Independent Market Operator
ABN: 95221850093

Your ref:
Our ref: IMO 01005
Enquiries: Patrick Peake

Mr Alistair Butcher
Acting Director, Electricity Access
Economic Regulation Authority
Level 6, 197 St Georges Terrace
Perth WA 6000

Dear Alistair

RESPONSE TO THE PROPOSED ACCESS ARRANGEMENT ISSUES PAPER FOR THE SOUTH WEST INTERCONNECTED SYSTEM

Thank you for the opportunity to comment on the Issues Paper in respect to the Proposed Access Arrangement for the South West Interconnected System. Attached please find a submission from the Independent Market Operator. I have also emailed a soft copy of the document to your website.

Yours sincerely

PATRICK PEAKE
MANAGER SYSTEM CAPACITY

7 November 2005

Level 22 Forrest Centre 221 St Georges Terrace Perth Western Australia 6000
PO Box 7096 Perth Western Australia 6850
Tel: 9254 4300 Fax: (08) 9254 4399
Email: imo@imowa.com.au www.imowa.com.au

INDEPENDENT MARKET OPERATOR

Response to the Proposed Access Arrangement Issues Paper for the South West Interconnected Network

October 2005

1. INTRODUCTION

The Economic Regulation Authority (ERA) published an Issues Paper entitled "Proposed Access Arrangement for the South West Interconnected Network" on 16 September 2006. The Issues Paper invited submissions regarding, amongst other matters:

- the peak demand forecasts; and
- the energy forecasts.

These forecasts are used for Networks' planning functions and also for developing tariffs. The Issues Paper notes that there is an inconsistency between the forecasts which have been developed by Networks and published in the 2004 Generation Status Review (GSR) and those published by the Independent Market Operator (IMO) in the 2005 Statement of Opportunities Report (SOO).

The IMO has subsequently determined that there was an error in the way in which some of the data in respect to production from non-Western Power generators has been processed. This has understated the energy sent out by around 2% in the SOO forecasts. This has been addressed and a revised set of forecasts is provided.

The GSR and SOO still differ in their forecasts of future energy sales. This, however, is due to changes in the underlying economic expectations with the SOO forecasting a lower level of growth than had been included within the GSR forecasts.

This Submission:

- describes the process used by the IMO's consultant to develop the forecasts used in the SOO;
- provides updated forecasts of energy usage in the South West Interconnected System (SWIS); and
- discusses those areas where the forecasts required by Networks may well differ from those used by the IMO.

2. THE IMO FORECASTS

The IMO is required to ensure that enough generation and demand side capacity is provided to meet two reliability criteria set out in the Wholesale Electricity Market Rules (Market Rules). Sufficient available capacity must be provided to:

- meet the forecast peak demand, plus a defined margin, where the peak demand is calculated at a probability level that is not expected to be exceeded in more than one year in ten; and,
- limit expected energy shortfalls to 0.002% of annual energy consumption.

The IMO therefore develops both energy and peak demand forecasts. Although the IMO's primary focus is the forthcoming two to three years, it develops and publishes a ten-year forecast as a guide to existing market participants and potential new entrants.

3. THE FORECASTING PROCESSES

Following a broad tendering process, the IMO retained the National Institute for Economic and Industry Research (NIEIR or National Economics) to develop its forecasts. NIEIR undertake electricity forecasting for a number of utilities within the National Electricity Market.

NIEIR had also previously developed the forecasts published by Western Power Networks in their GSR in 2003 and 2004. Use of the same forecasting consultant means that there is a consistent approach to the forecasts included within the GSR and the SOO.

3.1 Maximum demand forecast

NIEIR developed the forecasts for the summer maximum demand using an approach that takes into account four major components. The first of these is non-temperature sensitive load which is that component of residential, commercial and industrial load that does not change significantly as a result of differences in daily temperature. The growth in demand from these loads will be closely correlated to the level of economic activity within the SWIS. The number of new dwellings and the level of retail sales will be key drivers for this figure.

The second component is major industrial loads which covers all of the larger customers in the SWIS. This portion of the demand is assessed by considering known development plans and analysis of the flow through of general economic growth.

The third component is embedded generation which is generation that is co-located with major industrial loads. Industries such as the alumina refineries provide most of their own power but occasionally draw on the SWIS for stand-by supplies to cover generating plant outages.

The fourth component is the temperature sensitive load. This comprises space cooling appliances, such as air-conditioning, whose level of usage is strongly determined by the ambient temperature on any given day. The size of this load component, and the impact that it has on total peak demand, is very significant. To address this, NIEIR provide separate peak demand forecasts covering:

- the forecast demand which has a 10% probability of being exceeded in any year (the 10th percentile demand);
- the forecast demand which has a 50% probability of being exceeded in any year (the 50th percentile demand); and
- the forecast demand which has a 90% probability of being exceeded in any year (the 90th percentile demand).

A 10th percentile demand is expected to occur in one year in every 10 as a result of unusually hot weather. The Market Rules require the IMO to seek to have sufficient generation and demand side management capacity available in the SWIS to meet a

10th percentile demand. A 50th percentile demand is expected to occur one year in two, while a 90th percentile year should occur nine years in 10.

The widespread installation of air conditioning equipment is having a substantial impact on the peak demand. A number of factors are driving the level of installations including:

- the increasing affluence within the community;
- the perception that air conditioning has moved from being a luxury item to a necessity;
- the use of reverse cycle air-conditioning for winter heating;
- technological improvements; and
- the reduction in real price coupled with strong marketing.

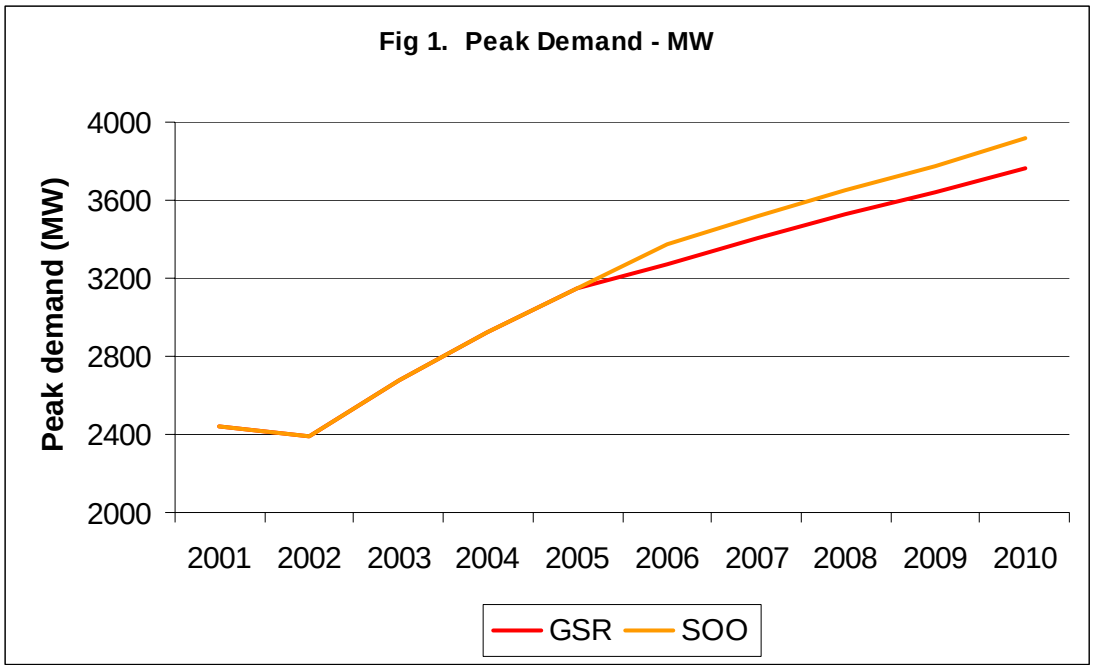
Furthermore, there has been an increase in the proportion of home units, retirement villages and other dwelling types where air-conditioning is perceived to be cost effective and necessary.

As with other electrical appliances in the past, the penetration of air-conditioning is moving from negligible towards saturation. The key difficulties, from a forecasting perspective, is in determining just how far this process has gone and what will be the saturation level at which the rate of growth may stabilise. Also, unlike other appliances such as microwave cookers or VCRs, the extra demand of each air-conditioning unit is quite significant and there is little diversity in their usage. They also tend to present a constant demand over a prolonged period compared to many other new appliances.

NIEIR uses data on air-conditioning sales as the basis for their approach to forecasting this component of peak demand. This is combined with regression analysis to link demand to the temperature of the current and previous day.

The utilisation of air-conditioners is strongly influenced by the actual temperatures experienced and the peak demand in a 10th percentile year is forecast to be in the order of 200 MW higher than in a 50th percentile year. In addition, purchases also jump when temperatures are high so a 10th percentile year will lead to a step increase in peak demand which carries through to following years.

Figure 1 compares the forecast peak demand in the 2004 GSR with that in the 2005 SOO and it can be seen that the SOO forecast is some 120 MW higher than that in the GSR. This difference is believed to be due to increases in air-conditioning purchases and usage. There was very hot weather in 2002/03 and this most likely prompted extra purchases which would have contributed to above forecast demand in 2003/04 and 2004/05.



3.2 Electricity sales forecasts

NIEIR use a set of economic models which consider, in sequence, Australia as a whole, Western Australia and then the geographic area served by the SWIS. Electricity consumption forecasts for industrial and commercial users are based on econometric models that link Western Australian electricity sales by industry to real industry output growth, electricity prices and weather conditions. Residential sales are determined from a model including average consumption per dwelling, weather, real income and electricity prices.

Western Power Networks provided NIEIR with data on electricity sales and output generated by Western Power and independent generators. This was used to estimate the level of sales for residential, business and public lighting. Further consumption data was provided by the Australian Bureau of Agricultural and Resource Economics and this was used to determine usage by various industries.

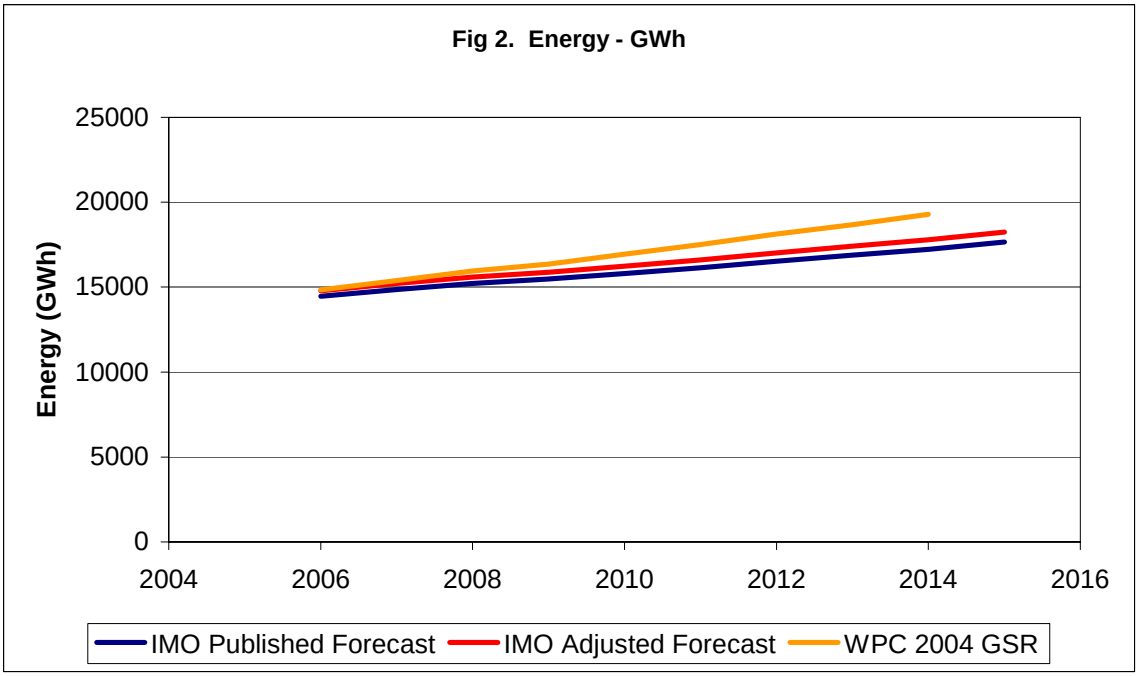
NIEIR provided a series of forecasts to the IMO covering three load growth cases – expected, high and low – based on differing economic assumptions. The IMO then adjusted this data to take account of losses within Western Power's power stations, and generation and usage by independent generators. These forecasts, which have been corrected to address the data error associated with non-Western Power generators, are show in Table 1 below.

Table 1- Revised Sent-out Energy Forecasts (GWh)

YEAR	Expected Growth Rate	High Growth Rate	Low Growth Rate
2005/06	14777	14934	14705
2006/07	15208	15499	15039
2007/08	15595	16000	15328
2008/09	15874	16467	15549
2009/10	16222	17022	15734
2010/11	16601	17545	15971
2011/12	17014	18123	16202
2012/13	17410	18720	16485
2013/14	17787	19381	16742

The comparison between the energy forecasts contained within the GSR and the SOO (as published and as adjusted) is shown in Figure 2 below:

Fig 2. Energy - GWh



It can be seen that the SOO forecast shows a lower growth rate than was forecast in for the GSR. In its report to the IMO, NIEIR commented that the energy forecasts have been revised downwards quite significantly. One of the factors driving this has been a reassessment of the historical energy growth using an alternative weather normalisation process. NIEIR had found that the weather normalised growth in energy in previous forecasts was too high based on recent experience.

Residential sales, which account for about one third of total electricity sales by Western Power, are expected to grow by around 3.2% in 2005/06 and remain high due to continued strong dwelling construction through to 2009/10. Commercial sales, which represent around 29% of the market, are expected to grow at around 2.9% over the coming 10 years whereas industrial demand is only expected to grow at around 1.7%.

4. CHOSING THE APPROPRIATE FORECASTS FOR NETWORKS

4.1 Scope

The IMO develops forecasts covering all generators and loads that are part of the South West Interconnected System. At present, this is congruent with Western Power's South West Interconnected Network (SWIN) but this may not always be the case. There are a number of major industries connected to the SWIN that have extensive on-site generation plant. These entities have a choice of how they are incorporated into the Wholesale Electricity Market:

- they may be fully incorporated in the market with all of the internal generation and loads separately measured and registered; or

- the on-site facilities are outside of the market and the only interaction occurs at the connection between the facility and the boundary.

The choice of how these facilities are registered determines how they should be treated within the forecasts. If the facilities are integrated within the market:

- all loads within the facility are separately measured and are included in the overall SWIS load forecast; and

- all generation capacity is separately measured and contributes towards the overall system requirements.

However, if the facility prefers to remain outside of the market only net transfers are included within the IMO's calculations so that:

- the internal loads are only included to the extent that these exceed the internal generation capacity and rely on imports from the SWIS;

- the internal generation is only included to the extent that it exceeds the internal loads and can export to the SWIS; and

- if the facility draws "stand-by" energy to cover outages of its internal generation, the IMO will include this in its overall system capacity requirement.

At present, the major industrial loads that have on-site generation, and the privately owned Goldfields Network, have elected to operate outside of the Wholesale Electricity Market. This means that the IMO only includes their net interaction with the Wholesale Electricity Market for the purposes of forecasting capacity requirements. If any of these entities elected to become fully registered within the Wholesale Electricity Market, then they would need to be included within the system forecast demand. However, as this energy would not be transported across Networks' transmission system, the new IMO forecast would not be appropriate for Networks' use.

4.2 Purpose of forecasts

All forecasts are prepared for a specific purpose. The IMO prepares its peak demand forecast to ensure that sufficient generation and demand side management capacity is provided to meet the system peak during a period of high temperatures which may be rare but still reasonably likely. For this reason, the IMO focuses on the

10th percentile demand and is less interested in the 50th or 90th percentile peak demands.

However, for Western Power Networks, the forecasts which are of more relevance are likely to be:

- the peak demand across any specific transmission or distribution element (to determine plant ratings); and

- the peak demand in an average year (to determine prices).

The IMO publishes longer term forecasts of energy consumption as a guide to market participants who are considering the installation of new generation facilities or entering into contracts for energy purchases. Both the IMO and Networks also require shorter term energy forecasts to assist in setting prices and price control formulae.

5. DISCUSSION

There are clearly significant differences between the forecasts published by the IMO and those previously published by Networks in the GSR. The increase in the peak demand forecasts is strongly influenced by the level of demand from air-conditioning. Sales of these appliances appear to have accelerated due to a variety of reasons, probably including the high temperatures in 2002/03. It is reasonable to assume that the earlier GSR forecasts may not have fully incorporated this trend.

Now that the inconsistency between the GSR and SOO energy forecasts has been resolved, the remaining differences are due to forecasts of future load growth. As outlined above, NIEIR considers that the energy forecasts within the GSR are too high and has proposed a lower growth rate which is incorporated within the SOO forecasts. Forecasts are dynamic and, based on actual demand this year, the forecast which is developed for next year's SOO may well be different again.

At present, the loads covered by the SOO forecasts are identical to those which need to be covered by Networks' forecasts. However, there are a number of independent generators and networks which may elect to fully integrate within the wholesale market. They would then need to be covered by the IMO's forecasts but be excluded from Networks' forecasts.

Under its legislation, the IMO is required to prepare the energy forecasts which are used for planning of capacity requirements within the SWIS. It is not obligatory that Networks use these forecasts, however, it would be desirable that planning of generation and networks be based, as far as is possible, on a common basis. The inconsistency between the 2004 GSR and 2005 SOO forecasts, has led Networks to use a forecast for this year that differs from that in the SOO. With the inconsistency issue resolved, the ERA may consider asking Networks to utilise the new energy forecasts within the SOO.