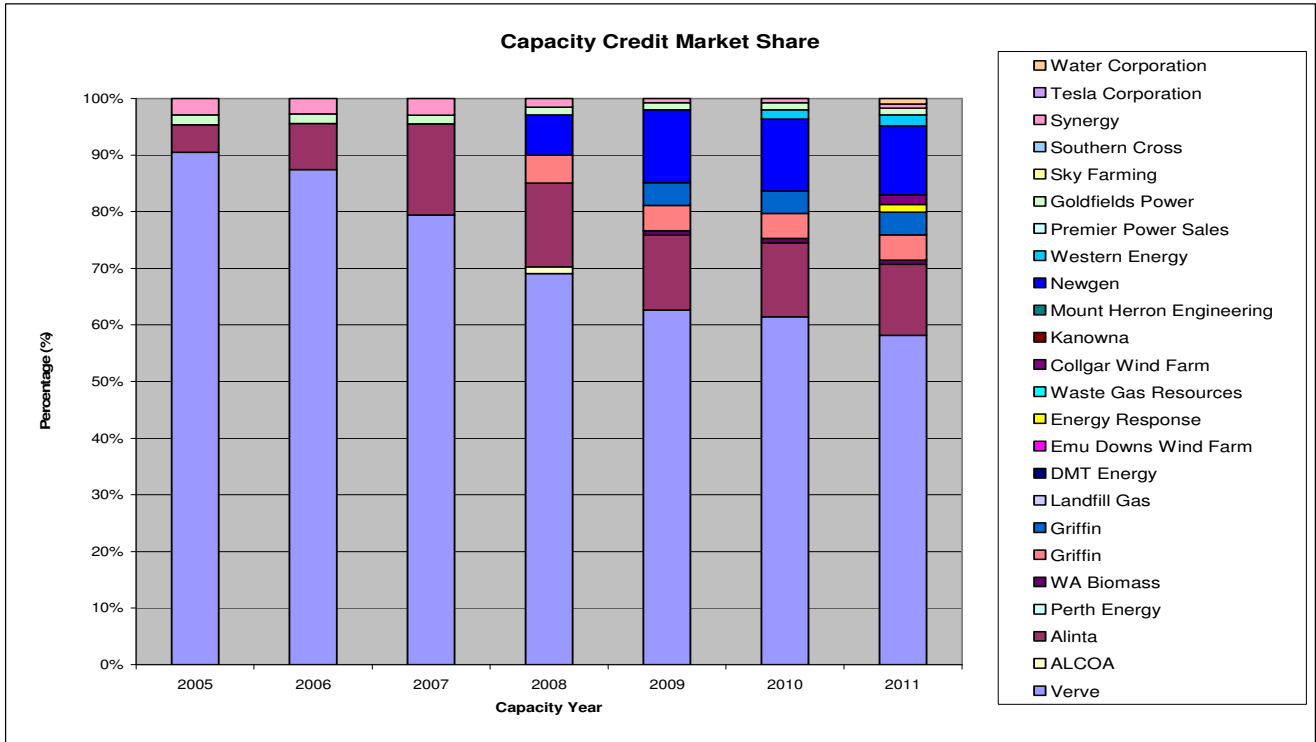
As part of the introduction of the WEM the single State-owned utility Western Power was disaggregated into four separate entities: Verve Energy (Generation), Synergy Energy (retail), Western Power (Networks) and Horizon Power (Regional power outside the SWIS). Vesting arrangements and generation caps were put in place to formalize the trading arrangements and to encourage competition in the longer term.

The WEM is currently dominated by the state-owned utilities Verve Energy (generation) and Synergy (retail), with a number of smaller independent power producers gaining market share as the vesting arrangements displace market share from Verve Energy.



At Energy Market Commencement (September 2006) Verve Energy controlled over 88 percent of the certified capacity in the market and produced 81 percent of the energy produced. However as at March 2009 its share of the capacity market was 67 percent and its share of the energy market was 77 percent.

Figure – share of the Capacity Market



Verve Energy’s share of the capacity market is further expected to reduce to below 60 percent by 2010. It would appear that under the current regulatory structure with a generation cap on Verve Energy the market dominance is reducing. If this regulatory structure is maintained, within the next 5 to 7 years Verve Energy’s market share could fall below 40 percent.

**Retail**

While the generation side of the market appears to have an evolutionary path towards an elimination of state utility dominance the same cannot be said for the retail market.

Synergy’s market dominance persists and has been further reinforced with the Varanus Island gas explosion that saw electricity and gas customers move from Alinta to the State utility Synergy, which was perceived to be safer.

Further regulatory and structural reform is required in the retail market to develop a competitive environment. The Minister for Energy has recently finalized a review of the arrangements between



Verve Energy and Synergy. This review considered whether the two entities should be merged and the extent to which further reform should be progressed.

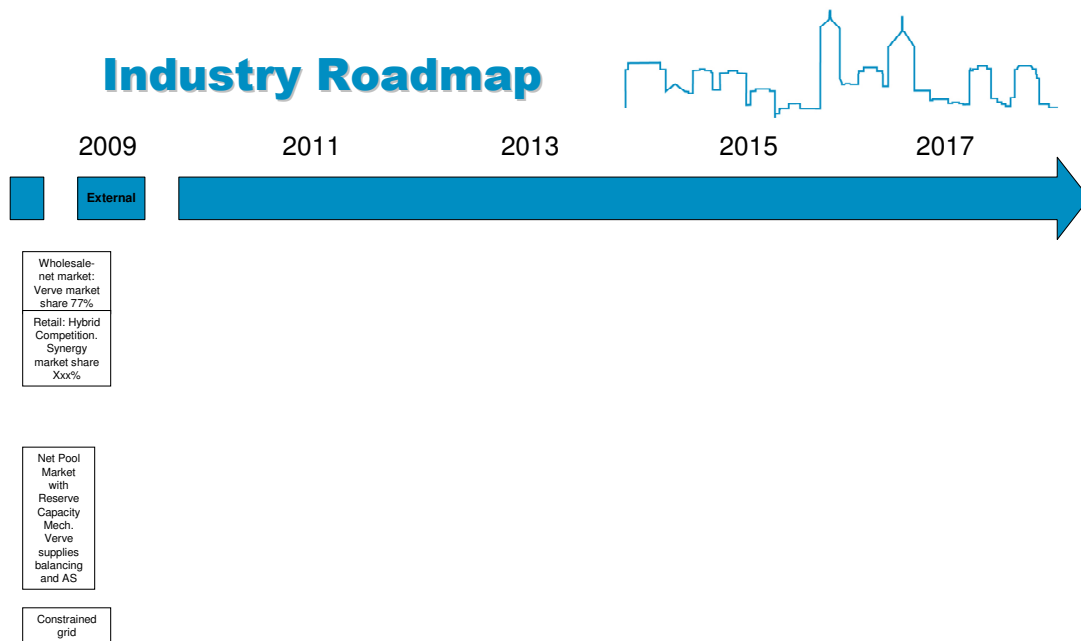
While a merger between Verve Energy and Synergy has now been discounted, further reform has been indicated. The areas for consideration include:

- Development of a State Energy Initiative (Energy Strategy or Roadmap).
- Review of the vesting arrangements between Verve Energy and Synergy;
- Review of arrangements in response to federal renewable energy policies;
- Review of certain aspects of the reserve capacity mechanism; and
- Review of balancing arrangements.

Notwithstanding this, there are a number of other matters which must be taken into account in considering the future of the WEM. These are raised in this roadmap.

## Where we are now

So far this paper has provided a brief overview of the reform process that has brought us to where we are now. The current position is illustrated by the figure below, which shows the main industry structures as at 2009. Using this as the basis of this Industry Roadmap, this paper sets out where the industry may be in five to seven years time, allowing for a transition strategy to be identified and further developed.



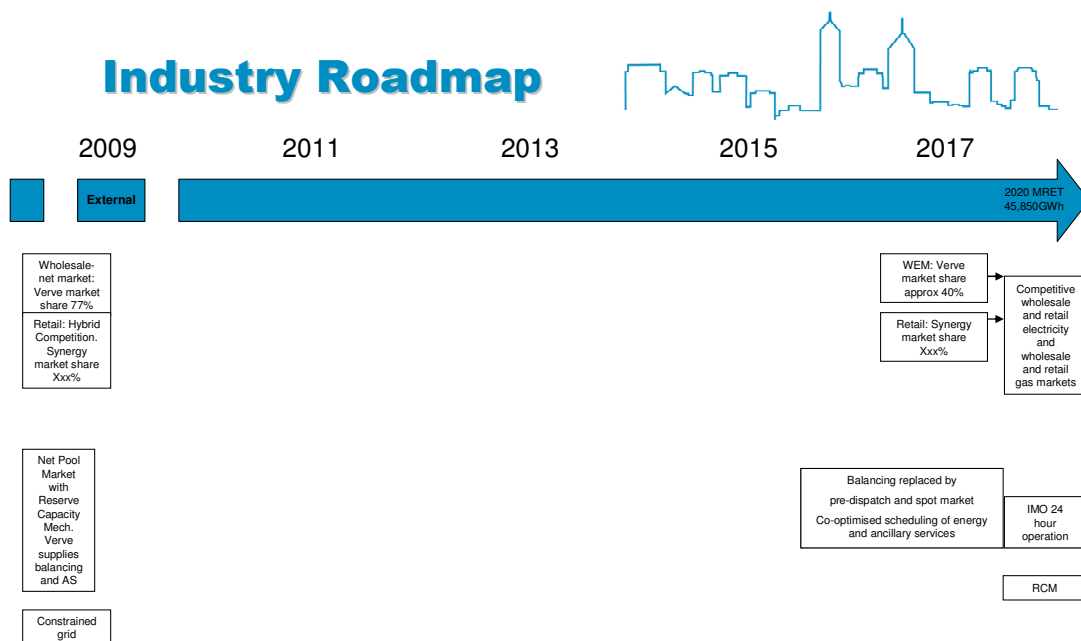
Some of the key elements to where the future might lie, and decision points along the way, are:

- The industry composition and level of competition in the market– Verve Energy, Synergy, IPPS, Independent Retailers, IMO, ERA and System Management;
- The nature of the WEM – Net versus Gross Market, Energy Only versus Energy plus capacity markets;
- Cost reflectivity of retail tariffs;
- Development of Gas trading and convergence of the gas and electricity market sectors; and
- Transmission infrastructure arrangements.

## Tomorrow – Five to seven years

This section discusses one possible outlook for the wider industry in the five- to seven-year timeframe. This timeframe is chosen as it represents a relatively strategic window which can be separated from day-to-day issues and the more immediate issues currently faced by stakeholders. Structural reform in this timeframe must take a considered and planned approach, bringing stakeholders along on the journey.

The outlook for the Industry Roadmap now shows how these may stand by 2017, as shown on the right hand side of the figure below.



The key developments or characteristics identified over this timeframe have been:

- Further dilution of market power by Verve Energy;
- Development of substantial level of competition in the retail sector;
- Enhanced balancing operations with the balancing responsibility shared by multiple parties;
- Potential for a pre-dispatch and spot market;
- Maintenance of a Capacity Market together with an Energy Market; and
- Liquidity in gas trading arrangements.

These issues are discussed in more detail in later sections, but the outlook has been developed using the following assumptions.

## Assumptions

There are a number of assumptions that have been adopted in developing this long-term roadmap. These are issues which are believed are unlikely to change over the roadmap horizon. Assumptions of this nature are used to border the issue so that progress can remain focussed. The primary assumptions are:

- **Keeping the lights on**  
It is assumed that “keeping the lights” on will remain to be a key political goal. The alternative would be an acceptance that energy cannot be delivered at any cost.
- **Demand influence**  
There is unlikely to be a quantum shift in the way demand is managed at either the commercial or residential levels. Some strategies may evolve which will improve visibility and awareness of electricity consumption, but it is unlikely there will be a revolution in the way consumption is managed.
- **Technology (evolution – not revolution)**  
Similar to demand influence, evolution in technology is expected rather than revolution. This is largely in terms of electricity generation technologies.
- **Privatisation**  
Widespread privatisation of State-owned assets is not expected. There may be some ownership dilution, but it is not expected there will be wholesale shifts in ownership.
- **Market Design**  
It is expected that the Reserve Capacity Mechanism will be retained as part of the overall market design.

## Outlook

There are a number of potential markets which may evolve in the next five to seven years. These markets are considered to be within the scope of the Industry Roadmap.

### Electricity:

- **Energy**
  - 23,000 GWh per year
  - Competitive balancing
  - Closer to real time, more dynamic trading
  - Shape – what might it look like?
- **Capacity**
  - Approximately 5,500 MW
  - It is assumed that the drivers that shaped the existing market design will be largely unchanged in five to seven years time. These are:



- The WEM is a small and geographically isolated market.
- Capacity and infrastructure must be sourced domestically.
- Preference still remains for a bilateral contracting market.

If these drivers still remain appropriate, and the Reserve Capacity Mechanism remains to be successful, there would appear to be little case for a move away from a capacity market.

- **Ancillary Services**
  - A competitive market for the provision of Ancillary Services will exist in five to seven years
  - Given the size and level of competition it is likely this will be comprised of simple trading and service provision mechanisms.
- **Gas**
  - There is a clear need to have some transparency and liquidity around gas trading. The potential convergence between the gas and electricity markets is expected to improve the efficiency of both sectors.
- **Financial Derivatives**
  - Greater sophistication in the market may create opportunities in this space. This may be somewhat external to the issues addressed in the Industry Roadmap.
- **Emissions Trading**
  - There is a potential opportunity for a trading house in the carbon space. If such an entity is developed it could be at either the State or Federal level. Progress in the climate change sector has been delayed due to recent events in the national and international arena. Significant uncertainty exists in this space at present.

## The Industry Roadmap – transitioning from where we are now to where we will be

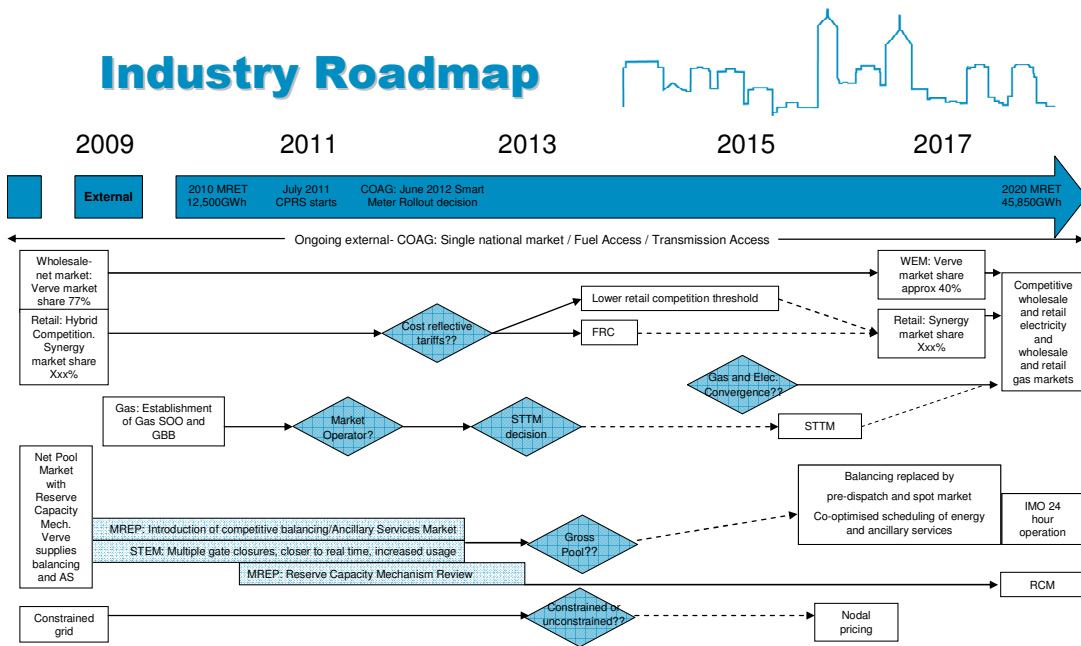
Transitioning from the current industry position to where we will be in five to seven years time requires a number of decisions be taken and implemented. These include decisions about:

- How far tariffs have moved towards being truly cost reflective;
- The status of transmission planning assumptions;
- Convergence options for the Gas and Electricity Markets; and
- Changes to the Vesting Contract environment.

These issues will need to be addressed to allow the industry to move forward on the pathway to further improvement. They are discussed briefly here to help inform the discussion.



# Industry Roadmap



## The Retail Environment in Western Australia

A retail electricity market exists when end-use customers can choose their supplier from among competing electricity retailers. The basic retail competition model allows all customers to choose their generator, either directly or through their choice of retailer. Franchise companies provide transportation and distribution services (to take advantage of economies of scale in these areas). However these companies must provide open access or common carriage and are generally regulated to some degree.

### The SWIS

The SWIS contestable market applies to consumers who use above 50 MWh of electricity annually. This is equivalent to an annual bill of approximately \$8,000 for a consumer. Consumers of electricity under 160 MWh are eligible for government regulated tariffs. 160 MWh equates to an annual bill of approximately \$28,000.

The electricity market in Western Australia has been progressively opened to retail competition since 1997. In its most recent annual report on retailer performance, the ERA noted that there were a total of five retailers actively operating in the Western Australian market in 2007/08: Synergy, Horizon Power, Rottneest Island Authority, Alinta Sales, and Perth Energy.

Of the new entrant retailers, Alinta Sales had over 1,000 customers and Perth Energy had around 200 customers. In total, the customers that Alinta Sales and Perth Energy had gained represented around 8 percent per cent of the estimated contestable market in 2007/08.

However further reform is necessary if a high level of competition is to be achieved in the medium term.

The Industry Roadmap presented here assumes it necessary to further open the retail market to competition. One option for achieving this is to lower the contestability threshold for retail competition. To encourage retail competition between the current 50MWh and 160 MWh thresholds, tariff prices should be the “cap” for prices and not the “floor”.

The SWIS could become more competitive by lowering the thresholds. Consideration needs to be given to what would a reasonable minimum for competition in a hybrid model<sup>2</sup> may look like. For example, it might be one big retail entity with a number of second tier retailers following closely behind.

Before this can occur the retail tariffs must be near cost reflectivity, otherwise there is little incentive for customers to switch from Synergy, the incumbent retailer. To encourage retail competition between the 50MWh and 160 MWh thresholds, tariff prices should be the “cap” for prices and not the “floor”.

## Retail Electricity Tariffs

It is generally accepted that in order for the WEM to operate efficiently, tariff increases must occur. Before 2009, residential electricity users in the Perth region last had a tariff increase in 1997/8.

In January 2009 the Office of Energy published a report to the Minister on Retail Electricity Tariff Arrangements in Western Australia. The Report recommended increases in tariffs for residential and small business customers to make them cost-reflective from 2009/10, and to make tariffs for contestable customers (large businesses) cost-reflective from 2008/09.

In February 2009, the Minister for Energy Announced tariff increases to residential and small business users. For residential users, rate increases of 10 percent and 15 percent were applied in April 2009 and July 2009. Small business rates were increased by two 10 percent increases.

While this helps the position of the State-owned entities of Verve Energy and Synergy, the level of increase is still below that projected by the Office of Energy.

Further rate increases are necessary for the industry to be competitive in the long term. Similarly, vesting arrangements between Verve Energy and Synergy must also be corrected to balance the financial position and risks shared by these corporations.

## Gas and Electricity Market Convergence

### **Western Australia Background**

Gas is the dominant primary energy source in Western Australia, accounting for just over 50 percent of primary energy usage in the State<sup>3</sup>. Gas is also a major fuel for electricity generation in the SWIS.

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<sup>2</sup> See Appendices for explanation

<sup>3</sup> ABARE Energy in Australia 2009 -

[http://www.abare.gov.au/publications\\_html/energy/energy\\_09/auEnergy09.pdf](http://www.abare.gov.au/publications_html/energy/energy_09/auEnergy09.pdf)



Generating plants that can fire only on gas will constitute 34 percent of total capacity in 20010/11. A further 30 percent of capacity is in plant that can fire gas as an alternative to either coal or liquid fuels.

Present gas marketing arrangements have evolved over many years largely as a result of bilateral contract negotiations. Gas supply and transport arrangements are dealt with separately.

### ***Way Forward***

In Western Australia, oversight of retail marketing of gas is by REMCo and wholesale marketing of electricity is the IMO. The retail gas market is very small at present, with only a small number of customers and little customer churn occurring between retail entities.

Recent developments through the Gas Market Development Working Group have identified a number of options around gas trading. These include:

- Development of a Gas Statement of Opportunities (GSOO) Report, similar to the electricity Statement of Opportunities Report produced by the IMO.
- Adoption of a Gas Bulletin Board (GBB) similar to that operated in the eastern states of Australia.

Establishment of a facilitated trading market was not supported at this stage by the Gas Market Development Working Group, however a watching brief and further review is recommended over the next few years.

Inevitably, as the market matures, there will be increasing pressure to open up gas supply and trading arrangements to dynamic market forces. Convergence between gas and electricity is likely at some time in the future.

### ***Transmission Arrangements***

Potentially one of the biggest areas needing further reform is the way in which electricity transmission planning and connection is conducted. Currently, Western Power is responsible for this role. It is assumed that these arrangements will not alter significantly over the period of this roadmap.

Other jurisdictions both nationally and internationally operate with competing commercial entities providing transmission and distribution infrastructure services. Such arrangements are not considered likely in the immediate term in Western Australia.

That said, there are a number of well known unresolved issues with the current arrangements, not the least of which is the fundamental assumption around infrastructure build and connection requirements. The most significant inherent assumption is that network connections to both generation and load are provided in an unconstrained manner. This primarily results from the (normal) application of an n-1 contingency planning regime, whereby connection is still available to users following the loss of one connection element. The WEM has been designed on this basis.



Moving to an unconstrained planning approach is a viable alternative in the medium- to long-term given the magnitude of the infrastructure investment required to maintain unconstrained access to the network.

Changing this core assumption would lead to a more complex market design including nodal pricing and significant redesign of the capacity market. This process, a further revolution in reform, is considered inevitable, but is more likely to occur towards the outer years of the roadmap process given the magnitude of change required by Western Power and of the WEM.

## Summary

Recent announcements by the Minister for Energy indicated the development of a Strategic Energy Initiative (SEI), which is now being developed by the Office of Energy. This document has presented a view to the future of the electricity industry in Western Australia which could feed into the SEI.

Industry experience will grow as we move to more competitive and open market structures. Decisions may be required about the development of:

- A nodal pricing electricity market;
- Improved real-time competitiveness of energy market components (balancing, spot market);
- A Governmental policy position on ownership of key utilities in both the generation and retail space;
- The convergence of the gas and electricity markets; and
- A move towards full retail contestability.

The future outlook of the energy industry is promising, with many positive developments and decision points on the horizon. The structure of the industry will be determined by those decisions.

## Appendices

Appendix 1 - Comments on Market Theory

Appendix 2 - Retail Environments

Appendix 3 - Tariffs

Appendix 4 - Notes on Convergence of Gas and Electricity Markets



## Appendix 1 - Comments on Market Theory

### Competitive Economically Efficient Markets

Economic efficiency suggests nothing more can be achieved using the current resources available (economic welfare has been maximised).

- No one can be made better off without making someone else worse off.
- More output cannot be obtained without increasing the amount of inputs (we are operating on the production possibility curve).
- Production proceeds at the lowest possible per-unit cost.

A competitive market should<sup>4</sup> facilitate an efficient allocation of resources to maximise the sum of profit and consumer surplus (overall economic welfare), as long as no other market imperfections exist (this is the basis for moving away from the inefficiencies created by a monopolist firm).

### Efficient Electricity Market

An efficient electricity market should produce:

1. cost reflective prices,
2. reliable and secure electricity supplies,
3. transparent operations that enables participants to manage their risks,
4. a level playing field for all participants
5. a mechanism to detect and deter market power abuse,
6. real competition in all market segments?

### Who wants competition in a market and why?

Competition should result in lower costs in the long run for consumers except in the case of a natural monopoly (that is where there are economies of scale in the industry that mean a single supplier with maximise economic welfare to the market – for example Electricity Transmission and Distribution Networks have high start up costs which create a large barrier to entry). Competition in a market will promote economic efficiency – therefore maximising economic welfare.

### Competition Drivers

There are a number of drivers to competition. These will vary between markets based on the core values of the industry sector. Generally, they include:

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<sup>4</sup> Note: not every free market is efficient due to lack of perfect information and variable cost functions

- Equality/ Fairness (no one firm extracting a enormous economic profit)
- Lower Prices – consumers all have equal access to supply
- Better information for consumers – more informed choices
- Greater Efficiency (perfectly competitive markets will promote efficiency by encouraging companies to minimise their costs of production. This should result in better resource allocation)
- A range of ownership structures competing for market share
- Faster pace of invention and innovation - encourage greater research and development - this would improve competitive edge of firms (but these considerations not taken into account with Perfect Competition)
- Reduction in market imperfections (pricing and information availability)
- Greater variety of products
- Reliability of supply – greater investment

### What is needed for successful competition?

There are three general factors which could be considered necessary (or highly desirable) for competition. These include:

- **Liquidity and flexibility;**

There needs to be a reasonably flexible way to trade around established position so as to be able to manage risk. This is an important aspect to market design and often results in the development of off-market products to facilitate transactions when the market structure fails to deliver.

- **Choice**

Choice between products and between providers of services is necessary in order to accommodate liquidity and flexibility. Providing a product or provider alternative is key to successful competition.

- **Appetite for competition and the ability for entities to be commercial**

Appetite for a competitive environment is one of the fundamental requirements for a competitive market. Consider the alternative - a government-owned monopoly. In this model, market-based competition is unlikely to occur with any degree of success. Corporate and political desire for competition is pre-requisite for successful competition, as is the ability for entities in the market to generate reasonable returns.

The first two aspects allow participants to manage their own risk. This is ultimately important in developing a successful market.

While these aspects may be necessary for successful competition there are a number of industry conditions and constraints which may restrict all market designs from reaching full efficiency. In Western Australia, for example, the size of the electricity market will be a key determinant in the level of efficiency that can be achieved. Tolerance to change and appetite for risk are other examples of factors which may limit the “theoretically optimal” solution. Practicable solutions should be considerate of these issues in any reform process.

## Appendix 2 - Retail Environments

### Preface

There are different forms of electricity retail environments. These are:

- monopoly,
- hybrid; and
- full retail contestability (FRC).

For the SWIS to move towards FRC there are unique challenges and general considerations relevant to Western Australia.

### Market Structure

A *monopoly environment* is a market composed of one retailer. This entity is usually a vertically integrated state-owned enterprise performing functions such as generation, distribution and retail.

A *hybrid model* is a market where only a segment of the market is contestable for retailers. This allows a number of retailers to compete for larger customers while smaller customers remain with the incumbent retailer. An incumbent retailer can be a state-owned enterprise and can be considered the retailer of last resort.

*FRC* is where all segments of customers are contestable. A retail electricity market exists when end-use customers can choose their supplier from competing electricity retailers. The basic retail competition model is characterised by the fact that it allows all customers to choose their generator, either directly or through their choice of retailer. Franchise companies provide transportation and distribution services (to take advantage of economies of scale in these areas). However these companies must provide open access or common carriage and are generally regulated to some degree.

### The WEM

The WEM contestable market applies to consumers in the SWIS who use above 50 MWh of electricity annually. This is equivalent to an annual bill of approximately \$8,000 for a consumer. Consumers of electricity under 160 MWh are eligible for government regulated tariffs. 160 MWh equates to an annual bill of approximately \$28,000.

The electricity market in Western Australia has been progressively opened to retail competition since 1997, as per the timing presented in Table 1.

<b>Date</b>	<b>Threshold for competition</b>
1 July 1997	≥ 10 MW average demand
1 July 1998	≥ 5 MW average demand
1 January 2000	≥ 1 MW average demand
1 July 2001	≥ 230 kW average demand
1 January 2003	≥ 34 kW average demand
1 January 2005	>50 MWh annual consumption

The Code of Conduct for the Supply of Electricity to Small Use Customers (Code of Conduct) protects customers under 160MWh by enforcing other requirements on retailers.

Currently, all customers that consume more than 50 MWh per annum are contestable, meaning that around 15,000 customers, or 1.5 percent of total customers in Western Australia, are able to choose their electricity supplier. As these customers are large users of electricity, they represent around 60 percent of total energy consumption.<sup>5</sup>

Contestable customers can be supplied either by the incumbent retailers – Synergy for customers inside the SWIS and Horizon Power for customers outside the SWIS – or by new entrant retailers. In its most recent annual report on retailer performance, the ERA noted that there were a total of five retailers actively operating in the Western Australian market in 2007/08: Synergy, Horizon Power, Rottneest Island Authority, Alinta Sales, and Perth Energy. Of the new entrant retailers, Alinta Sales had over 1,000 customers and Perth Energy had around 200 customers. In total, the customers that Alinta Sales and Perth Energy had gained represented around 8 percent per cent of the estimated contestable market in 2007/08.

In addition to these active retailers, a number of other businesses have been granted retail licenses by the Authority, including BHP Billiton Nickel West, CSBP Limited, EDL NGD (Western Australia), Goldfields Power, Griffin Energy Sales, Griffin Power, Landfill Gas and Power, Newmont Power, Ord Hydro, Premier Power Sales and Southern Cross Energy Partnership. It is noted that in most cases these licenses apply to the retailing of electricity to a more limited number of customers.

Government regulated tariffs have not increased for nearly a decade in Western Australia. Residential tariffs have not increased since 1997/1998 and large business tariffs have not increased since 1991/1992. Commencing April 2009, tariff prices have started increasing. It is forecasted that further increases in the future are required to reach cost-reflective levels<sup>6</sup>.

<sup>5</sup> Economic Regulation Authority, 2007/08 Annual Performance Report: Electricity Retailers, March 2009.

<sup>6</sup> Electricity Retail Market Review, Final Recommendations Report Review of Electricity Tariff Arrangements, Office of Energy Report to the Minister of Energy Jan 2009.



To encourage retail competition between the 50MWh and 160 MWh thresholds, tariff prices should be the “cap” for prices and not the “floor”.

To progress the Western Australia SWIS towards FRC, unique challenges will need to be resolved. A major challenge is to increase government regulated tariffs. Raising tariffs will be one step closer towards incentivising commercial retailers to compete under the 160 MWh threshold.

The SWIS could become more competitive by lowering the thresholds. Consideration needs to be given as to what a reasonable minimum for competition (in a hybrid model) may look like, for example, one big player with a number of second tier retailers following closely behind.

Experiences from other states in Australia can be leveraged by Western Australia. The issues are multi faceted and have the potential to affect the “perceived” success of FRC.

As the market arrangements needed prior to implementation of electricity FRC are not yet fully in place within the SWIS, a FRC timeline cannot be defined at this stage. The following developments are still required:

- Regulated retail tariffs need to be set at cost-reflective levels,<sup>7</sup> and a clear mechanism needs to be established to ensure that retail tariffs remain cost-reflective over time.
- The WEM within the SWIS needs to develop further to support the entry of new retailers, as evidenced by achievement of at least one of the following:
  - the development of liquid, transparent and competitive trade in financial electricity contracts, with observable prices;
  - the presence of new entrant retailers competing for a range of contestable retail customers; and/or
  - the Economic Regulation Authority’s annual report on the effectiveness of the WEM supporting the conclusion that the market facilitates the efficient entry of new retail competitors.

Implementing FRC requires establishment of the following mechanisms:

- a wholesale market settlement system, including a means to measure customers’ half-hourly electricity consumption;
- customer transfer arrangements to facilitate customer switching between retailers;
- a market operator; and
- enhanced customer protection measures for small use customers.

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<sup>7</sup> Alternatively, retail tariffs could be set lower than cost-reflective levels, and Community Service Obligation (CSO) payments applied in a standardised manner to allow all retailers to recover the difference between the retail tariffs applicable at any given time and the Government-determined cost-reflective tariffs.



Additional detail on this is outlined below, under issues and considerations for evolution.

## Experiences from other jurisdictions

The majority of states in Australia have progressed from a hybrid model to FRC. The outstanding states are Western Australia, Tasmania and Northern Territory. Tasmania plans to be fully competitive in July 2010<sup>8</sup>.

For jurisdictions that have transitioned into FRC, there were some experiences that may be relevant for Western Australia. The following considerations vary in importance for each jurisdiction:

- Provide a safety net for consumers who face financial difficulties;
- Installing regulated retail price caps for the smaller segment consumers required during the transition to FRC and/or a period after FRC;
- Significant changes to systems and procedures to cope with larger number of customers – e.g. Settlement, billing, exchange of information and customer management;
- Requirements to install the meters and communication links for contestable customers;
- Will customers switch to a different retailer; and
- Finding the right measures of success for FRC – lower retail prices, customer switching retailers, number of retailers, etc.

Victoria removed all price caps from 2009. This means all customers (including residential) no longer will be “protected” by retail price caps.

## Issues and considerations for evolution through hybrid to FRC

### *Evolution:*

Most retail market evolution involves a transition period which is based on a gradual market opening, starting with the largest competitors and progressively lowering eligibility thresholds down to full consumer’s choice. It has taken 8 years on average for Australian states to transition from hybrid models to FRC. Transition period in other jurisdictions:

- Less than 2 years (Norway, California, NZ);
- Between 2 – 4 years (Finland)
- Over 4 years: (England and Wales, Spain)

### *Measurement:*

All consumers need to be measured in order to ascertain the actual consumption that each of the retailers is responsible for. In retail energy markets, supplier obligations are settled on an hourly or sub-

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<sup>8</sup> Electricity Market Reform, table 6.2, page 183, by Fereidoon P. Sioshansi, Wolfgang Pfafenberger.

hourly basis. For most customers, consumption is measured on a monthly basis, based on meter reading schedules.

Profiling allows retailers to estimate how much electricity any consumer will use in each half hour by providing a typical consumption shape. Load profiles are used to convert the monthly consumption data into estimates of hourly or sub-hourly consumption in order to determine the supplier obligation. For each hour, these estimates are aggregated for all customers of an energy supplier, and the aggregate amount is used in market settlement calculations as the total demand that must be covered by the supplier (reconciliation can be either global reconciliation or by differencing<sup>9</sup>).

Profiling involves estimating consumers' half hourly electricity usage and can use typical consumption 'shapes' built up over time by looking at a representative sample. For example, a retailer who supplies dairy farmers might install electricity meters on a number of farms. Over time a 'profile' will develop of how much electricity an average dairy farmer uses during each half hour of the day. The retailer then uses this information in the reconciliation process.

There are typically two types of profiles, network supply point<sup>10</sup> (or access point) derived profiles and statistically sampled or engineered profiles. NSP derived profiles make use of population data, i.e. from a grid exit point or an access point. Statistically sampled/engineered profiles are developed using sample data for what are termed "similar" customers.

*Other issues:*

- Customer information databases/database of record
- Customer transfer/switching mechanisms
- Customer protection/Complaints mechanisms
- Frequency of meter reading requirements
- Reconciliation methodology
- Distribution use of system agreements
- FRC monitoring

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<sup>9</sup> Global reconciliation is where the retail market is reconciled using all meter readings, not just those submitted by non-incumbent retailers, in this model any unaccounted for energy is shared among buyers.

<sup>10</sup> Any point of connection between a local network and the grid for example, two local networks or a generator and a grid.



## Appendix 3 - Tariffs

### RETAIL ELECTRICITY TARIFFS

#### *Office of Energy Report*

In January 2009 the Office of Energy published a report to the Minister on Retail Electricity Tariff Arrangements in Western Australia. The report found that:

- Current retail electricity tariffs are not cost-reflective.
- Retail electricity tariffs need to reflect the costs of supply to ensure the continued security of supply and the financial viability of all electricity industry participants (both private and Government-owned).
- Tariffs need to increase into the future to move to cost-reflective levels. Increases are required in 2009/10 to take into account existing costs of electricity supply. In 2010/11 the commencement of a Carbon Pollution Reduction Scheme New is expected to add further costs.
- Concessions should be increased in line with Government approved tariff increases to mitigate some of the impacts of the tariff increases on low income and disadvantaged consumers.
- Household electricity prices have remained fixed since 1997, but costs to supply electricity have increased significantly over the past decade, particularly in recent years with the strong economic conditions in Western Australia, and with cost pressure on Western Power in particular.
- In many instances, electricity users have the opportunity to reduce their use. Increased energy efficiency will become increasingly important and can be achieved by applying simple energy saving techniques.

The Report recommended increases in tariffs for residential and small business customers to make them cost-reflective from 2009/10, and to make tariffs for contestable customers (large businesses) cost-reflective from 2008/09.

In order for tariffs for residential and small business customers in the SWIS to be cost-reflective from 2009/10, the tariffs would need to increase at the rates shown in the following table.

Tariff	2009/10	2010/11	2011/12
A1/A2	52 percent	26 percent	13 percent
B1	132 percent	32 percent	19 percent
L1/l2	29 percent	26 percent	14 percent
R1	37 percent	27 percent	10 percent
k1/K2	50 percent	26 percent	14 percent

Examples of the customers in each tariff class are shown in the table below.

Tariff	Definition	Customers
<b>A1/A2</b>	A1 is Synergy's standard residential tariff for private residential dwellings.  A2 is the Horizon Power equivalent.	Residential households.
<b>B1</b>	The Synergy tariff for off-peak residential water heating between 11pm and 6am.	Residential households.
<b>L1/L2</b>	L1 is Synergy's tariff for small businesses that use low/medium voltage electricity (240/415 volts).  L2 is the Horizon Power equivalent.	Schools and churches. Shops and factories. Hotels and motels. Sporting complexes. Hospitals.
<b>R1</b>	R1 is a Synergy tariff for non-contestable business customers that consume between 80 and 137 kWh per day, and use more than 20 percent of their power in off-peak periods.	Retail. Accommodation. Agriculture. Government. Manufacturing.
<b>K1/K2</b>	K1 is Synergy's tariff for locations where part of the electricity use is for residential purposes, and part is for business purposes.  K2 is the Horizon Power equivalent.	Farming properties. Commercial properties with a caretaker's residence attached.

## Office of Energy Recommendations

The Office of Energy report contained forecasts of the required increase in the retail component of electricity tariffs necessary to make tariffs for residential and small business customers cost-reflective from 2009/10. The report also forecast the required increase in the retail component of electricity tariffs necessary to make tariffs for large business customers cost reflective from 2008/09. The necessary increases are shown in the table below.

Tariff	2009/10	2010/2011	2011/2012
A1/A2	52 percent	26 percent	13 percent
B1	132 percent	32 percent	19 percent
L1/L2	29 percent	26 percent	14 percent
R1	37 percent	27 percent	10 percent
K1/K2	50 percent	26 percent	14 percent

The report recommended that Government should gradually introduce the tariff increases for residential and small business customers, and should fund any difference through Community Service Obligations, details of which should appear on electricity bills.

*Tariffs for small use customers:*



- In the short term the retail component should retain current tariff structures (except for the new costs associated with the Carbon Pollution which should be completely assigned to the variable component of the tariff). The network component of the retail tariff should reflect the structure of the fixed and variable components of the relevant network tariffs.
- A new tariff should be created for contestable customers on the current L1/L2 tariff, if a gradual increase is implemented for non-contestable customers currently in the L1/L2 tariff.
- Further consideration should be given to changing the A1/A2, L1/L2 and K1/K2 tariffs to an inclining block tariff structure once these tariffs reach cost-reflective levels
- If smart meters are introduced in Western Australia, consideration should be given to changing the A1/A2, L1/L2 and K1/K2 tariffs to a time-of-use tariff structure.

#### *Tariffs for large customers*

In order for tariffs for large businesses (contestable customers) in the SWIS to be cost reflective in 2009/10, the ERA report forecast that the tariffs need to increase in accordance with the table on the next page.

Tariff	2009/10	2010/11	2011/12
L3/L4	39 percent	20 percent	13 percent
R3	42 percent	19 percent	11 percent
S1	27 percent	19 percent	11 percent
T1	35 percent	19 percent	9 percent
M1/M2	51 percent	20 percent	13 percent
N2	-	-	-
P2	39 percent	20 percent	13 percent
W1/W2	142 percent	20 percent	10 percent
Z	63 percent	31 percent	23 percent

As for small use customers, the retail component of these tariffs should remain the same in the short term (except for the new costs associated with the Carbon Pollution which should be completely assigned to the variable component of the tariff). The network component of the retail tariffs should reflect the structure of the fixed and variable component of the relevant network tariffs.

#### *Future tariff reset process*

- Regulated electricity tariff resets should be undertaken by the ERA
- The first retail tariff determination by the ERA should take effect from 1 July 2012, and timing for subsequent retail tariff determinations should coincide with the timing of the network Access Arrangement resets as far as possible.
- Retail electricity tariffs should be subject to annual adjustments between the two resets.
- Government can retain the discretion to continue arrangements for gradual increases for residential and small use customers from the first tariff determination by the ERA, with



community Service Obligation payments made for the difference between tariffs and increase levels.

#### *Concessions and Subsidies*

- All rebates for financially disadvantaged residential customers should be increases in proportion to any Government approved electricity tariff increases.
- The seniors Air Conditioning Rebate should be expanded to apply to those eligible for the Dependent Child Rebate, and renamed.
- The Supply Charge Rebate should continue to be administered via electricity bills, but should be re-titled 'Energy Rebate' and should not be linked to the value of the electricity charge.
- The Community and Charitable Organisation Tariff (C1/C2 and D1/D2) should be removed from 2009/10 with assistance being provided instead by direct Community Service Obligations payments.
- Community Service Obligation Payments should replace the Tariff Equalisation fund to fund the Union Tariff Policy in Horizon powers supply areas from 2009/10

*Network tariffs* should be automatically passed through for all classes of regulated retail electricity tariffs and should be separately itemized on bills.

*Costs for measures taken to mitigate greenhouse gas emissions* should be automatically passed through for all classes of regulated retail electricity tariffs and should be separately itemized on retail bills where costs are based on a specific allowance.

## Appendix 4 - Notes on Convergence of Gas and Electricity Markets

### Gas and Electricity Market Convergence:

#### *Categorising market convergence:*

- Convergence of products and services: evolving similarities with respect to certain products or services
- Convergence of regulatory regimes: evolution of similar regulatory regimes
- Convergence of business governance: redefining markets in order to attain competitive advantages
- Convergence of technology: Evolution of technological similarities or complementarities

#### **Market characteristics:**

Value chain of gas sector:

Production	Wholesale Trade	Transmission	Storage	Distribution	Retail trade	Final customer
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Value chain of electricity:

Production	Wholesale Trade	Transmission	Distribution	Retail trade	Final customer
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#### **Drivers of convergence:**

- Upstream: linkage of natural gas in power generation
- Midstream: synergies between gas/electricity trading and risk management
- Downstream: opportunities to eliminate duplication costs

### **Western Australia Background**

Gas is the dominant primary energy source in Western Australia, accounting for just over 50 percent of primary energy usage in the State<sup>11</sup>. Gas is also a major fuel for electricity generation in the SWIS. Generating plants that can fire only on gas will be 34 percent of total capacity in 20010/11. A further 30 percent of capacity is in plant that can fire gas as an alternative to either coal or liquid fuels.

<sup>11</sup> ABARE Energy in Australia 2009 - [http://www.abare.gov.au/publications\\_html/energy/energy\\_09/auEnergy09.pdf](http://www.abare.gov.au/publications_html/energy/energy_09/auEnergy09.pdf)

Present gas marketing arrangements have evolved over many years largely as a result of bilateral contract negotiations. Gas supply and transport are dealt with separately.

Energy is increasingly exchangeable. Electricity generation is a key facilitator in this regard. The varying nature of electricity demand drives a surplus of capacity at most times and multiple fuel choices to minimise cost across a portfolio of plant with varying capacity factors. Multi-fuel capability also provides security in electricity generation in the event that particular fuel sources are unavailable.

As a consequence, electricity generation can facilitate reliability of energy supply generally, by shifting to alternatives when one fuel is in short supply. The Varanus Island gas supply disruption saw this in action with a shift to diesel fired generation both on and off SWIS minimizing overall disruption and allowing high value gas use to continue.

## Issues

For maximum benefit from this exchangeability of energy there must be effective trading mechanisms in place across gas and electricity markets, but this is not presently the case, particularly for gas trading.

Some trade occurs in both gas supply and transport, but this is party to party and not transparent. Also, the bilateral nature of gas trading effectively excludes medium to small customers from trade. Another problem with the present gas trade arrangements is that they are inflexible, being built on detailed contract arrangements, suitable for long term major trades. These arrangements can be difficult to establish or amend quickly, particularly for smaller trades. More flexibility could make gas trading more dynamic and responsive.

A particular issue for gas trading is that both supply and transport of gas is needed for effective trade. This further complicates increased competition under the present confidential bilateral arrangements. The move to a short term trading market in the Eastern States has been built on trade of delivered gas, however, this model may not work in Western Australia. The Bulletin Board introduced during the Varanus Island gas supply disruption demonstrated benefits of gas trade, but also identified issues, including around the coordination of supply and transport needs.

The present electricity market facilitates trade in electricity, but is not well aligned with the gas market on which many of its generators rely. For instance, daily gas nominations must be made before final positions are known in the electricity market. Difficulty in gas trading around committed positions presents risk for generators that do not achieve the electricity market position they have assumed when making gas nominations.

## Present National Developments

The National Gas Market Development Plan has three key strategies aimed at increasing transparency in the market:

- The establishment of a National Gas Market Bulletin Board



- The introduction of a national Gas Supply/Demand statement (Gas Statement of Opportunities); and
- The detailed design of a Short-Term Trading Market.

The Bulletin Board is in place. It is intended to improve decision making and trade through providing readily accessible and up to date information on the market and the transmission pipeline systems.

The national gas supply demand statement is intended to provide a long term outlook, over 10 years of demand forecast and supply capabilities, highlighting where potential supply shortfalls or transmission constraints may occur in the future. This aims to assist industry and potential new participants in commercial decisions on investment and contracting. However, it will not form a basis for centralised planning of gas infrastructure.

The Short Term Trading Market is in the final stages of development. It will establish a mandatory price-based balancing mechanism for all gas delivered to or withdrawn from defined market hubs.

### **Benefits of Convergence**

Both electricity and gas users may benefit from a more flexible approach to gas trading combined with better coordination and linkages with the electricity market. The more flexible and dynamic energy trading from such converge will likely improve competition in both markets. Given the importance of energy to the State, improved competition in energy supply is likely to have significant benefits for the State economy.

### **Way Forward**

In Western Australia, oversight of retail marketing of gas is by REMCo and wholesale marketing of electricity is the IMO. There is no explicit centralized oversight of gas wholesale markets or electricity retail markets.

Possible future convergence of gas and electricity markets in Western Australia could see convergence of oversight functions, as is presently underway in the Eastern States with the establishment of the Australian Energy Market Operator.

