

# **Meeting Electricity Demand in the 2007/08 Summer Period**

**MINISTER FOR ENERGY**

I submit for your information and presentation to Parliament a report of the Office of Energy on the outlook for electricity supply reliability during the 2007/2008 summer period.

This report has been prepared by the Office of Energy based on information provided by Western Power, Horizon Power and the Independent Market Operator.

A handwritten signature in black ink, appearing to be 'Jason Banks', with a stylized, flowing script.

Jason Banks  
**Coordinator of Energy**  
12 December 2007

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## FOREWORD - COMPLETING THE MOVE TO NEW RELIABILITY ARRANGEMENTS

October 2007 saw the final step in the transition to the new arrangements for managing reliability under the Government's electricity reform program. The present summer peak demand period is the first for which the new electricity market arrangements on the South West Interconnected System will take full effect. Horizon Power, formed in the break up of the pre-existing Western Power Corporation, remains focussed on maintaining reliable power supply to its many regional isolated power systems across the State that are not part of the South West Interconnected System.

Under the market arrangements for the South West Interconnected System, the reserve capacity mechanism provides assurance that there will be sufficient capacity to meet demand. This mechanism requires retailers to secure sufficient capacity from generators and demand management to meet forecast extreme peak demands plus prudent reserves to allow for unplanned plant outages and system management requirements.

To allow time for new plant to be constructed, the reserve capacity cycle plans three years in advance. The new market commenced operation on 21 September 2006, but the first reserve capacity cycle, which started in 2005, sought capacity to meet demand in the 2007/08 reserve capacity period commencing in October this year.

Central to the effective management of the Wholesale Electricity Market is the role of the Independent Market Operator (IMO). The IMO administers and operates the Wholesale Electricity Market. It is the body through which buyers and sellers transact capacity and energy, where that capacity and energy is not traded bilaterally. In addition the IMO is responsible for maintaining and developing the rules and market related procedures that govern the operation of the Wholesale Electricity Market.

The IMO is also responsible to manage the reserve capacity process. This includes the preparation of demand forecasts and capacity certification processes to meet those forecasts.

A second body, System Management, is responsible for the physical operation of the power system so as to ensure its secure and reliable operation. System Management is a ring fenced business unit of Western Power. System Management plays a central role in the scheduling of generator and transmission outages, and manages the real-time operation of the power system. While System Management's actions are subject to the Market Rules, in extreme circumstances it has wide powers to over-ride normal market processes if that is required to maintain or restore the supply of energy to consumers.

Other key entities in the governance of the Wholesale Electricity Market are:

- the Minister for Energy, who established the initial Market Rules and who appoints the board of the IMO;
- the Economic Regulation Authority, which performs regulatory and market surveillance roles; and
- the Energy Review Board, which acts as an adjudicator for appeals.

Generators and retailers must be licensed by the Economic Regulation Authority and must operate within the wholesale market rules. These new arrangements build upon and improve pre-existing systems to ensure reliable electricity supply while providing the added benefit of competition.

## A POSITIVE OUTLOOK FOR SUMMER POWER RELIABILITY

The South West Interconnected System and isolated regional systems are expected to provide reliable power supply over the coming peak demand period.

### *South West Interconnected System*

#### *Supply Demand Balance*

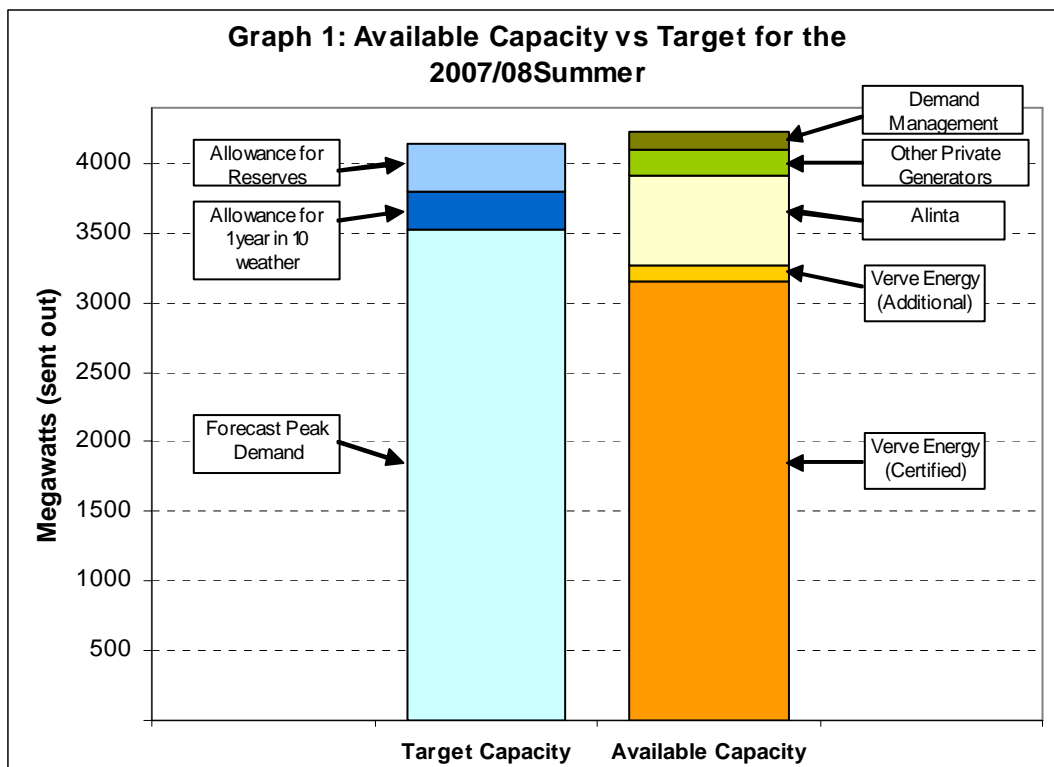
The Independent Market Operator and Western Power's System Management have assessed that capacity available will be in excess of that required to meet established reliability criteria during the peak demand period from January to March 2008.

The Independent Market Operator's assessment is based on forecast peak demand, augmented to reflect summer weather conditions as would be expected to occur only once in every ten years. To this is added:

- a reserve allowance equal to the size of the largest generating unit (304MW);
- additional reserve to cover for intermittent loads (6MW); plus
- an allowance of 30 MW for the management of normal load variations.

This forecast load is compared with forecast generation and demand management capacity certified through the reserve capacity process.

For the 2007/08 peak demand period the peak forecast and reserves total 4140MW. Certified capacity totals 4115MW leaving an amount of 25MW, however, Verve Energy has additional firm capacity related to recent plant upgrades. This capacity is certified commencing in the 2008/09 reserve capacity period, rather than for the 2007/08 period. However, it is already fully commissioned and so can be made available to the market if required. As a consequence, there will be a small excess of capacity, in the order of 90MW, available to meet extreme demand and unforeseen plant outages should they occur.



Western Power's System Management, which is focussed more on system requirements for the immediate future, has separately developed peak demand forecasts and maintains a close watch on generator performance. System Management has also concluded from its perspective that more than sufficient capacity is available to meet demand.

### *Generation and Demand Management*

Since last summer, the aging Stages A and B of Verve Energy's Muja Power Station have been retired. However, more than compensating for this loss in capacity are new generators installed by Alinta at Wagerup and the recovery of previous capacity reductions at Verve Energy's Muja unit 6.

System Management has advised that pre-summer maintenance across the generating portfolio is presently being completed to ensure that plant is well prepared to meet peak demands. System Management is responsible for approving the timing of plant maintenance activities to ensure that sufficient reserve margins are maintained and that maintenance outages are avoided in peak demand periods.

Another important strategy used to respond to peak demands is demand management. This entails arrangements with participating customers to reduce their demand for short periods. For some customers the nature of their electricity use means that financial incentives to reduce load make this option attractive. For the electricity system, demand management offers a very cost effective way to manage the short periods of extreme peak demand, compared with the alternative of providing high cost generating plant which would only very rarely be required to operate. For the 2007/08 period over 100MW of demand management capacity is expected to be available for use if required.

### *Networks*

As well as generating plant, transmission and distribution systems are key elements in maintaining reliable supply.

The network has been expanded over the last twelve months in order to meet the predicted load growth. Significant network enhancements completed during 2007 include:

- commissioning of a new 330 kV terminal at Landwehr;
- commissioning of four new substations at Henley Brook, Waikiki, Bibra Lake and Bentley;
- installation of additional transformers at five major substations; and
- commissioning of approximately 15 new distribution feeders.

Western Power's summer readiness work program is substantially complete. This includes ensuring the readiness of Western Power's normal fleet of distribution connected generators. This year the number of generators available has more than doubled with an additional ten generators being available for the period from 1 December 2007 to 30 April 2008.

The electricity network as a whole is expected to cope with anticipated load conditions, although, if extreme conditions are experienced, it is possible that some localised overloading of the network may occur. Western Power maintains contingency plans and communication arrangements to mitigate the effects of any outage that might occur.

Significant transmission upgrades have also been completed during 2007 to facilitate the connection of the new Bluewaters and NewGen power stations. These measures will contribute to Western Power's preparedness for the following summer.

### *Communication Program*

Building on last year's Beat the Peak campaign, Western Power is working in conjunction with Synergy and the Office of Energy to increase public awareness of how peak demand can be reduced and also to ensure rapid and effective communication with customers in the event that supply problems occur.

### *Regional Systems*

Based on advice from Horizon Power, regional systems are well prepared for the coming summer.

Horizon Power has prepared its systems for extremes in environmental conditions and customer demand across its areas of operation. However, in the most extreme conditions, as might occur if cyclones pass over major settlements or where there is severe flooding, some level of power failure is unavoidable.

To deal with these extreme circumstances Horizon has plans in place to minimise power loss and to quickly restore power. These include a Cyclone Response Plan and emergency response plans for each of its sites, together with a corporate crisis management plan to cover such eventualities.

### *Cyclone Preparations*

Following the severe impact of cyclones last year, in particular cyclone George, which crossed the coast near Port Hedland in March 2007, Horizon Power has completed a full review and test of its cyclone readiness, Emergency and Crisis management procedures and coordination with other agencies. This review has been completed and has culminated in a Cyclone Response Plan for Horizon Power that incorporates both pre-season tasks and detailed checklists in response to an impending cyclone for each of its operational areas in both the Networks and Generation Divisions. The completion of undergrounding of power in Port Hedland will also assist in reducing the effects of cyclones at this major centre.

### *Generation Reliability*

Generation reliability is assured through maintaining sufficient generating capacity in each power station to accommodate plausible failure of generating sets or fuel supply. Horizon Power's systems are supplied in some cases by Horizon's own generation and in some by contracted generators. Power purchase arrangements with private generators incorporate these reliability requirements.

In addition Horizon Power supplements permanent generating plant with hired plant where peak demand lopping is required for only a few months of the year. The hire plant is also used to cover for breakdowns of permanent generating equipment. In early 2007 Horizon took the opportunity to purchase eleven ex-hire packaged generators to offset some budgeted hire costs and to reduce its reliance on third parties and the increasing scarcity of hire generators. Hire generation is still used to supplement capacity cost-effectively as required. Based on the summer rating of Horizon power station generator capacities, approx 30% of total installed capacity this summer will be derived from hire plant.

### *Distribution Reliability*

Distribution reliability is similarly based on the capacity to manage plausible failure scenarios. Horizon Power monitors the existing network assets for load flows, overloads and transformer peak loads to ensure the network capacity is maintained to meet reliability criteria. Network assets include distribution and transmission assets, transformers, conductors/cables, switches and earthing points.

Bushfires also present a significant risk to reliability and Horizon Power maintains a Bushfire Management Plan detailing the required works to be undertaken in high fire risk zones to reduce the chance of fires occurring in these areas.

Horizon has advised that all of its systems are ready for the coming summer period. This includes ensuring that pre-existing generation plant is maintained until new plant presently being installed in Broome, Derby, Fitzroy Crossing and Halls Creek is fully proven.

Also, while not specifically related to summer conditions, significant improvements have been made following the power outages late last year related to flooding of the Pacific Hydro Pty Ltd hydro-electric power station which supplies the towns of Kununurra and Wyndham. In addition to avoiding future flooding, automated and remote operation of Horizon's back-up generation will be in place for summer.

## **BACKGROUND TO RELIABILITY PLANNING**

### *Assurance of Reliability*

High levels of supply reliability are essential to support our State's modern economy. However, the cost of reducing the probability of supply interruption becomes disproportionately high as very high reliability is approached.

It is in the nature of electricity supply that it is not practicable or cost effective to guarantee absolute supply reliability. This is true in Western Australia, as it is in all electricity supply systems. Extreme weather events or exceptionally unlikely coincidences of plant failures will always have the potential to result in interruption of electricity supply to customers.

Experience here and elsewhere in the world has led to the adoption of engineering and planning criteria to give assurance that economically appropriate levels of reliability will be achieved.

The stringent standards and planning criteria used in Western Australia are equivalent to those used in other Australian jurisdictions.

### *Electricity Forecasts*

The South West Interconnected System covers the south-west of the State extending north to Kalbarri, east to Kalgoorlie and south to Albany. The highest electricity loads in this system occur in the summer months and are a combination of the underlying commercial, industrial and domestic loads overlaid with short term air-conditioning demand. Air-conditioning can contribute 25%-50% of demand on days of extreme summer peak load.

The load forecasts used in assessing the capacity to meet demand take account of the extreme weather conditions that would be expected to occur only one year in every ten years, rather than just the peak system load that would normally be expected in a particular year. This conservative approach takes account of the wide year-to-year variation in weather and the significant effect that can have on the electricity system demand.

### *Current Summer Weather Forecast*

Each month, the Bureau of Meteorology updates a three month outlook for temperature across Australia. The most recent outlook was released on 22 November 2007, covering December, January and February.

The Bureau has reported that the “Western Australian outlook for maximum temperatures averaged over summer (December to February) shows no moderate or strong shifts in the odds towards either hotter or cooler than average conditions. ”Averaged over summer, the chances are between 40 and 60% for above-normal maximum temperatures over WA. So for every ten years with ocean patterns like the current, about five summers are expected to be warmer than average over WA, with about five being cooler.”

The Bureau’s outlook for temperature focuses on average maximum and minimum temperatures rather than the peak conditions that produce the highest electricity loads. Accordingly, while the temperature outlook appears benign, it remains prudent for the State’s electricity systems to be prepared for high demands during the summer period. In this regard, it is important to note that the present positive assessment for electricity reliability is based on peak demand forecasts that presume extreme weather conditions as would be expected only one year in every ten.