Public Version

Annual Wholesale Electricity Market Report for the Minister for Energy

21 December 2007

Economic Regulation Authority
WESTERN AUSTRALIA

A full copy of this document is available from the Economic Regulation Authority web site at www.era.wa.gov.au

For further information, contact:

Economic Regulation Authority
Perth, Western Australia
Phone: (08) 9213 1900

Contents

List of Tables

List of Figures

Executive Summary

The Wholesale Electricity Market Rules (**Market Rules**) require the Economic Regulation Authority (**Authority**) to provide to the Minister a report on the effectiveness of the Wholesale Electricity Market (**WEM**) at least annually, and more frequently where the Authority considers that the WEM is not effectively meeting the Wholesale Market Objectives. The *Electricity Industry Act 2004* (**Act**) requires the Authority to provide to the Minister a report based on a review of the extent to which the market objectives set out in the Act have been or are being achieved.

Given the substantial overlap between these two requirements, this report fulfils the requirements under both the Market Rules and the Act, providing an assessment of the effectiveness of the WEM since the market commenced on 21 September 2006.

In undertaking its review of the effectiveness of the market, the Authority has been mindful of the fact that the market is relatively new, having been in operation only since 21 September 2006, and that the market is intended to evolve over time. This has influenced the Authority's approach to this review. In light of the extensive work that was undertaken over a period of six years during the restructuring of the electricity industry in Western Australia and the implementation of the WEM, and the extensive public consultation that was undertaken during these processes, the Authority's view is that it is unlikely that fundamental change to the market would be appropriate on the basis of the evidence available from less than a year of market operations.

In forming this view, the Authority has had regard to a range of market data and analysis provided to the Authority by the Independent Market Operator (**IMO**). This market data indicates that the market has been operating effectively during its early stages. In particular, the Authority notes that:

- since market commencement, new participants have entered the market, which will bring about a fall in the share of capacity in the market that is provided by Verve Energy from around 90 per cent to around 60 per cent over the years to 2009/10;
- despite Verve Energy currently accounting for the overwhelming majority of capacity in the market, other Market Participants have been active in the short term energy market (**STEM**) since market commencement;
- with the entry of new generation facilities operated by Market Participants other than Verve Energy over the next few years, there will be a broader range of Market Participants scheduling bilateral quantities and participating in the STEM;
- outcomes in the market to date indicate that prices have tended to decline and become less volatile in both the STEM and the balancing market; and
- outcomes in the market to date indicate that prices in the STEM and the balancing market have provided useful signals to Market Participants, with prices responding to scarcity in the market.

At this stage, the Authority is not aware of outcomes in the STEM that indicate market power as an issue. However, the IMO continues to develop analyses to shed light on the causes of high prices in the STEM, as well as variations in bidding behaviour by Market Participants. In addition, the Authority is working on a short run marginal cost (**SRMC**) paper and, together with the IMO, a SRMC model. Once finalised the paper and the model will assist understanding of bidding behaviour by Market Participants. As this work

progresses, the Authority will continue to monitor bidding behaviour by Market Participants.

While outcomes in the market to date are generally positive, the Authority is aware of some potential issues with the operation of the market. In most cases, the Authority considers that the rule change process is the appropriate mechanism for making changes to the Market Rules. In some cases, the Authority has identified issues that are deserving of particular ongoing review and scrutiny. Specifically, there are questions in regard to:

- the appropriateness of the investment signals provided by the market, particularly whether the market will lead to investment in excess capacity, or will lead to insufficient investment in base load or mid-merit capacity;
- the appropriateness of the timing of the reserve capacity mechanism, and whether this can create barriers to investment for facilities with long lead times;
- whether the timing of planned network outages impacts on the effectiveness of the market, particularly during peak periods; and
- whether there are barriers to the participation of consumers in demand-side management programs.

At this early stage, the Authority considers that there is insufficient evidence to conclude that these issues will have a material impact on the effectiveness of the market. The Authority will continue to monitor these matters, and their impact on the effectiveness of the WEM.

INTRODUCTION

1 Background

The Economic Regulation Authority (**Authority**) is the independent economic regulator for Western Australia. The Authority administers industry-specific legislation in the areas of electricity, gas, rail and water.

One of the Authority's responsibilities is to report on the effectiveness of the Wholesale Electricity Market (**WEM**).

Clause 2.16.11 of the Wholesale Electricity Market Rules (**Market Rules**) requires the Authority to report on the effectiveness of the market in meeting the Wholesale Market Objectives. Clause 1.2.1 of the Market Rules sets out the Wholesale Market Objectives:

(a) to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system;

(b) to encourage competition among generators and retailers in the South West interconnected system, including by facilitating efficient entry of new competitors;

(c) to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;

(d) to minimise the long-term cost of electricity supplied to customers from the South West interconnected system; and

(e) to encourage the taking of measures to manage the amount of electricity used and when it is used.

The Market Rules require the Authority to provide to the Minister a report on the effectiveness of the WEM at least annually, and more frequently where the Authority considers that the WEM is not effectively meeting the Wholesale Market Objectives. The Minister's Report is to include any recommended measures to increase the effectiveness of the WEM in meeting the Wholesale Market Objectives.

Section 128(3) of the *Electricity Industry Act 2004* (**Act**) requires the Authority to report on the extent to which the objectives of the market have been or are being achieved. The objectives of the market set out in Section 122(2) of the Act are identical to the Wholesale Market Objectives set out in Clause 1.2.1 of the Market Rules.

The Act requires the Authority to conduct a review on the extent to which the objectives of the market have been or are being achieved as soon as practicable after the expiration of three years from the commencement of the Act, and to provide to the Minister a report based on that review not later than three years and six months after the commencement of Part 9. Part 9 of the Act commenced on 23 June 2004.

Given the substantial overlap between the reporting requirements under Clause 2.16.11 of the Market Rules and Section 128(3) of the Act, this report fulfils both requirements. This report is the first Minister's Report provided by the Authority, and provides an assessment of the effectiveness of the WEM since the market commenced on 21 September 2006.

1.1 Process

In preparing this Minister's Report, the Authority has undertaken public consultation. During June and July 2007, the Authority conducted informal meetings with key

stakeholders, inviting these stakeholders to provide their preliminary views on the effectiveness of the WEM. Subsequently, the Authority released a Discussion Paper on 9 August 2007 to assist interested parties to make submissions on issues relevant to the effectiveness of the WEM. A notice was posted on the Authority's web site advising the release of the Discussion Paper and inviting submissions to be lodged with the Authority by 6 September 2007. Subsequently, a second notice was posted on the Authority's web site, and published in The West Australian newspaper, inviting any further submissions to be lodged with the Authority by 23 November 2007. A list of the submissions received is provided in Appendix 2.

In preparing this Minister's Report, and in forming the views set out in it, the Authority has considered both the comments raised by key stakeholders during the informal meetings, and the submissions provided to the Authority in response to the Discussion Paper.

In preparing this Minister's Report, the Authority has also had regard to a range of market data. In accordance with the Market Rules, the Independent Market Operator (**IMO**) has provided the Authority with data and analysis relating to the WEM, which is summarised in this Minister's Report. In forming the views set out in this report, the Authority has considered the data and the analysis provided by the IMO.

1.2 Confidentiality

Clause 2.16.15 of the Market Rules requires that, where the Authority provides a report to the Minister in accordance with Clause 2.16.11, the Authority must, after consultation with the Minister, publish a version of the report which has confidential or sensitive information aggregated or removed.

This version of the Minister's Report is the public version. Information that is classed as confidential under Chapter 10 of the Market Rules has been identified by the Authority and has been aggregated or removed. Where information that is required to be included in the Minister's Report has been removed from this public version due to it being classed as confidential, the removal of that confidential information is noted. The Minister has been provided with the confidential version of this report.

1.3 Structure of this report

This report is structured as follows:

- Section 2 provides an overview of the electricity reform process in Western Australia and of the WEM;
- Section 3 sets out the requirements for the Minister's Report;
- Section 4 provides a summary of the Market Surveillance Data Catalogue (**MSDC**);
- Section 5 sets out the Authority's assessment of the effectiveness of the WEM, the IMO and System Management;
- Section 6 sets out the Authority's assessment of the specific events, behaviour and matters that impacted on the effectiveness of the WEM.

2 The Wholesale Electricity Market

This section provides an overview of the WEM. It begins with a brief history of recent electricity reform in Western Australia, before outlining the key features of the WEM.

2.1 Electricity reform in Western Australia

The electricity reform process in Western Australia has been very comprehensive, comprising six years of design and implementation.

The Western Australian Government established the Electricity Reform Task Force (**ERTF**) in August 2001 to investigate and make recommendations on structural and market reforms of the State's electricity sector. The ERTF formed four working groups to investigate the areas of market design, structural reform, regulatory arrangements and the electricity access code. These working groups were made up of representatives from Government, Western Power and industry. The ERTF also undertook two rounds of formal public consultation, and consulted a range of stakeholders directly on specific issues relating to the electricity supply industry.

Following this process, the ERTF made a series of recommendations in regard to further reform to the electricity supply industry. Importantly, the ERTF noted that the recommendations were designed to provide an evolutionary approach to electricity reform, which was considered appropriate due to the specific nature of the Western Australian electricity supply industry.

In respect of market design, the recommendations of the ERTF sought to extend and enhance bilateral contracting, which was considered to be a positive and an important element of the open access arrangements to Western Power's networks. The ERTF considered that basing the market design around this bilateral regime should continue, but be supported by a net pool system. The ERTF concluded that such a market design would offer lower transition costs, less price volatility and lower susceptibility to the exercise of market power than alternative market designs. In making its recommendations, the ERTF was mindful of the likely structure of the market over the first few years of the market, including relatively few generation participants, one or two retail participants and relatively inexperienced Market Participants.

The ERTF considered that the net pool system should be day-ahead rather than a real time pool. The ERTF considered that real time markets are more complicated and costly to implement, and are inherently more susceptible to the exercise of market power. Also, given the number of Market Participants and dominance of Western Power at that time, the small size of the market and the inexperience of many participants in operating in an electricity market, the ERTF considered that a day-ahead market was more suitable to Western Australia.

In respect of restructuring, the ERTF's main focus was on the restructuring of Western Power to provide the basis for the development of a competitive market. The ERTF recommended the disaggregation of Western Power into separate generation, retail and network businesses as a means of providing new entrant competition.

The ERTF recognised that mechanisms would be necessary to mitigate the market power of State Retail (now Synergy) and State Generation (now Verve Energy) during the initial years of the reform process. A key initiative recommended by the ERTF was the vesting

contract between State Generation and State Retail, which was intended to decrease over time as the market became progressively more competitive upon the entry of new independent generators and new retailers.

Following the Government's endorsement of the recommendations of the ERTF, the reform process continued with the implementation of the WEM. The Electricity Reform Implementation Steering Committee (**ERISC**) was established in January 2003 with responsibility for the implementation of the wholesale electricity market, among other things. To assist with the detailed development of the Market Rules, a Market Rules Development Group (**MRDG**) was established. As the ERTF had done before it, the MRDG undertook substantial public consultation with a full range of stakeholders. The MRDG was comprised of 15 members from industry and Government, and was supported by expert teams. These teams were also comprised of representatives from industry and Government, supported by expert advisors. Many of the recommendations of the ERTF, including the adoption of a bilateral contract market supported by a day-ahead net pool system, are now embodied in the Market Rules.

The Market Rules include a formal rule change process, which provides a mechanism for ongoing market evolution. The formal rule change process commenced on 15 December 2006, with the IMO having a primary role in processing rule changes, and industry providing important input on rule change proposals. A Market Advisory Committee (**MAC**) advises the IMO in regard to rule changes, procedure changes, and electricity market operation matters in general.

2.2 Overview of the WEM

The WEM is made up of two components: a capacity market and a wholesale energy market.

2.2.1 The capacity market

The reserve capacity mechanism is designed to ensure that there is sufficient generation and demand-side management (**DSM**) capacity available in the South West Interconnected System (**SWIS**) to meet forecast electricity demand.

The IMO is responsible for the operation of the reserve capacity mechanism in accordance with specific steps that are defined in the Market Rules.

The capacity required in the SWIS is set out in the Statement of Opportunities Report (**SOO**). The IMO is required to publish a SOO each year, outlining projected capacity requirements for the SWIS for each of the next ten years. The IMO will determine the capacity required in each year to:

- meet the forecast peak demand in the SWIS even after the outage of the largest generation unit and while maintaining some capability to respond to frequency variations; and
- limit expected energy shortfalls to 0.002 per cent of annual energy consumption.

Generators and DSM facilities that want to contribute capacity to the WEM must apply to the IMO for certification of their capacity. The certification process determines the

contribution that each facility is able to make to the capacity requirement in a capacity year.[1]

Once the capacity of a facility is certified, the operator of the facility then indicates to the IMO the amount of capacity they want to trade bilaterally, the amount of capacity they want to offer through the reserve capacity auction, and whether they want to terminate any capacity. Capacity credits are then assigned by the IMO on the basis of priorities set out in the Market Rules. All certified facilities that are in operation or under construction, and which nominate their intention to trade capacity bilaterally, are assigned capacity credits. If there is a shortfall of capacity after this, then certified facilities that are proposed but not yet under construction, and which nominate their intention to trade capacity bilaterally, are assigned capacity credits. If there is a shortfall capacity after this, then the IMO runs a reserve capacity auction where bidders are assigned capacity credits based on their offer prices until sufficient capacity is acquired.

2.2.2 The energy market

The energy component of the WEM consists of three separate mechanisms for trading energy: bilateral trading, the short term energy market (**STEM**) and balancing.

Bilateral contracting enables Market Participants to enter into contracts to trade energy at commercially negotiated prices and terms. Bilateral trades are settled directly between Market Participants. Generators are required to inform the IMO as to how much energy they have agreed to supply under bilateral contracts in bilateral submissions. Bilateral submissions must be provided to the IMO by the day before the day on which the relevant trading day begins. They are to include information on the energy to be supplied under bilateral contracts and the Market Participants to be supplied. Once the window for submission of bilateral submissions is closed, the energy in the bilateral submissions is scheduled.

The STEM is a day-ahead market operated by the IMO to facilitate the trading of energy around bilateral positions. Market Participants submit to the IMO a STEM submission, which includes a portfolio supply curve (made up of price-quantity pairs that the Market Participant can supply to the STEM) and a portfolio demand curve (made up of price-quantity pairs that the Market Participant can purchase from the STEM). Prices in the portfolio supply curve and the portfolio demand curve must be between the minimum STEM price and the maximum STEM price; or, for generation facilities running on liquid fuel, between the minimum STEM price and the alternative maximum STEM price. On the basis of bids and offers established from these portfolio supply curves and portfolio demand curves, the IMO determines the STEM clearing price and quantity for each half-hourly trading interval. All offers to sell with offer prices at or below the clearing price, and all bids to buy with bid prices at or above the clearing price, are deemed scheduled in the STEM. Each Market Participant's net contract position is then equal to its net bilateral position as modified by its net position in the STEM.

Balancing enables Market Participants to adjust their net contract position to enable supply to match demand in real time. The price of energy in the balancing market is generally set equal to the price in the STEM, unless the total exposure to the balancing market increases beyond a certain value. In this case, the balancing price is recalculated using the original portfolio supply curve for the trading interval.

[1] A capacity year runs from the trading day commencing on 1 October to the trading day ending on 1 October the following calendar year.

REPORTING REQUIREMENTS

3 Requirements for the Minister's Report

There is substantial overlap between the reporting requirements under Clause 2.16.11 of the Market Rules and Section 128(3) of the Act.

Section 128(3) of the Act requires the Authority to provide a report based on its review assessing the extent to which the Wholesale Market Objectives have been or are being achieved. The Market Rules also require the Authority to report on the effectiveness of the market in meeting the Wholesale Market Objectives but, in addition, set out more specific requirements.

Clause 2.16.12 of the Market Rules sets out the requirements for the Minister's Report:

> A report referred to in clause 2.16.11 must contain:
>
> (a) a summary of the information and data compiled by the IMO and the Economic Regulation Authority under clause 2.16.1;
>
> (b) the Economic Regulation Authority's assessment of the effectiveness of the market, including the effectiveness of the IMO and System Management in carrying out their functions, with discussion of each of:
>
> i. the Reserve Capacity market;
>
> ii. the market for bilateral contracts for capacity and energy;
>
> iii. the STEM;
>
> iv. Balancing;
>
> v. the dispatch process;
>
> vi. planning processes; and
>
> vii. the administration of the market, including the Market Rule change process;
>
> (c) an assessment of any specific events, behaviour or matters that impacted on the effectiveness of the market; and
>
> (d) any recommended measures to increase the effectiveness of the market in meeting the Wholesale Market Objectives to be considered by the Minister.

The Authority's reporting requirements are addressed in the sections that follow:

- Section 4 provides a summary of the data identified in the MSDC and the analysis of that data undertaken by the IMO (required by clause 2.16.11(a) of the Market Rules);
- Section 5 sets out the Authority's assessment of the effectiveness of the market, including the effectiveness of the IMO and System Management in carrying out their functions; and
- Section 6 sets out the Authority's assessment of any specific events, behaviour or matters that impacted on the effectiveness of the market.

In assessing the effectiveness of the market, the Authority has been cognisant that the WEM is only relatively new. As discussed in Section 2.1, and in the Authority's Discussion Paper, extensive consultation was undertaken during the restructuring of the electricity industry in Western Australia. Given that the WEM has been operating for only a short time, and that there is good reason to expect that the WEM will develop as it matures and as Market Participants develop a greater understanding of the market, the Authority considers that this first Minister's Report should be based on an assessment of

the effectiveness of the WEM at a fairly high level. The Authority considers it unlikely, in the absence of any substantiated concern, that fundamental change to the market would be appropriate, as the market has been operational for barely a year.

4 Market Surveillance Data Catalogue

Clause 2.16.1 of the Market Rules makes the IMO responsible for collecting the data identified in the MSDC, analysing the compiled data, and providing both the data and the analysis to the Authority. The data that is to be included in the MSDC is set out in Clause 2.16.2 of the Market Rules, and the analysis of the data that the IMO must undertake is set out in Clause 2.16.4 of the Market Rules.

The Minister's Report is to include a summary of both the data items in the MSDC and the analysis of the data undertaken by the IMO. The summary is provided in this section, and is structured to follow the data items set out in Clause 2.16.2. The summary covers the period from market commencement to 31 July 2007.

In regard to the summary of the MSDC set out in this section, the Authority notes that in the period since market commencement, the IMO has continued to refine the data items identified in the MSDC and the analysis undertaken. As the IMO continues its analysis and as the market develops, it is anticipated that the data items identified in the MSDC and the analysis undertaken by the IMO will also develop. Future Minister's Reports will reflect such changes.

4.1 Number of Market Generators and Market Customers

Clause 2.16.2(a) of the Market Rules requires that the MSDC identify the number of Market Generators and Market Customers in the WEM.

As of 31 July 2007, there were 23 entities registered as Market Generators, Market Customers, or both. This is an increase in the number of Market Participants at market commencement, when there were 15 entities registered as Market Generators, Market Customers, or both. Table 1 provides a list of these participants, at market commencement and at 31 July 2007.

In addition to these Market Generators and Market Customers, there are other classes of Market Participants. As of 31 July 2007, there were two entities registered as Network Operators: Western Power and Alinta.

Table 1: Market Generators and Market Customers

	Market commencement (21 September 2006)	31 July 2007
Market Generators and Market Customers	Alcoa of Australia Ltd Alinta Sales Pty Ltd Landfill Gas and Power Pty Ltd Perth Energy Pty Ltd Southern Cross Energy Verve Energy	Alcoa of Australia Ltd Alinta Sales Pty Ltd Landfill Gas and Power Pty Ltd Perth Energy Pty Ltd Southern Cross Energy Verve Energy Griffin Power Pty Ltd
Market Generators	EDWF Manager Pty Ltd Goldfields Power Pty Ltd Mount Herron Engineering Pty Ltd Waste Gas Resources Pty Ltd	EDWF Manager Pty Ltd Goldfields Power Pty Ltd Mount Herron Engineering Pty Ltd Waste Gas Resources Pty Ltd Bioenergy Limited Eneabba Gas Limited Enebba Energy Pty Ltd Namarkkon Pty Ltd NewGen Power Kwinana Pty Ltd Wambo Power Ventures Pty Ltd Western Australia Biomass Pty Ltd
Market Customers	Barrick (Kanowna) Limited Newmont Power Pty Ltd Premier Power Sales Pty Ltd Synergy Water Corporation	Barrick (Kanowna) Limited Newmont Power Pty Ltd Premier Power Sales Pty Ltd Synergy Water Corporation

4.2 Number of participants in each reserve capacity auction

Clause 2.16.2(b) of the Market Rules requires that the MSDC identify the number of participants in each reserve capacity auction.

A reserve capacity auction is run by the IMO only if the number of capacity credits assigned to facilities that have indicated their intention to trade their capacity bilaterally is insufficient to meet the system requirement. As yet, there has been no requirement for the IMO to run a reserve capacity auction.

4.3 Prices in each reserve capacity auction and STEM auction

Clause 2.16.2(c) of the Market Rules requires that the MSDC identify clearing prices in each reserve capacity auction and STEM auction. Since there has been no requirement for the IMO to run a reserve capacity auction, this Minister's Report will deal only with clearing prices in STEM auctions.

As well as the requirement under Clause 2.16.2(c) of the Market Rules that the MSDC identify clearing prices in STEM auctions, there is also a requirement under Clause 2.16.4 to calculate:

- means and standard deviations of clearing prices in STEM auctions;
- monthly, quarterly and annual moving averages of clearing prices in STEM auctions;
- statistical analysis of the volatility of prices in STEM auctions;
- the proportion of time that clearing prices in STEM auctions are at each price limit;
- the correlation between capacity offered into the STEM auctions and the incidence of high prices; and
- exploration of key determinants for high prices in the STEM.

This section summarises the results of the requirements under both Clause 2.16.2 and Clause 2.16.4.

4.3.1 STEM prices

STEM prices will be summarised separately for peak trading intervals (occurring between 8am and 10pm) and off-peak trading intervals (occurring between 10pm and 8am). There are significant differences between peak and off-peak clearing prices, both in terms of the average level of prices and the volatility of prices. Table 2 sets out the mean and standard deviation of STEM clearing prices, for peak and off-peak trading intervals, over the period from market commencement to 31 July 2007.

Table 2: Mean and standard deviations of STEM prices (21 September 2006 to 31 July 2007)

Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	32.3	23.4
Peak	68.9	50.6

Figure 1 illustrates average daily off-peak STEM prices for each trading day from market commencement up to 31 July 2007, as well as 30-day and 90-day moving average prices.[2] As can be seen from the average daily prices, and more clearly from the 30-day moving average price, off-peak prices trended downwards from market commencement to their lowest point in March 2007. Off-peak prices then returned to higher levels over April, May and, in particular, June 2007. Part of the explanation for the higher prices observed during June may be gas curtailments that occurred during the month.

[2] Since the market has been operating for less than a year, there is as yet no annual moving average STEM price, which is required under Clause 2.16.4(b). For the same reason, no annual moving average is calculated for STEM peak prices or for balancing prices.

Figure 1: Average daily off-peak STEM prices [3]

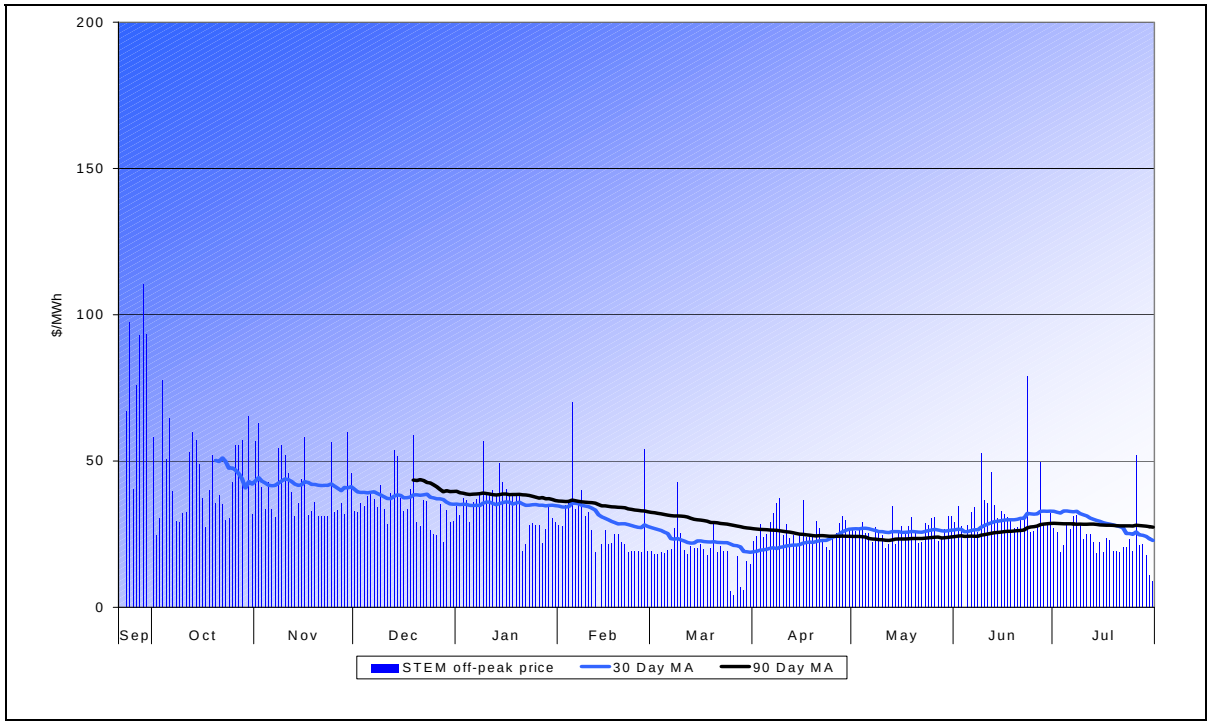


Figure 2 illustrates average daily peak STEM prices for each trading day from market commencement to 31 July 2007, as well as 30-day and 90-day moving average prices. Peak STEM prices have followed a broadly similar pattern to off-peak STEM prices, although with greater volatility. For the first three months of the market, peak STEM prices were high and volatile. The IMO notes that this was due, at least in part, to fuel restrictions and low levels of generator availability over this period.[4] Peak prices trended downwards from market commencement to their lowest point in March 2007 (although peak prices did spike considerably for several days in early March 2007, coinciding with warm weather and high demand)[5]. Peak prices then returned to higher levels over April, May and June 2007, spiking on several occasions in June. The IMO notes that this was due, at least in part, to increased plant outages due to maintenance, and further fuel restrictions.[6]

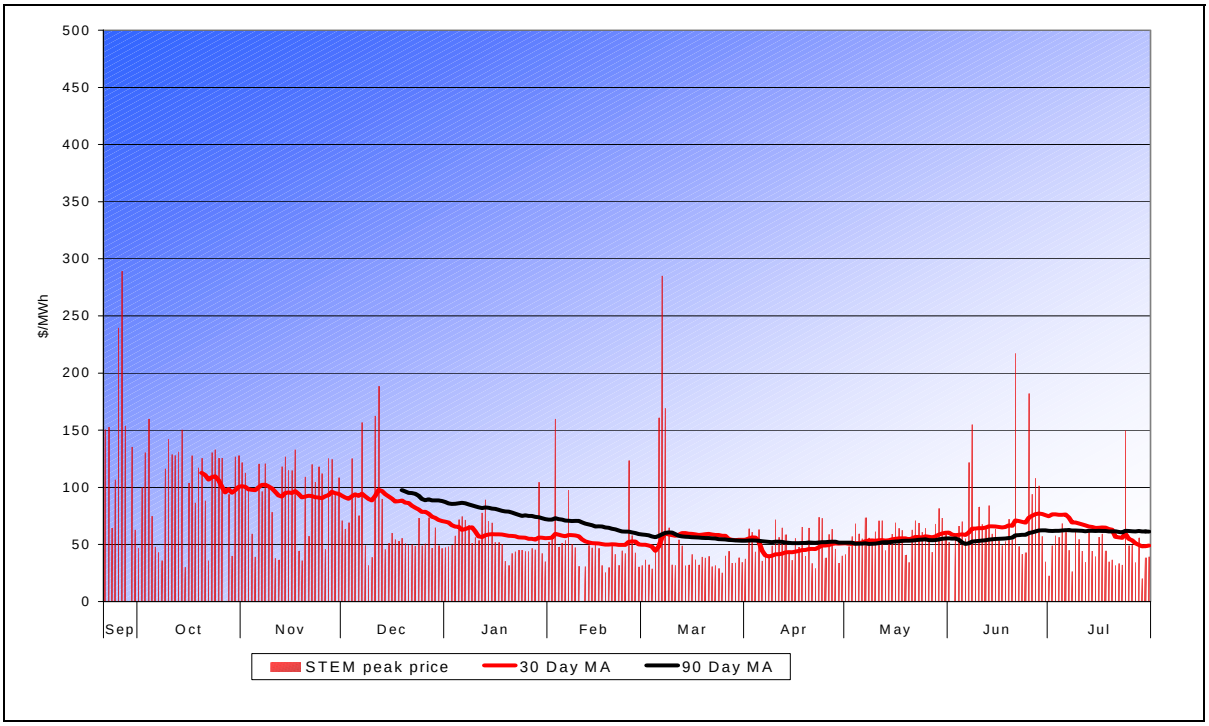
[3] Trading days for which no STEM price is evident were subject to a market suspension.

[4] IMO, *Wholesale Electricity Market: Electricity Trading 2006/07*, July 2007.

[5] IMO, *Wholesale Electricity Market: Electricity Trading 2006/07*, July 2007.

[6] IMO, *Wholesale Electricity Market: Electricity Trading 2006/07*, July 2007.

Figure 2: Average daily peak STEM prices [7]



4.3.2 Volatility of STEM prices

Figure 1 and Figure 2 indicate that prices in the STEM were both consistently higher and more volatile during the first few months following market commencement than for the remainder of the period to 31 July 2007. This is confirmed by statistical analysis of the volatility of STEM prices. Volatility is examined by determining means and standard deviations of STEM prices.

For example, Figure 3 illustrates the means and standard deviations (as well as maximum and minimum) of STEM prices by month for off-peak trading intervals from market commencement up to 31 July 2007. Figure 4 illustrates the means and standard deviations (as well as maximum and minimum) of STEM prices by month for peak trading intervals from market commencement up to 31 July 2007.

During both peak and off-peak trading intervals, the standard deviations of STEM prices indicate that price volatility was highest during the first few months of the market, and particularly during September 2006. Reasons for the greater volatility during the first few months of the market include fuel restrictions and low levels of generator availability over this period. While volatility has not returned to the levels seen in September 2006, there are observable increases in volatility, for both peak and off-peak trading intervals, during those months that exhibited higher demand: February, March and June. A higher incidence of gas pipeline constraints was also a likely factor during June.

[7] Trading days for which no STEM price is evident were subject to a market suspension.

Figure 3: Summary statistics for STEM prices in off-peak trading intervals, by month

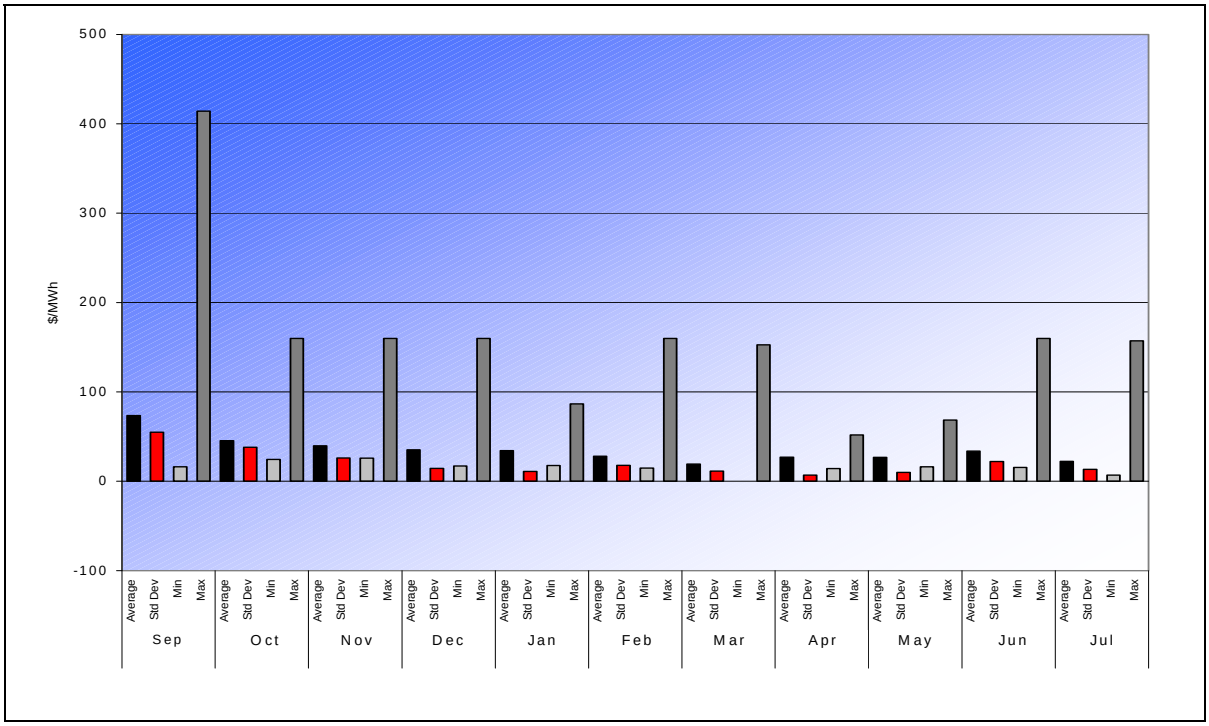
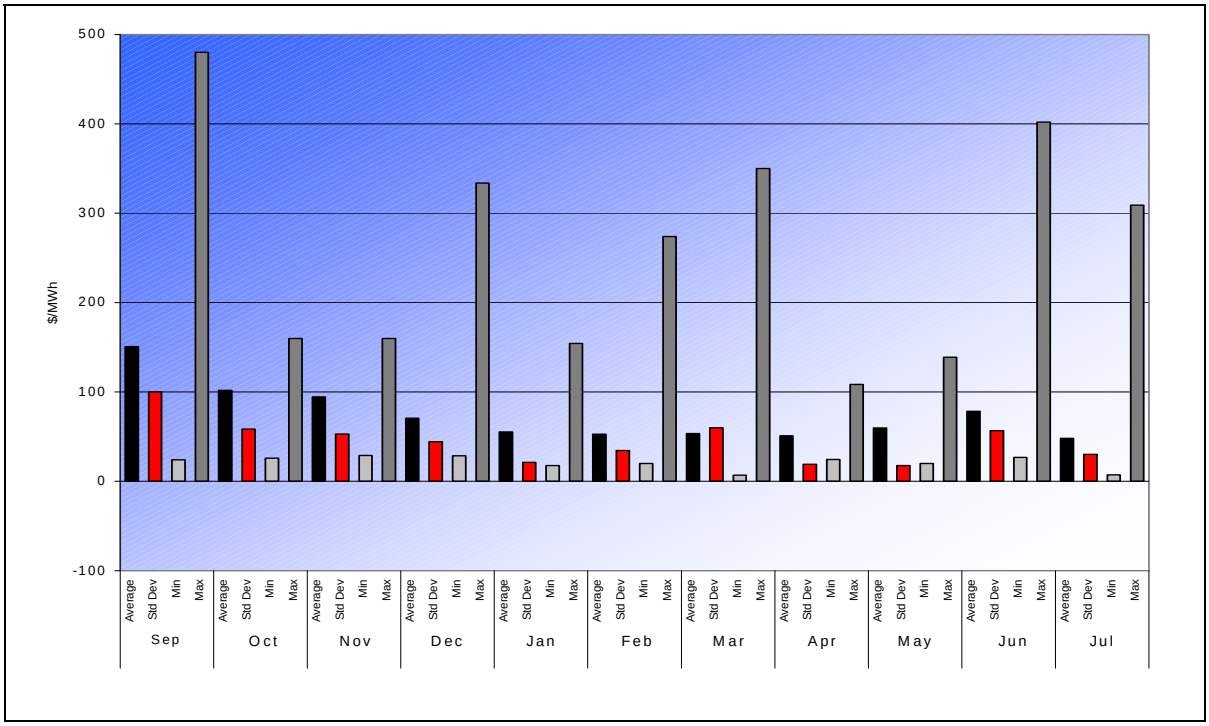


Figure 4: Summary statistics for STEM prices in peak trading intervals, by month



4.3.3 High prices in the STEM

The Market Rules require an examination of both the incidence of high prices in the STEM and the causes of high prices in the STEM.

One way of examining the incidence of high prices is to assess the proportion of time that STEM prices are at the energy price limits. There are two energy price limits set out in the Market Rules that act as a cap on high prices:

- The maximum STEM price is the maximum price that may be associated with a portfolio supply curve for a portfolio including no facilities expected to run on Liquid Fuel. The maximum STEM price is based on the cost of an open cycle gas turbine. The Market Rules specify that the maximum STEM price is adjusted annually to reflect changes in the consumer price index (**CPI**), and is subject to review by the IMO. For the year from 1 October 2006 to 30 September 2007 the maximum STEM price is $159.84/MWh.
- The alterative maximum STEM price is the maximum price that may be associated with a portfolio supply curve for a portfolio including facilities expected to run on Liquid Fuel. The alternative maximum STEM price is based on the cost of a liquid fuel facility. The Market Rules specify that the alternative maximum STEM price is adjusted monthly to reflect changes in oil prices and CPI, and is subject to review by the IMO. Since market commencement, the alternative maximum STEM price has been as low as $380.00/MWh and as high as $484.00/MWh.

Figure 5 illustrates the proportion of peak and off-peak trading intervals during which STEM prices were at the maximum STEM price. During the first two months of the market, STEM prices regularly reached the maximum STEM price, particularly during peak trading intervals. Since then, the frequency with which the maximum STEM price has been reached has fallen substantially, and it has occurred a significant proportion of the time only during peak trading intervals in the higher demand months of February, March and June.

Figure 6 illustrates the proportion of peak and off-peak trading intervals during which STEM prices were at the alternative maximum STEM price. As can be seen, STEM prices have only ever consistently reached the alternative maximum STEM price during peak trading intervals in September 2006.

Figure 5: Proportion of trading intervals STEM prices are at maximum STEM price, by month

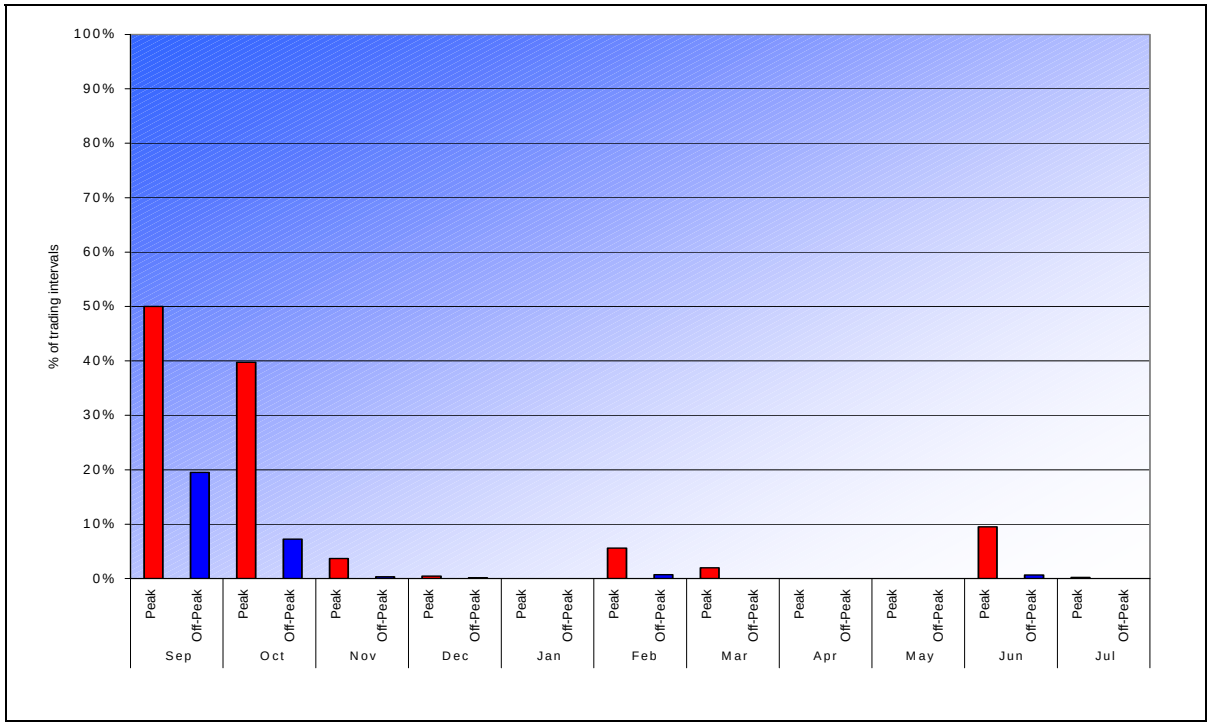
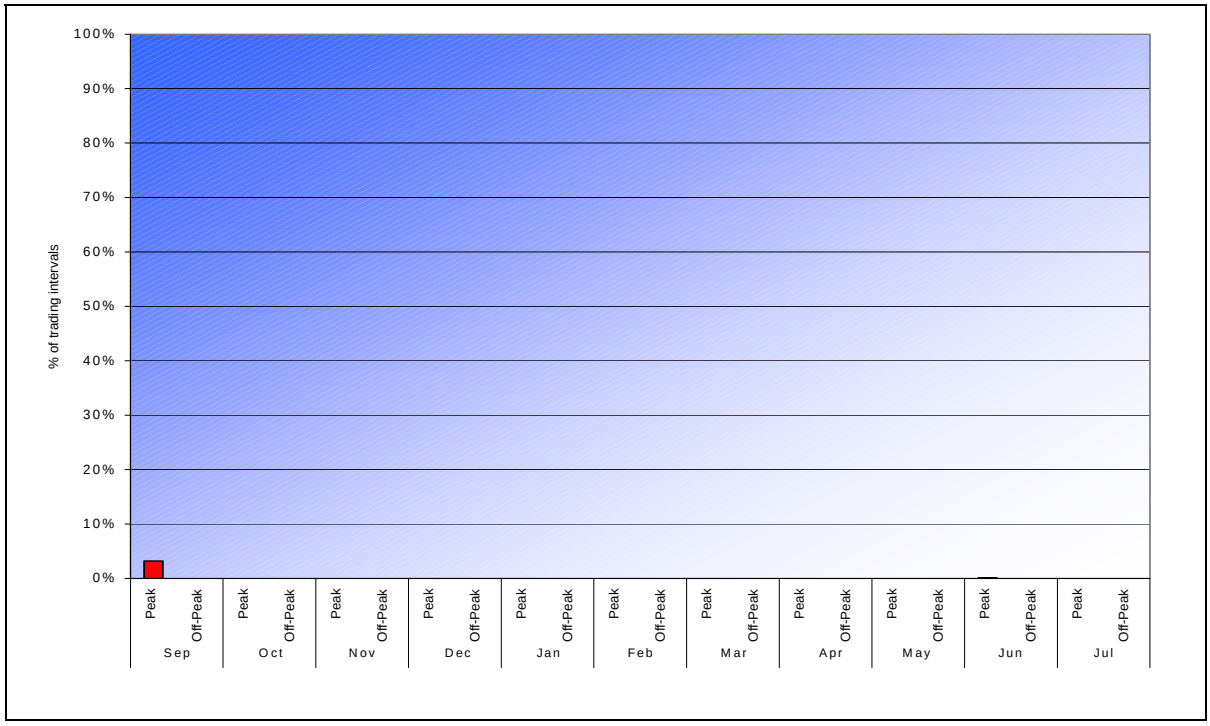


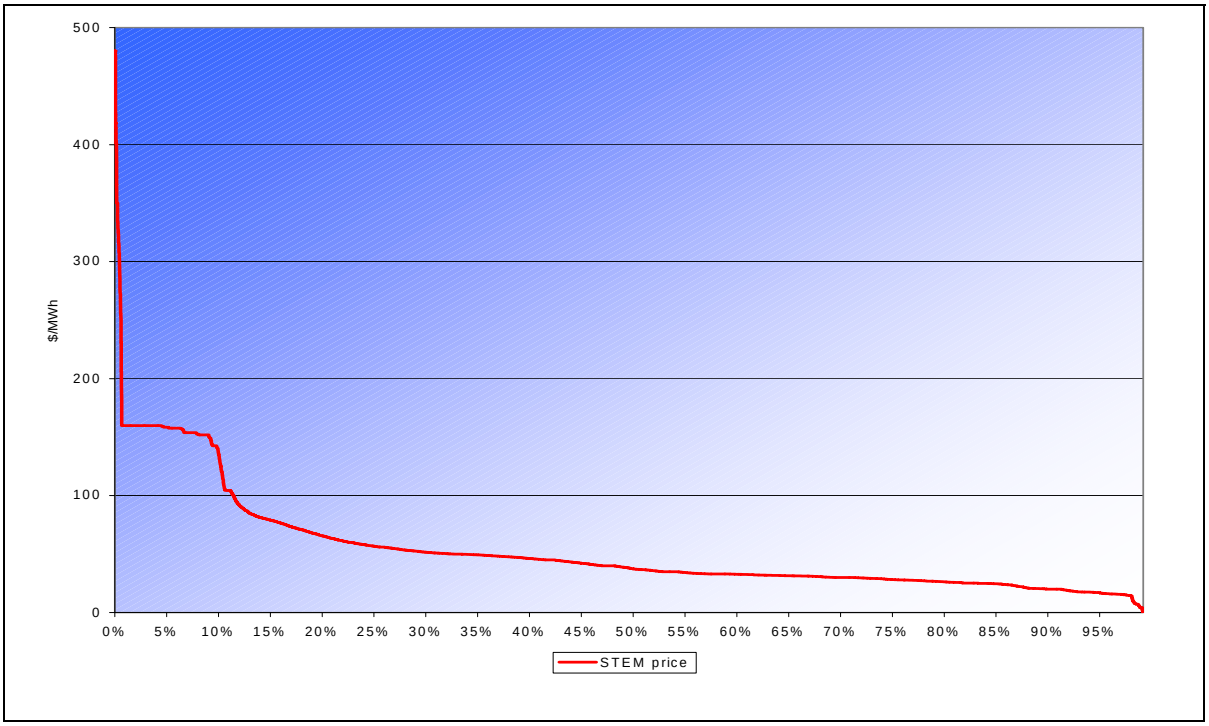
Figure 6: Proportion of trading intervals STEM prices are at alternative maximum STEM price, by month



Another way of examining the incidence of high prices is to plot a price duration curve. Figure 7 sets out the price duration curve for STEM prices, covering all trading intervals from market commencement to 31 July 2007.[8]

As can be seen in Figure 7, the majority of STEM prices occur in a broad range below $100/MWh: prices fall between $10/MWh and $90/MWh for over 85 per cent of total trading intervals, with the distribution of prices within this range being fairly even. Prices between $100/MWh and $150/MWh are relatively uncommon, with prices tending to reach or approach the maximum STEM price if they exceed $100/MWh. Prices at or near the maximum STEM price are relatively common: prices fall between $150/MWh and the maximum STEM price of $159.84 for around 8.5 per cent of total trading intervals. It is quite rare for prices to fall between the maximum STEM price and the alternative maximum STEM price, with this occurring in less than 1 per cent of total trading intervals.

Figure 7: Price duration curve for STEM prices (21 September 2006 to 31 July 2007)



In relation to the causes of high STEM prices, the Market Rules require the calculation of the correlation between capacity offered into STEM auctions and the incidence of high prices, and the exploration of key determinants for high prices in the STEM.

The requirement to calculate the correlation between capacity offered into STEM auctions and the incidence of high prices can be interpreted in several ways. Two interpretations of capacity offered into STEM auctions are:

- total quantities in all Market Participants' portfolio supply curves, which equals the sum of the cumulative quantity over all price-quantity pairs in each Market Participant's portfolio supply curves at every half hour interval; or
- total quantities in all Market Participants' STEM offers, which equals the sum of the cumulative quantity over all price-quantity pairs in each Market Participant's STEM offers at every half hour interval.

[8] Price duration curves for peak and off-peak periods are set out in Figure 25 and Figure 26 in Appendix 3.

These two quantities are related, with a Market Participant's portfolio supply curve being converted to STEM offers relative to the Market Participant's net bilateral position. In other words, the portfolio supply curve includes quantities contracted bilaterally, while STEM offers exclude quantities contracted bilaterally.

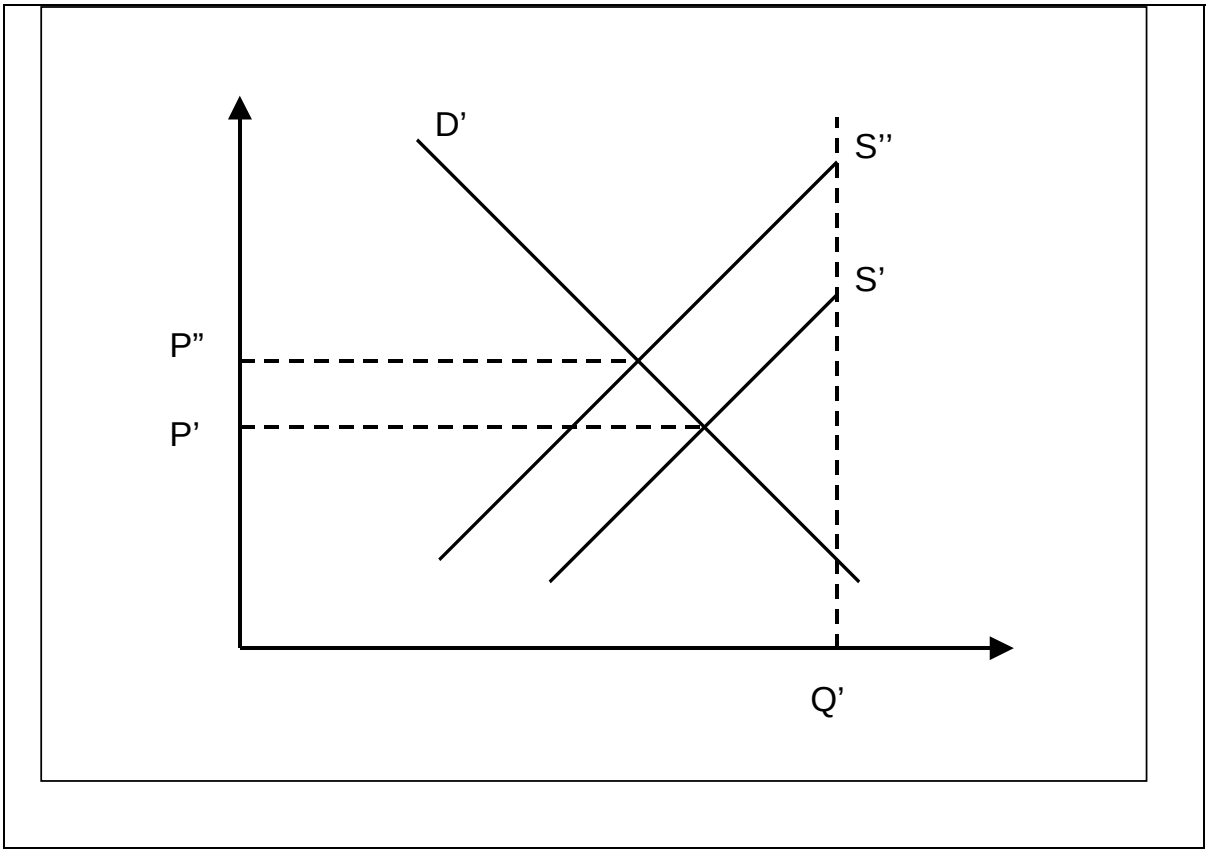
Table 3 summarises the results of the correlations between STEM prices and total quantities in STEM offers, and between STEM prices and total quantities in portfolio supply curves. Correlations are calculated for all trading intervals, as well as separately for peak and off-peak trading intervals. The results show that there is a negative correlation between quantities and STEM prices, indicating that trading intervals in which larger quantities are offered into the STEM tend to have lower STEM prices. This correlation is stronger for off-peak trading intervals than it is for peak trading intervals, indicating that the relationship between STEM prices and quantities is stronger during off-peak periods. Also, the correlation is stronger for total quantities in STEM offers than it is for total quantities in portfolio supply curves. This result is to be expected, since it is STEM offers that are used to determine the STEM price, not portfolio supply curves.

Table 3: Correlation coefficient between STEM prices and quantities (21 September 2006 to 31 July 2007)

STEM measures	All trading intervals	Peak trading intervals	Off-peak trading intervals
STEM price and STEM offer quantity	-0.33	-0.25	-0.30
STEM price and portfolio supply curve quantity	-0.19	-0.12	-0.20

However, care is needed in interpreting the results of these correlations. The reason is that simply correlating these quantities with the STEM price fails to take account of the many other factors that are relevant to the STEM price. For example, consider a hypothetical market with an upward sloping supply curve (S') and a downward sloping demand curve (D'), as seen in Figure 8. The analysis above examines the correlation between the maximum quantity offered (Q'), and the market clearing price P'. This correlation does not take into account the many other factors that determine the market clearing price, including the fact that a change in bidding behaviour may shift the supply curve without changing the quantity Q'. For instance, if Market Participants offer quantities at higher prices, without increasing the total quantity offered, the supply curve will shift upwards (S'') and the market clearing price will increase to P'', without any change in the quantity Q'. A simple correlation between STEM prices and quantities will fail to capture this.

Figure 8: Hypothetical market



What this highlights is the fact that understanding the key determinants for high prices in the STEM requires detailed market analysis. It is not sufficient to only consider the total quantity offered into the market. Bidding patterns and demand conditions will also have an important impact on STEM prices.

Clause 2.16.4(g) requires the IMO to explore the key determinants for high prices in the STEM. As set out in Section 4.3.1, the Authority's analysis to date indicates that high STEM prices to date have typically been coincident with high demand, particularly during the summer months of February and March, and/or fuel constraints. This is not to suggest that high demand and fuel constraints are the only determinants of high STEM prices, or that other factors are not relevant. In order to develop a more detailed understanding of the key determinants for high prices, further analysis is required.

The IMO has been considering the most appropriate approach for undertaking this analysis, but at this early stage of the market has not finalised an approach that it considers robust. As the market develops, and as the IMO has the opportunity to investigate determinants of high prices over a longer period of time, and under a wider variety of market conditions, the IMO will continue to work on its approach to understanding market drivers. The Authority expects to report on this analysis in more detail in future Minister's Reports. The Authority also expects that its work on a SRMC paper and, together with the IMO, a SRMC model, will assist in an understanding of the determinants of high STEM prices.

4.4 Balancing prices

Clause 2.16.2(d) of the Market Rules requires that the MSDC identify balancing data prices and other standing data prices used in balancing.

There is also a requirement under Clause 2.16.4 to calculate:

- means and standard deviations of balancing data prices;
- monthly, quarterly and annual moving averages of balancing data prices;
- statistical analysis of the volatility of balancing data prices;
- the proportion of time that balancing data prices are at each price limit;
- the correlation between capacity available for balancing and the incidence of high prices; and
- exploration of key determinants for high balancing prices.

This section summarises the results of the requirements under both Clause 2.16.2 and Clause 2.16.4.

4.4.1 Balancing prices

4.4.1.1 Standing data prices used in balancing

The standing data prices used in balancing consist of prices bid to increase or decrease supply by Market Participants other than Verve Energy. The standing data prices for a Market Participant other than Verve Energy are used to settle quantities subject to dispatch instructions issued by System Management to that Market Participant.

The standing data prices used in balancing are summarised in Figure 27 through Figure 30 in Appendix 3, for the period from market commencement to 31 July 2007. These Figures present average daily prices bid to increase and decrease consumption, by type of facility: non-liquid generation, liquid generation, intermittent generation and curtailable load.[9]

Figure 27 through Figure 30 indicate that Market Participants other than Verve Energy have tended to bid close to the available price caps for increasing supply. For instance, the average daily price bid by non-liquid facilities to increase supply has always been in excess of $150/MWh (but has never been as high as the maximum STEM price) and the average daily price bid by liquid facilities to increase supply has always been in excess of $350/MWh (but has never been as high as the alternative maximum STEM price). This tendency is even clearer for curtailable load, with the prices bid to increase supply (decrease load) following the monthly changes in the alternative maximum STEM price.

Market Participants other than Verve Energy are also increasingly bidding close to the minimum STEM price to decrease supply. Over the first months of the market, non-liquid and liquid facilities tended to bid around -$100/MWh to decrease supply. Since February 2007, however, these generators have consistently bid close to the minimum STEM price of -$159.84/MWh. Prices bid by intermittent generation to decrease supply have followed a similar trend, but have settled around -$110/MWh since April 2007.

[9] Curtailable load is load through which electricity is consumed, where consumption can be curtailed at short notice.

4.4.1.2 MCAP, UDAP and DDAP

Balancing data prices include the marginal cost administrative price (**MCAP**), the upwards deviation administrative price (**UDAP**) and the downwards deviation administrative price (**DDAP**).

MCAP is used to settle deviations from net contract position by Verve Energy, by non-scheduled generators, by non-dispatchable, interruptible and curtailable loads, and by non-Verve Energy scheduled generators subject to commissioning tests or tests of their reserve capacity requirements. UDAP and DDAP are used to settle deviations by non-Verve Energy scheduled generators (excluding those subject to a test) that deviate from their schedules without instruction from System Management. In general terms, the value of the MCAP for a trading interval is either equal to the STEM price for that trading interval or is based on STEM bids and STEM offers for that trading interval. The value of the UDAP is zero during off-peak periods and is equal to the MCAP multiplied by 0.5 during peak periods. The value of the DDAP is the MCAP multiplied by 1.1 during off-peak periods and the MCAP multiplied by 1.3 during peak periods.

As with STEM prices, balancing prices will be separately summarised for peak and off-peak periods.

Table 4, Table 5 and Table 6 set out the mean and standard deviation of the MCAP, the UDAP and the DDAP, for peak and off-peak periods, over the period from market commencement up to 31 July 2007. Broadly speaking, the patterns of balancing prices reflect the pattern of STEM prices, with prices both higher and more volatile during peak periods. This result is as expected, since the MCAP for a given trading interval (and, by extension, the UDAP and the DDAP for that trading interval) is either equal to the STEM price for that trading interval, or is based on STEM bids and STEM offers for that trading interval.

Table 4: Mean and standard deviations of the MCAP (21 September 2006 to 31 July 2007)

Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	39.8	36.4
Peak	82.4	65.9

Table 5: Mean and standard deviations of the UDAP (21 September 2006 to 31 July 2007)

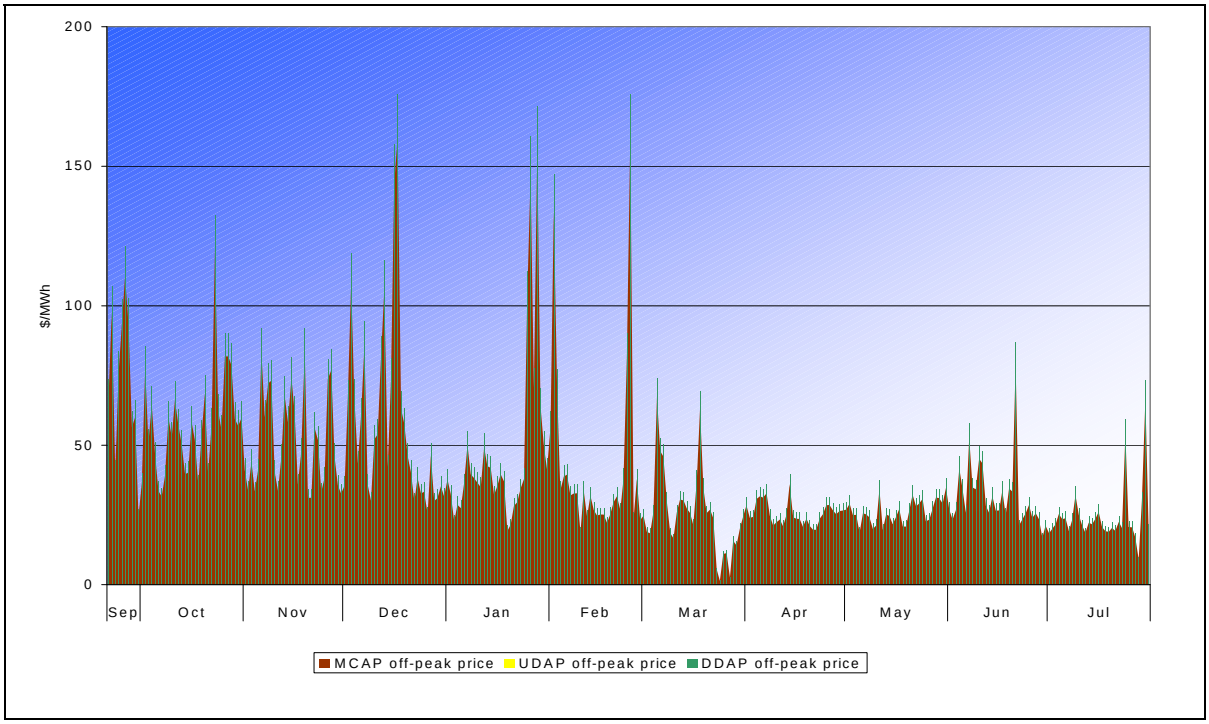
Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	0	0
Peak	41.2	33.0

Table 6: Mean and standard deviations of the DDAP (21 September 2006 to 31 July 2007)

Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	43.8	40.0
Peak	105.6	78.3

Figure 9 illustrates average daily off-peak balancing prices for each trading day from market commencement up to 31 July 2007. The Market Rules specify that the UDAP is set equal to zero during off-peak periods. This explains why UDAPs are not visible in Figure 9. The Market Rules specify that the DDAP is set equal to the MCAP multiplied by 1.1 during off-peak periods. This explains the clear link between MCAPs and DDAPs observed in Figure 9.

Figure 9: Average daily off-peak balancing prices



The pattern of off-peak balancing prices seen in Figure 9 is similar to the pattern of off-peak STEM prices seen in Figure 1. This similarity is shown more clearly in Figure 10, which compares 30-day moving averages of off-peak STEM and balancing prices, and in Figure 11, which compares 90-day moving averages of off-peak STEM and balancing prices. Just as off-peak STEM prices trended downwards from market commencement until March 2007 before gradually returning to higher levels, so have off-peak balancing prices.

Off-peak MCAPs have become much more closely aligned with off-peak STEM prices since around April 2007. Prior to then, off-peak MCAPs tended to be above off-peak STEM prices. The IMO suggests that this is likely to reflect the initial tendency by Market Participants to 'buy' more energy in balancing than the STEM, leading to higher demand in real time than projected the day ahead, and the upward recalculation of balancing prices. The IMO notes that more recently however, Market Customers have tended to enter bilateral positions that exceed their load and then sell energy back into the balancing market, resulting in average balancing prices more closely matching STEM prices.[10] This has implications for balancing quantities. The initial tendency by Market Participants to 'buy' more energy in balancing than the STEM increased the requirement for balancing.

[10] IMO, *Wholesale Electricity Market: Electricity Trading 2006/07*, July 2007.

Figure 10: 30-day moving average off-peak STEM and balancing prices

Figure 11: 90-day moving average off-peak STEM and balancing prices

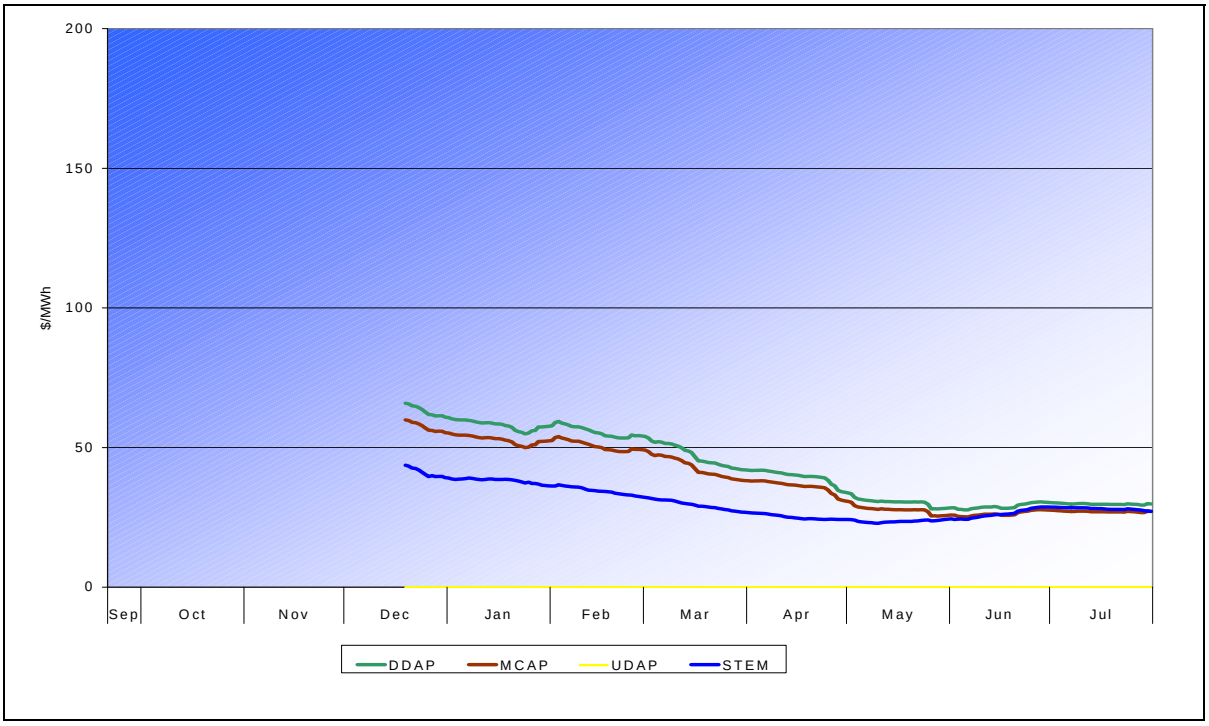
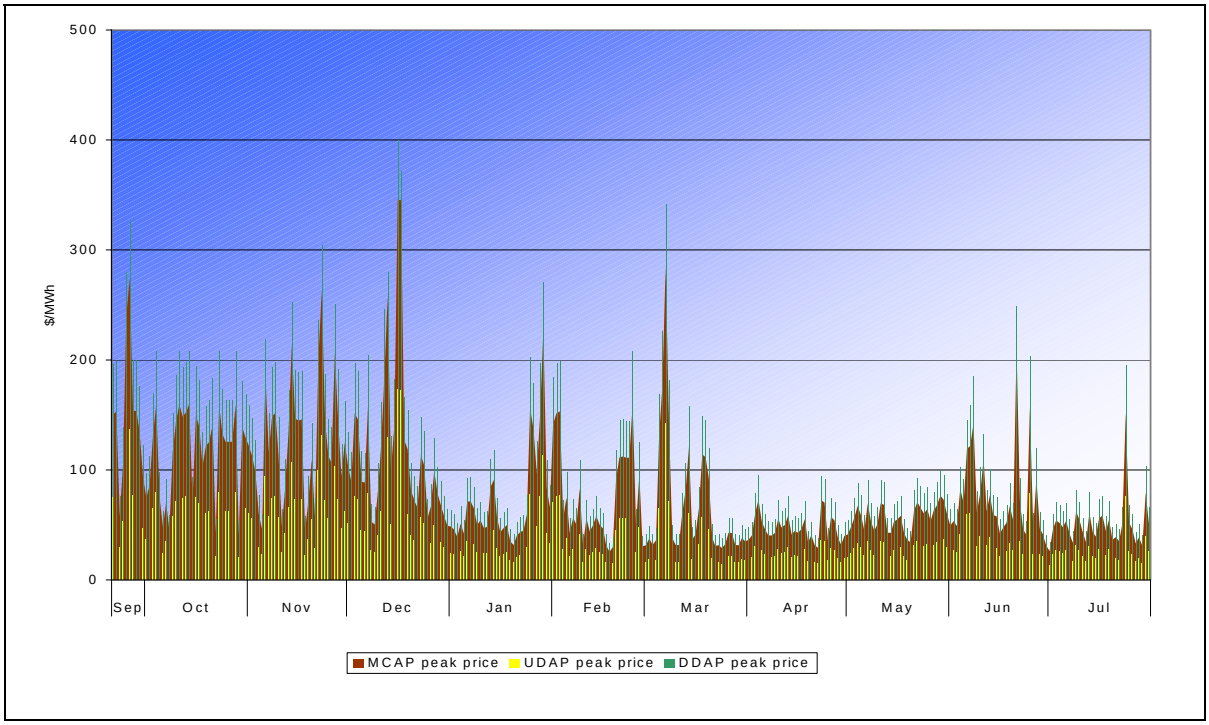


Figure 12 illustrates average daily peak balancing prices for each trading day from market commencement to 31 July 2007. As discussed above, the Market Rules specify that during peak trading intervals the UDAP is set equal to the MCAP multiplied by 0.5, and

the DDAP is set equal to the MCAP multiplied by 1.3. This explains the link between the MCAPs, UDAPs and DDAPs observed in Figure 12.

Figure 12: Average daily peak balancing prices

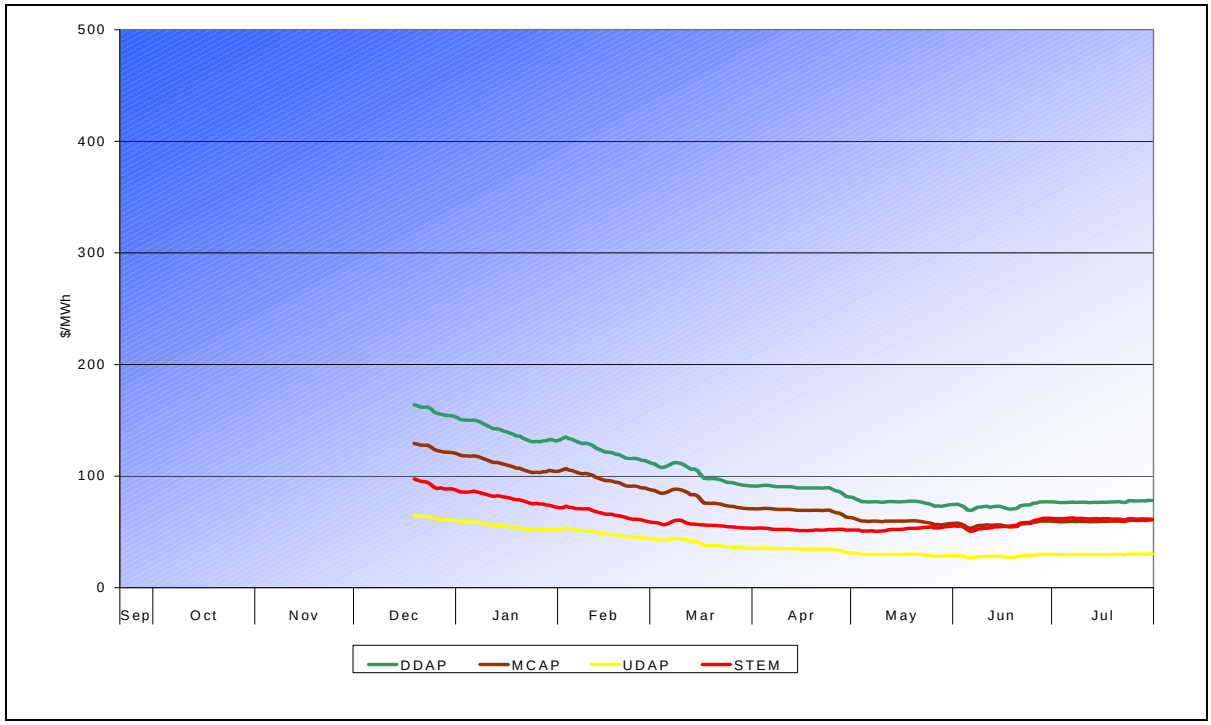


As with off-peak trading intervals, the pattern of balancing prices during peak periods, seen in Figure 12, is similar to the pattern of peak STEM prices, seen in Figure 2. This similarity is shown more clearly in Figure 13, which compares 30-day moving averages of peak STEM and balancing prices, and in Figure 14, which compares 90-day moving averages of peak STEM and balancing prices. During peak trading intervals, both STEM prices and balancing prices have trended downwards from market commencement until April 2007, before returning to higher levels during May and June.

As was the case during off-peak periods, peak MCAPs have become much more closely aligned with peak STEM prices since around April 2007. That MCAPs tended to be above STEM prices prior to April 2007 indicates that real time effective demand was greater than expected over this period.

Figure 13: 30-day moving average peak STEM and balancing prices

Figure 14: 90-day moving average peak STEM and balancing prices



4.4.2 Volatility of balancing prices

As with STEM prices, balancing prices were both higher and more volatile during the first few months of the market. This is indicated in Figure 9 and Figure 12, and is confirmed by

statistical analysis of the volatility of balancing prices. Volatility is examined by determining means and standard deviations of balancing prices.

The means and standard deviations (as well as the maximum and minimum) of balancing prices are illustrated in Figure 31 through Figure 35 in Appendix 3. In general, patterns of volatility in balancing prices reflect patterns of volatility in STEM prices: volatility was highest during the first few months of the market before trending downwards, with increases during those months with higher demand. In addition, balancing prices exhibit greater volatility relative to STEM prices for those early months of the market during which MCAPs were consistently greater than STEM prices.

4.4.3 High balancing prices

As with STEM prices, the Market Rules require an examination of both the incidence of high balancing prices and the causes of high balancing prices.

As with STEM prices, the incidence of high balancing prices will be examined by considering the proportion of time that balancing prices are at the price limits and by considering the price duration curve for balancing prices.

Figure 15 illustrates the proportion of peak and off-peak trading intervals during which MCAPs were at the maximum STEM price. This makes clear that MCAPs have regularly been at the maximum STEM price, particularly during peak trading intervals in the first few months of the market. Comparing Figure 5 with Figure 15, it is clear that MCAPs have been at the maximum STEM price more often than have STEM prices. This is consistent with the observation that MCAP prices tended to be greater than STEM prices up until April 2007, as discussed in Section 4.4.1.

Figure 16 illustrates the proportion of peak and off-peak trading intervals during which MCAPs were at the alternative maximum STEM price. MCAPs have rarely reached the alternative maximum STEM price although again it has been more common for MCAPs to do so than for STEM prices to do so.

Figure 15: Proportion of trading intervals MCAP prices are at maximum STEM price

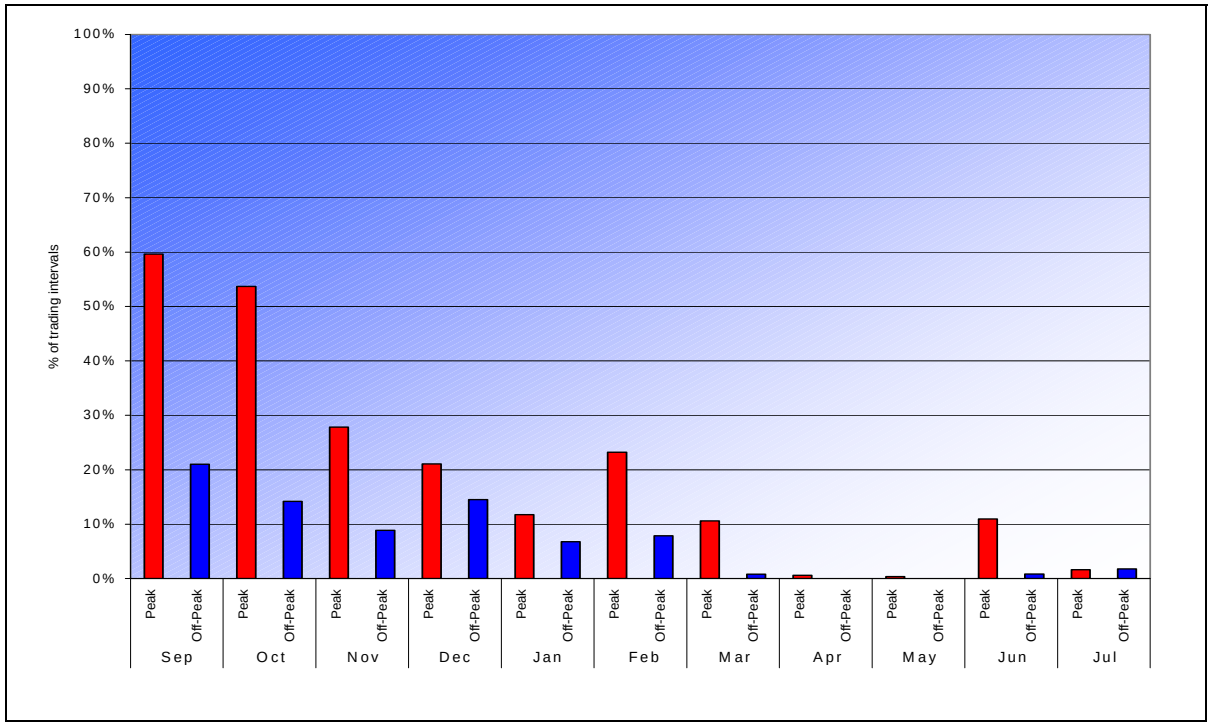


Figure 16: Proportion of trading intervals MCAP prices are at alternative maximum STEM price

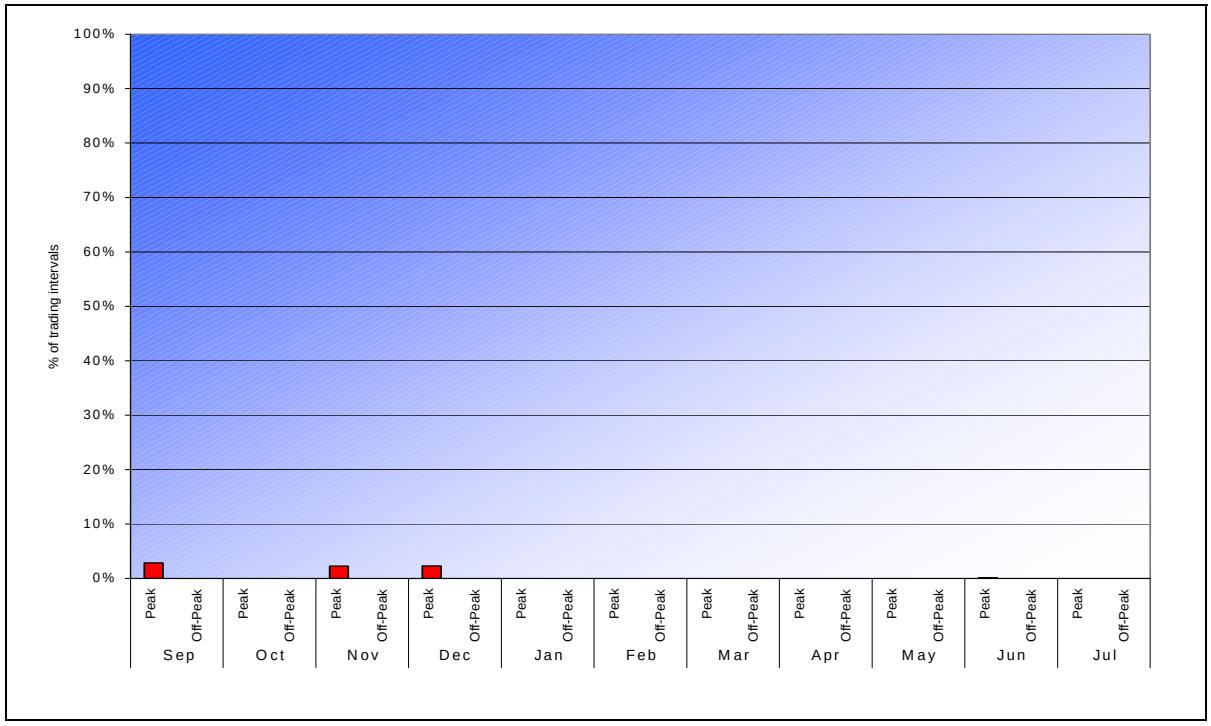
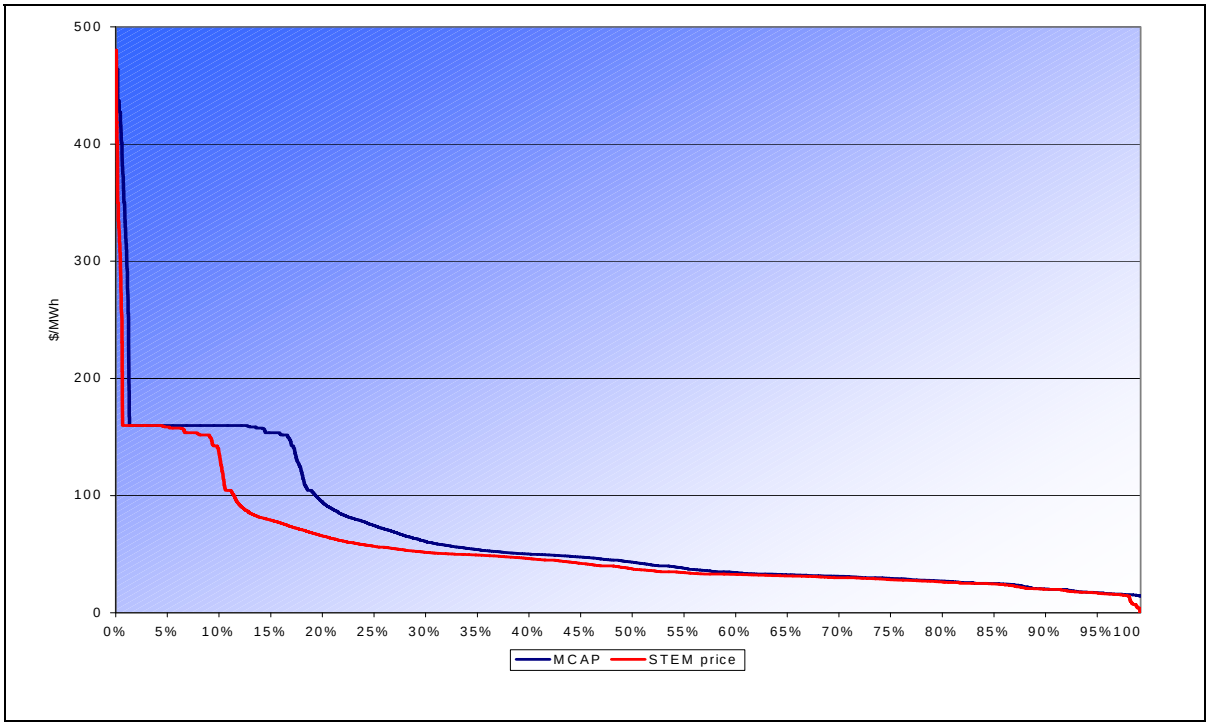


Figure 17 sets out the MCAP duration curve, covering all trading intervals from market commencement to 31 July 2007. For the purposes of comparison, Figure 17 also includes the STEM price duration curve.[11]

As can be seen in Figure 17, the price duration curve for MCAPs follows the price duration curve for STEM prices quite closely, with the exception that MCAPs are high more frequently than are STEM prices. In particular, while STEM prices fall between $150/MWh and the maximum STEM price for around 8.5 per cent of trading intervals, MCAPs fall between these prices for around 15 per cent of trading intervals.

Figure 17: Price duration curve for MCAPs (21 September 2006 to 31 July 2007)



In relation to the causes of high balancing prices, the Market Rules require the calculation of the correlation between capacity available in balancing and the incidence of high prices, and the exploration of key determinants for high balancing prices.

As was the case when examining the causes of high STEM prices, the requirement to calculate the correlation between capacity available in balancing and the incidence of high prices is open to interpretation. An interpretation of the incidence of high prices is high MCAPs (since MCAPs are the basis for determining UDAPs and DDAPs). Since MCAPs are either equal to the STEM price or are determined by STEM bids and STEM offers, an interpretation of capacity available in balancing would seem to be the same capacities used in the correlation for STEM prices: total quantities in STEM offers (which excludes bilateral quantities) and total quantities in portfolio supply curves (which includes bilateral quantities).

Table 7 summarises the results of the correlations between MCAPs and total quantities in STEM offers, and between MCAPs and total quantities in portfolio supply curves. Correlations are calculated over the period from market commencement to 31 July 2007, for all trading intervals, as well as separately for peak and off-peak trading intervals.

[11] The price duration curves for peak and off-peak periods are set out in Figure 25 and Figure 26 in Appendix 3.

The results show that there is a negative correlation between quantities and MCAPs, indicating that trading intervals in which larger quantities are offered into the STEM tend to have lower MCAPs. This correlation is stronger for total quantities in STEM offers than it is for total quantities in portfolio supply curves. This result is to be expected, since it is STEM offers that determine MCAPs. The correlation is not materially different between peak and off-peak periods.

Table 7: Correlation coefficients between MCAPs and quantities (21 September 2006 to 31 July 2007)

MCAP measures	All trading interval	Peak trading intervals	Off-peak trading intervals
MCAP and STEM offer quantity	-0.39	-0.33	-0.33
MCAP and portfolio supply curve quantity	-0.13	-0.12	-0.11

As with the correlation of STEM prices and quantities, care is needed in interpreting the results of these correlations between MCAPs and quantities. As discussed in Section 4.3.3, a simple correlation between MCAPs and quantities fails to capture other determinants of price, in particular changes in bidding behaviour.

Clause 2.16.4(g) requires the IMO to explore the key determinants for high balancing prices. Alongside its consideration of the key determinants of high prices in the STEM, discussed in Section 4.3.3, the IMO has been considering the most appropriate approach for undertaking an analysis of high balancing prices. At this early stage of the market the IMO has not finalised an approach that it considers robust. As the market develops, and as the IMO has the opportunity to investigate determinants of high prices over a longer period of time, and under a wider variety of market conditions, the IMO will continue to work on its approach. The Authority expects to report on this analysis in future Minister's Reports.

4.5 Reserve capacity auction offers

Clause 2.16.2(dA) of the Market Rules requires that the MSDC identify all reserve capacity auction offers. As discussed, as of 31 July 2007 there has been no requirement for the IMO to run a reserve capacity auction. Since the Market Rules require submission of reserve capacity auction offers only if the reserve capacity auction is to proceed, no reserve capacity auction offers have been made. Accordingly, this Minister's Report does not include an analysis of reserve capacity auction offers.

4.6 Bilateral quantities

Clause 2.16.2(e) of the Market Rules requires that the MSDC identify all bilateral quantities scheduled with the IMO.

Bilateral quantities scheduled with the IMO are classified as confidential information. In principal, information on bilateral quantities could be aggregated and included in this public version of the report. However, at this early stage of the market, the majority of bilateral quantities are traded between Verve Energy and Synergy, so that aggregation would not necessarily mask the data. As a result, information on the bilateral quantities scheduled with the IMO has not been presented in this public version of the report.

Nevertheless it can be noted that total bilateral quantities scheduled with the IMO have remained relatively consistent over time. There are some peaks in total bilateral quantities that occurred during January, February and March, and a slight upward trend over the period from market commencement to 31 July 2007 but, on the whole, quantities have remained relatively steady.

4.7 STEM offers and STEM bids

Clause 2.16.2(f) of the Market Rules requires that the MSDC identify all STEM offers and STEM bids, including both quantity and price terms.

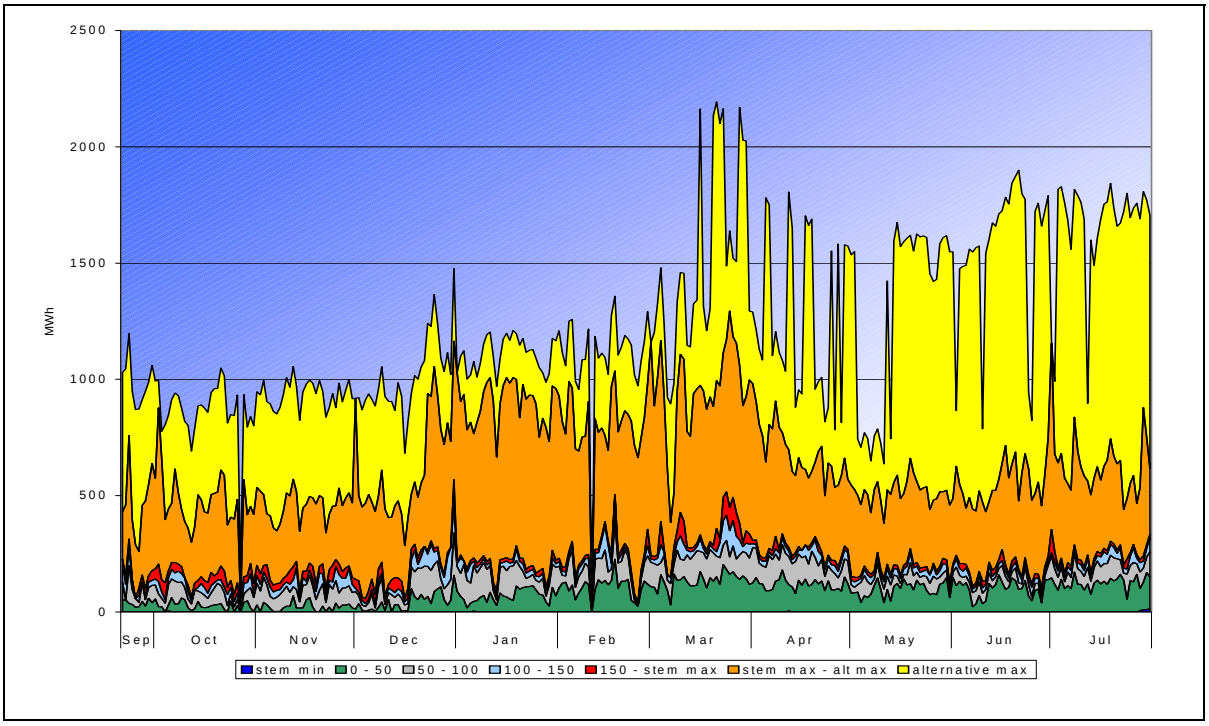
The Market Rules require that the IMO determine STEM offers and STEM bids for each Market Participant and for each trading interval for which a STEM submission is received. The IMO determines STEM offers and STEM bids by converting a Market Participant's portfolio supply curve and portfolio demand curve into a single STEM price curve, and then converting this into STEM offers and STEM bids relative to the Market Participant's net bilateral contract position.

STEM offers reflect an increase in generation or a decrease in consumption. Figure 18 illustrates the daily average quantity of STEM offers per trading interval, for all Market Participants, from market commencement to 31 July 2007. The daily average quantity of STEM offers is broken down by price levels and bands to provide a summary of the prices at which these quantities were offered. STEM offers for each Market Participant are separately set out in Appendix 3, in Figure 36 through Figure 42.

As can be seen in Figure 18, significant quantities have consistently been offered in the STEM at prices above $100/MWh. Indeed, during the first three months of the market it was rare for STEM offers to be priced below $100/MWh; since then STEM offers priced below $100/MWh have become more common, but the majority of STEM offers have still been priced above $100/MWh. There have also been significant quantities offered in the STEM at prices in excess of the maximum STEM price. This has increasingly been the case since March 2007, with noticeable spikes in quantities offered at prices above the maximum STEM price since then.

The total quantity of STEM offers over the period since market commencement has been dominated by quantities offered by Verve Energy, Alinta and Goldfields Power, with Synergy also offering large quantities into the STEM for some intervals.

Figure 18: Daily average quantity of STEM offers (cumulative MWh per trading interval)

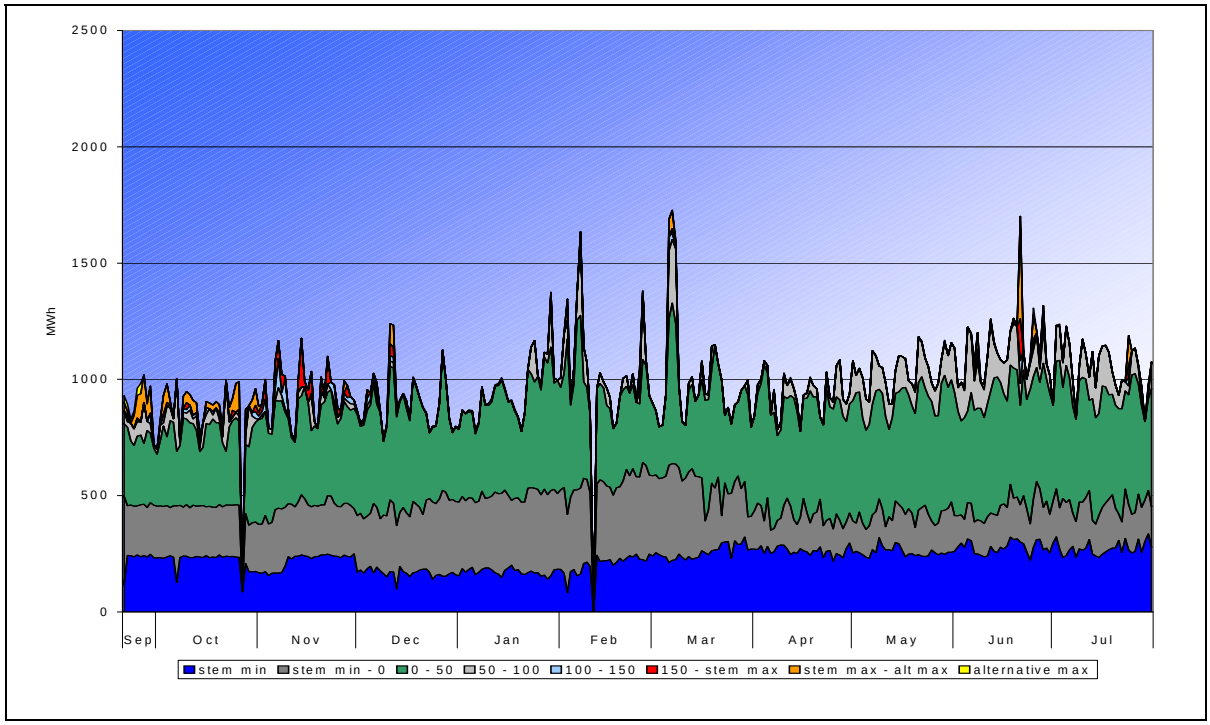


STEM bids reflect a decrease in generation or an increase in consumption. Figure 19 illustrates the daily average quantity of STEM bids per trading interval, for all Market Participants, from market commencement to 31 July 2007. As for STEM offers, the daily average quantity is broken down by price levels and bands to provide a summary of the prices at which these quantities were bid. STEM bids for each Market Participant are separately set out in Appendix 3, in Figure 43 through Figure 49.

As can be seen in Figure 19, the quantity of STEM bids has tended to be lower than the quantity of STEM offers. Significant quantities have consistently been bid at the STEM minimum price, between the STEM minimum price and $0 per MWh, and between $0 per MWh and $50 per MWh. Quantities have been bid at higher prices less consistently, typically during the first weeks following market commencement, and during the high demand periods of around February, March and June, when both the quantity of STEM bids and the price of these STEM bids was greater.

The total quantity of STEM bids is dominated by the two largest generators: Verve Energy and Alinta. Over the period from market commencement to 31 July 2007, the quantity of Verve Energy's STEM bids has averaged 865 MWh per trading interval and the quantity of Alinta's STEM bids has averaged 114 MWh per trading interval, with an average of 988 MWh per trading interval bid by all Market Participants.

Figure 19: Daily average quantity of STEM bids (cumulative MWh per trading interval)



4.8 Fuel declarations

Clause 2.16.2(gA) of the Market Rules requires that the MSDC identify all fuel declarations. There is also a requirement under Clause 2.16.4 to calculate any consistent or significant variations between fuel declarations and the actual operation of a Market Participant in real time.

A Market Participant submitting a STEM submission must include in the STEM submission a fuel declaration. The fuel declaration is to set out, for each of the Market Participant's dual fuel facilities, whether the facility was assumed to be operating on non-liquid fuel or liquid fuel in forming the portfolio supply curve.

Fuel declarations for individual Market Participants are deemed confidential, so this information has not been included in this public version of the report.

The Authority does note, however, that fuel declarations for dual-fuel facilities are strongly influenced by the expected availability of gas. Market Participants are not always aware of gas constraints affecting their facilities at the time that they are required to make their STEM submissions. This can result in variations between fuel declarations and the actual operation of a facility. The IMO has monitored variations between fuel declarations and actual operation in order to identify whether there is evidence of patterns of variations that raise cause for concern. In the course of the IMO's work, some data issues have been identified, which the IMO is working to rectify. The Authority expects to report on observed variations in its next Minister's Report.

4.9 Availability declarations

Clause 2.16.2(gB) of the Market Rules requires that the MSDC identify all availability declarations. There is also a requirement under Clause 2.16.4 to calculate any consistent or significant variations between availability declarations and the actual operation of a Market Participant in real time.

A Market Participant must include an availability declaration in its STEM submission. The availability declaration is to set out, for each trading interval and for each of the Market Participant's facilities, the difference between the energy available from the facility based on its standing data (adjusted to account for any energy committed to providing ancillary services and any energy unavailable due to outages reported by the IMO) and the energy assumed to be available from the facility in forming the portfolio supply curve for the trading interval. Only quantities greater than zero need to be reported in the availability declaration.

In the context of the size of the WEM, in which daily maximum demand is typically in excess of 1,000 MWh per trading interval, quantities of availability declarations have not been substantial. Nevertheless, they may have a material impact on the market. A useful comparison is between the average daily quantity of availability declarations and the average daily quantity of forced outages; these quantities are of the same order of magnitude. The impact of availability declarations on the quantities available in the STEM is therefore comparable to the impact of forced outages on the quantities available in the STEM.

Significant variations between availability declarations and the actual operation of a Market Participant in real time are assessed by comparing the capacity remaining available after taking into account quantities declared in an availability declaration and the total loss factor adjusted quantity supplied as measured by System Management's SCADA system. If the capacity remaining available is less than the quantity supplied, this indicates that a facility has been available to a greater extent than set out in the STEM submission. This has been determined for each facility in the market, but the information is considered to be sensitive and so is not presented in this public version of the report.

4.10 Ancillary service declarations

Clause 2.16.2(gC) of the Market Rules requires that the MSDC identify all ancillary service declarations. There is also a requirement under Clause 2.16.4 to calculate any consistent or significant variations between ancillary service declarations and the actual operation of a Market Participant in real time.

A Market Participant that is a provider of ancillary services must include in its STEM submission an ancillary services declaration. The ancillary services declaration is to set out the MWh of energy, from both liquid and non-liquid facilities that the Market Participant has not included in the portfolio supply curve because it expects to have to maintain surplus capacity with which to provide ancillary services.

Between market commencement and 31 July 2007, the only Market Participant to submit an ancillary service declaration was Verve Energy. The ancillary services declarations of Verve Energy have not been presented in this public version of the report.

Since Verve Energy is the only Market Participant to submit an ancillary service declaration, there is as yet no analysis of significant variations between ancillary service declarations and the actual operation of a Market Participant in real time. In the event that

other Market Participants begin to provide ancillary services, as considered in Section 4.17, the Authority will report in future on variations between ancillary service declarations and the actual operation of facilities in real time.

4.11 Variations in STEM offers and bids

Clause 2.16.2(h) of the Market Rules requires that the MSDC identify any substantial variations in STEM offer and STEM bid prices or quantities relative to recent past behaviour.

The prices and quantities of STEM offers and STEM bids by each Market Participant are illustrated in Figure 36 through Figure 49 in Appendix 3. It is clear from these figures that there are significant variations in the prices and/or quantities of STEM offers and STEM bids of all Market Participants. In many cases these variations occur both in the short-term, with significant variations observed from day to day in both quantities and prices, and over the course of the whole period from market commencement to 31 July 2007, with frequent step changes in the quantities and/or prices of STEM offers and STEM bids.

Given these significant variations in STEM offers and STEM bids, it is difficult to develop a robust system for identifying substantial variations relative to recent past behaviour. In order to develop such a system, two conceptual issues need to be addressed: first, what constitutes a substantial variation in prices or quantities; and, second, how is recent past behaviour to be defined? Within the context of the consistent variation in STEM offers and STEM bids that is observed, the way that these conceptual issues are resolved will have a big impact on the variations that are identified as substantial.

The IMO has begun developing and assessing a system for identifying substantial variations in STEM offers and STEM bids, and continues to work on resolving the conceptual issues associated with defining a substantial variation and defining recent past behaviour. The IMO will continue this process, and the Authority will continue to monitor the IMO's analysis, and consider the implications of the IMO's analysis for the Authority's views on the effectiveness of the market on an ongoing basis. The Authority will report on the results of this work in future Minister's Reports.

4.12 Evidence of Market Customer's overstating consumption

Clause 2.16.2(hA) of the Market Rules requires that the MSDC identify any evidence that a Market Customer has significantly over-stated its consumption as indicated by its net contract position with a regularity that cannot be explained by a reasonable allowance for forecast uncertainty or the impact of loss factors.

In order to identify whether a Market Customer has significantly overstated its consumption, it is necessary to determine both the Market Customer's actual load and the Market Customer's planned load:

- Actual load is determined on the basis of settlement quantities for a Market Customer. This provides a measure of real-time load, taking into account any dispatch instructions.
- Planned load is determined in a different way for stand-alone Market Customers and Market Customers that are also Market Generators:

- For stand-alone Market Customers, planned load is measured as its net contract position.
- For Market Customers that are also Market Generators, planned load is measured as demand as set out in the Market Customer's resource plan. The reason is that net contract position does not provide a useful measure of planned load for Market Customers that are also Market Generators: these participants are able to meet their own demand using their own generation facilities, so that this demand will not be reflected in their net contract position. For these customers, therefore, demand as stated in the Market Participant's resource plan is used to measure planned load.

The extent to which a Market Customer over-states its consumption is determined by calculating actual load less planned load. If actual load less planned load is positive, this indicates that the Market Customer has under-stated its consumption. If actual load less planned load is negative, this indicates that the Market Customer has over-stated its consumption. To understand the extent of any over-statement or under-statement, it is also useful to determine any over-stated or under-stated amount as a proportion of planned demand.

This information is confidential, and is not presented in this public version of the report.

4.13 Capacity available through balancing

Clause 2.16.2(i) of the Market Rules requires that the MSDC identify the capacity available through balancing from scheduled generators and non-scheduled generators and dispatchable loads.

At this stage, the IMO calculates the capacity available through balancing from Market Participants other than Verve Energy since, in effect, all of Verve Energy's capacity is available to provide balancing. The IMO calculates the capacity available through balancing from a facility as the facility capacity limit, less the loss-factor adjusted generation for the facility (as set out in the resource plan), less quantities for the facility set out in an availability declaration.

This information is confidential, and is not presented in this public version of the report. However, aggregated information can nevertheless be reported. In particular, aside from some notable variations from particular facilities, total capacity available through balancing has been relatively steady over the period from market commencement to 31 July 2007, varying between 40 MWh and 60 MWh per trading interval.

4.14 Number and frequency of dispatch instructions

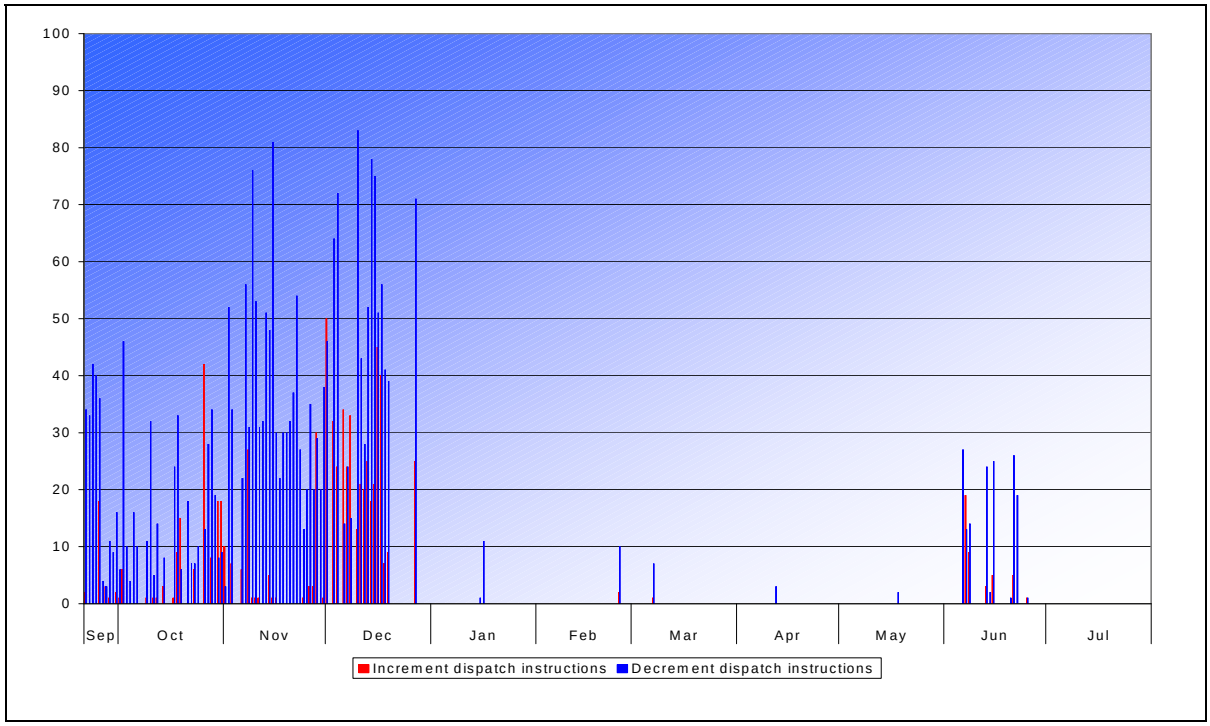
Clause 2.16.2(j) of the Market Rules requires that the MSDC identify the frequency and nature of dispatch instructions to Market Participants other than Verve Energy.

A dispatch instruction is an instruction issued by System Management to a Market Participant other than Verve Energy directing that the Market Participant vary the output or consumption of one of its facilities from the level indicated in its resource plan, or to vary the output of consumption of one of its facilities holding capacity credits.

Figure 20 illustrates the number of increment dispatch instructions and decrement dispatch instructions per trading day, from market commencement to 31 July 2007. It is clear from Figure 20 that dispatch instructions have most frequently been issued during

the first few months following market commencement. This suggests that the net contract positions of Market Participants during this period were less likely to reflect real-time loads. Part of the explanation for this may be a greater incidence of forced outages during this period. However, as discussed in Section 4.15, the number and magnitude of forced outages during this period was not unusually high. System Management suggests that dispatch instructions were issued more often during this period due to fuel constraints affecting Verve Energy's facilities. Pipeline curtailments were also an issue during June, when dispatch instructions are also evident. Fuel constraints can lead to an increase in dispatch instructions by increasing the likelihood that Verve Energy's facilities will run on liquid fuel and, therefore, that System Management will rely on other Market Participant's facilities to provide balancing.

Figure 20: Daily average number of dispatch instructions



4.15 Number and frequency of outages

Clause 2.16.2(k) of the Market Rules requires that the MSDC identify the number and frequency of outages of Scheduled Generators and Non-Scheduled Generators, and Market Participants' compliance with the outage scheduling process.

In regard to planned outages, Figure 21 indicates that Market Participants have tended not to schedule outages during January, February and March. The number of planned outages during these months is noticeably lower than the number of planned outages during the rest of the period. However, Figure 22 indicates that the quantity of energy subject to planned outages is not as low in January, February and March relative to the rest of the period as would be suggested by the number of planned outages. That is, while there are fewer planned outages during January, February and March, they tend to be more significant outages.

In regard to forced outages, Figure 23 indicates that the number of forced outages has been greater during the hot season – December, January, February and March – and in July. This pattern is similar to the pattern of maximum demand in the SWIS, which has tended to be higher during the hot season and during the colder winter months of June and July. However, Figure 24 indicates that that the quantity of energy subject to forced outages is not as high during these high demand months relative to the rest of the period as would be suggested by the number of forced outages. That is, while there are more forced outages during the hot season and June and July, they tend to be less significant outages.

On the whole, there is mixed evidence regarding the timing of planned and forced outages. The Authority will continue to review the timing of planned and forced outages in future Minister's Reports, and consider the impact that the timing of outages has on the operation of the market.

Figure 21: Number of planned outages (cumulative daily average per trading interval)

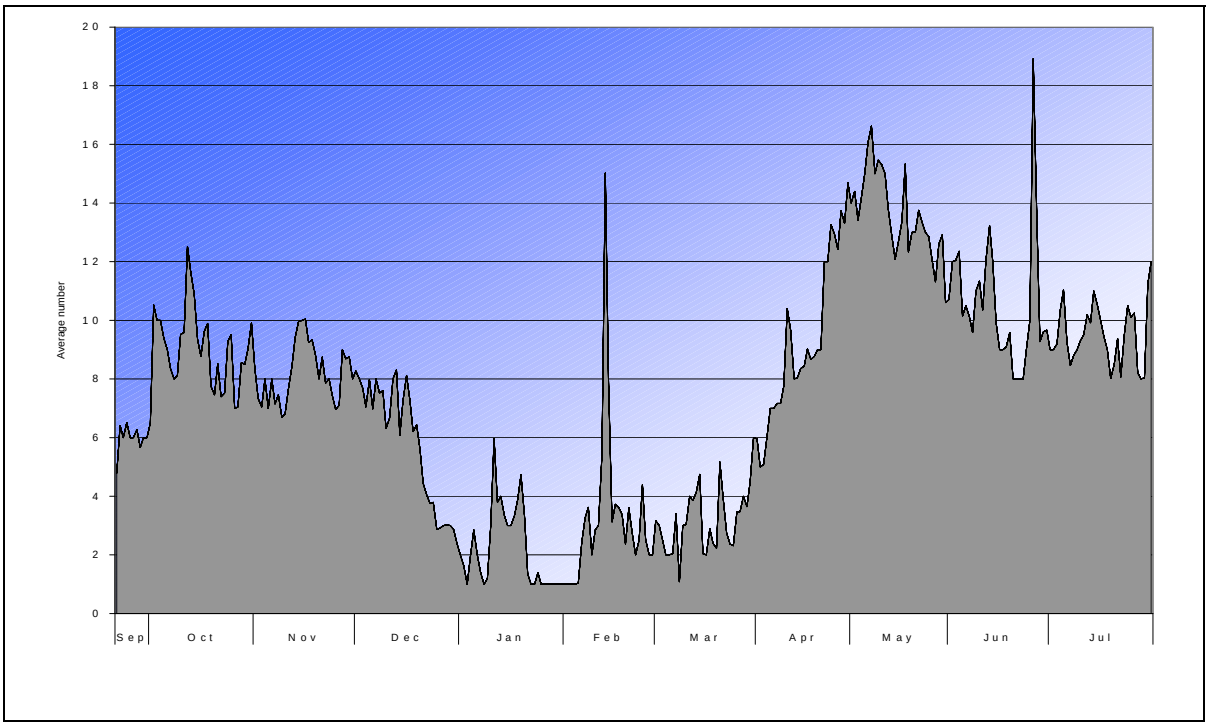


Figure 22: Quantity of energy subject to planned outage (cumulative daily average MWh per trading interval)

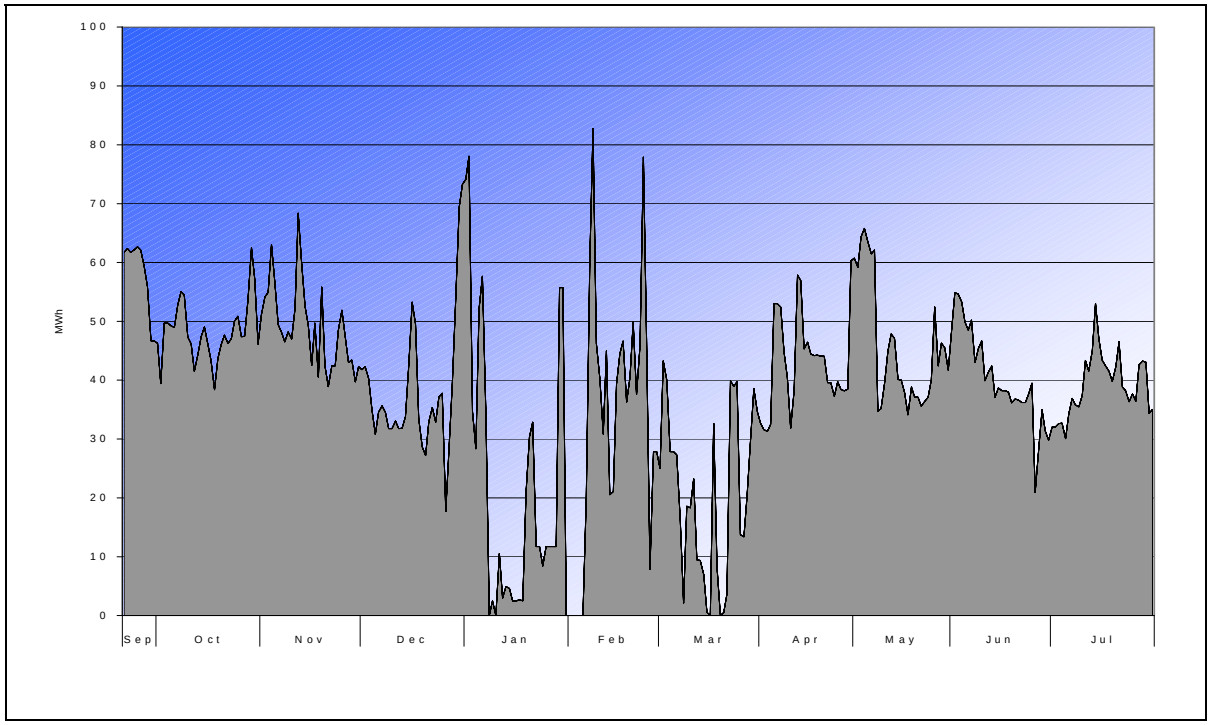


Figure 23: Number of forced outages (cumulative daily average per trading interval)

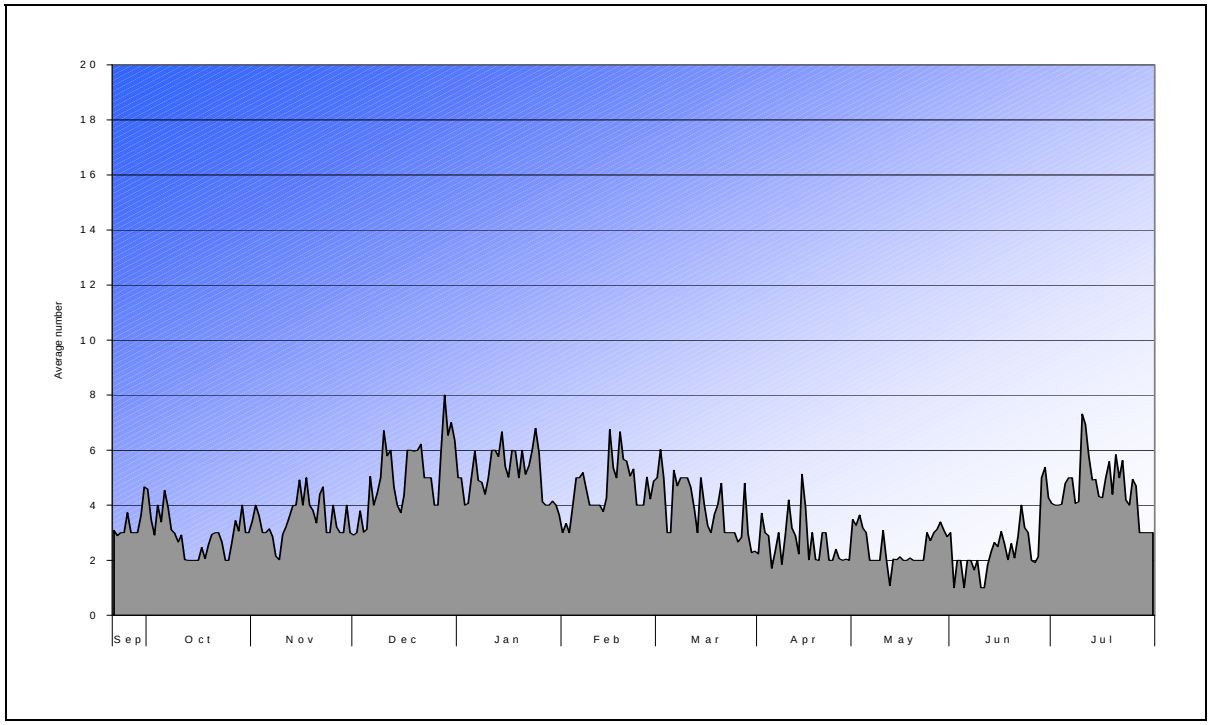
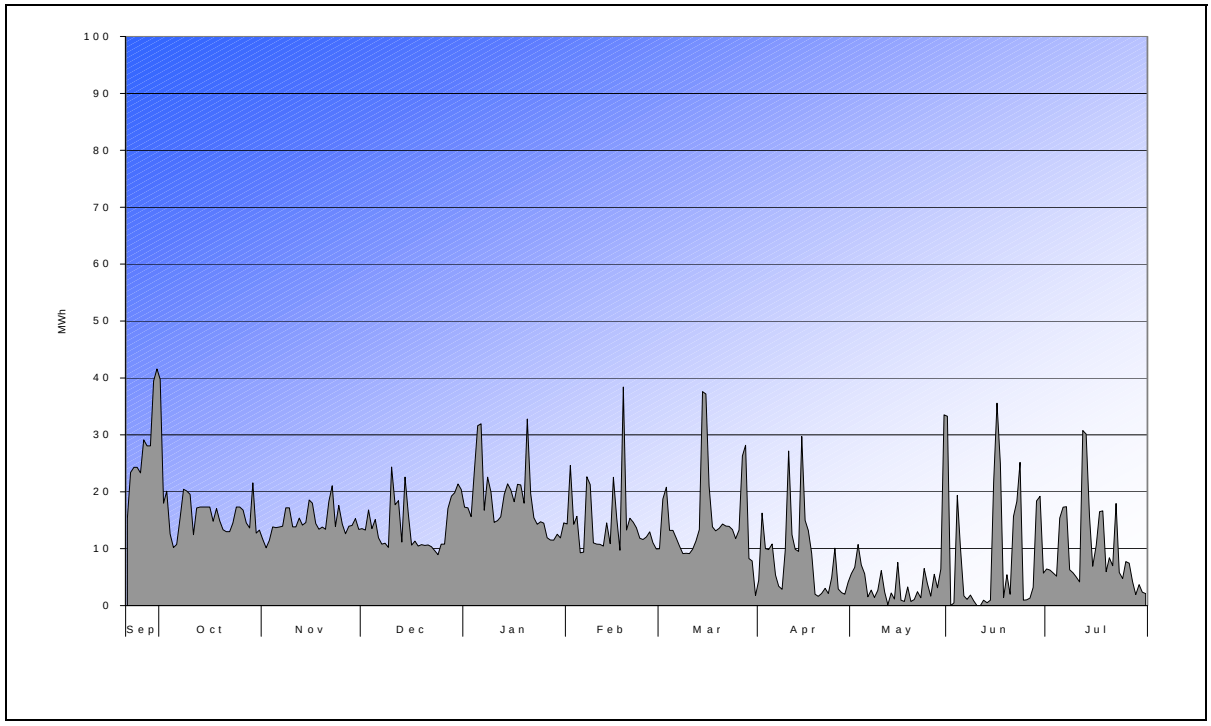


Figure 24: Quantity of energy subject to forced outage (cumulative daily average MWh per trading interval)



4.16 Performance in meeting reserve capacity obligations

Clause 2.16.2(l) of the Market Rules requires that the MSDC identify the performance of Market Participants with reserve capacity obligations in meeting their obligations.

The performance of Market Participants with reserve capacity obligations in meeting their obligations is assessed by comparing the quantity of a facility's forced outages and planned outages to the maximum generating capacity of the facility, as registered by the IMO.

This information is confidential, and is not presented in this public version of the report. However, aggregated information can nevertheless be reported. In particular, the ratio of quantities subject to outages to capacity tends to be relatively low, in the order of a few per cent or lower. Some facilities have experienced more significant outages, but the Authority understands that those facilities with a significant proportion of trading intervals subject to planned outages have been subject to scheduled maintenance work.

4.17 Ancillary service contracts and balancing support contracts

Clause 2.16.2(m) of the Market Rules requires that the MSDC identify details of ancillary service contracts and balancing support contracts that System Management enters into.

System Management has not entered into any ancillary service contracts between market commencement and 31 July 2007. System Management currently has ancillary service contracts in place with two Market Customers, Synergy and Kanowna, to supply spinning

reserve. These ancillary service contracts pre-date market commencement and were inherited by System Management upon the disaggregation of the old Western Power.

Clause 3.11.14 of the Market Rules requires that System Management must document a procedure to be followed, and must follow that procedure, when:

- determining ancillary service requirements;
- entering into ancillary service contracts; and
- preparing budget proposals for providing ancillary services.

This procedure is set out in the *Power System Operating Procedure: Ancillary Services*[12] (***PSOP: Ancillary Services***). *PSOP: Ancillary Services* requires that the following process is to be followed in procuring ancillary services:

- the issuing of an expression of interest;
- the calling of competitive tenders (if required);
- the assessment of tenders according to the criteria in the Market Rules;
- the development of proposals for meeting the ancillary service requirements;
- the submission and approval of an ancillary services procurement plan setting out the procurement proposal; and
- the formalising of the necessary contracts and agreements.

However, there is a transitional arrangement in place for the first year of the market. Under this transitional arrangement, System Management is not required to undertake the competitive tender process, and Verve Energy is required to supply the market with all ancillary services beyond those contracted by System Management as interruptible loads. System Management noted that it continually reviews the provision of ancillary services, and, at this time, has determined that Verve Energy is meeting the requirements.

The competitive tendering process is expected to begin for the 2008/09 financial year. System Management is currently assessing the performance of ancillary services under the existing arrangements, as part of a process of developing performance benchmarks against which competitive offers to supply ancillary services can be assessed. However, System Management commented that given the size of the SWIS, and the infancy of the Market, it would not be prudent or beneficial to the market for System Management to enter into an ancillary service contract with a Market Participant other than Verve Energy at this stage.

System Management has not entered into any balancing support contracts between market commencement and 31 July 2007. The Authority understands that prior to market commencement the then Western Power had several contracts for the provision of balancing in place. Provision was made in the Market Rules for balancing support contracts so that the existing contracts could continue once the market commenced. However, the existing contracts were terminated prior to market commencement. Since market commencement, Verve Energy has been principally responsible for providing balancing in the market. The issue of these balancing arrangements is addressed in more detail in Section 5.5.

[12] Power System Operation Procedure: Ancillary Services. Available at: http://www.imowa.com.au/Attachments/SMProcedures/PSOP%20-%20Ancillary%20Services.pdf

4.18 Rule change proposals

Clause 2.16.2(o) of the Market Rules requires that the MSDC identify the number of rule change proposals received, and details of rule change proposals that the IMO has decided not to progress under Clause 2.5.6.

The formal rule change process under the Market Rules commenced on 15 December 2006.

Prior to this, the Office of Energy was responsible for administering the rule change process on behalf of the Minister for Energy. Between market commencement and 15 December 2005, the Office of Energy received 14 rule change proposals, 12 of which were approved, and one of which was deferred until the formal rule change process commenced. There was only one rule change proposal that the Office of Energy did not recommend to the Minister for Energy for approval. This was Rule Change Proposal CR2, submitted by Verve Energy, which proposed that the maximum STEM price be set equal to the alternative maximum STEM price.

Since the commencement of the formal rule change process the IMO has been responsible for processing rule change proposals in accordance with the Market Rules. Between 15 December 2005 and 31 July 2007, the IMO received nine rule change proposals, three of which were approved and six of which remained open as of 31 July 2007. All of the rule change proposals received by the IMO were progressed, as advised under Clause 2.5.6 of the Market Rules.

4.19 Other information

Clause 2.16.2(p) of the Market Rules requires that the MSDC identify such other items of information as the IMO considers relevant to the functions of the IMO and the Authority under Clause 2.16. As of 31 July 2007, the IMO has not provided any other information in the MSDC.

5 Effectiveness of the WEM, the IMO and System Management

Clause 2.16.12 of the Market Rules requires that the Minister's Report contain the Authority's assessment of the market, including the effectiveness of the IMO and System Management in carrying out their functions, with discussion of each of:

1) the reserve capacity market;

2) the market for bilateral contracts for capacity and energy;

3) the STEM;

4) balancing;

5) the dispatch process;

6) planning processes; and

7) the administration of the market, including the Market Rule change process.

The summary of the data items in the MSDC and the analysis of the data undertaken by the IMO, as set out in Section 4 of this report, provides an overview of the operation of the market to date. In general, this data and analysis indicates that the market has been operating effectively during its early stages.

Since market commencement, new participants have been attracted to the market. In particular, several new Market Generators have entered the market since market commencement. There has also been an increase in the number of Market Generators with significant facilities that have been assigned capacity credits. The IMO has noted that Verve Energy accounted for around 90 per cent of all capacity credits at the start of the market, but will account for around 60 per cent in 2009/10 during the third reserve capacity cycle.

While new generation capacity operated by Market Participants other than Verve Energy will enter the market over the next few years, Verve Energy is currently the largest Market Generator by far. This is reflected in the energy market. Verve Energy is the dominant supplier of energy scheduled under bilateral contracts. Verve Energy is also the source of substantial bid and offer quantities in the STEM. However, other participants have also at various times been active in the STEM to a substantial extent, with Alinta, Goldfields Power and Synergy offering substantial quantities in the STEM, and with Alinta and Goldfields Power bidding substantial quantities in the STEM. As new generation capacity enters the market over the next few years, there will be a broader range of Market Participants scheduling bilateral quantities and participating in the STEM.

Outcomes in the STEM to date have been encouraging. During the first few months following market commencement, STEM prices were both relatively high and volatile. This is likely to have reflected, at least in part, gas constraints that occurred during this period. Since then, prices have tended to decline and become less volatile.

Outcomes in the STEM also indicate that STEM prices provide useful signals by responding to scarcity. Prices have tended to be higher during periods of high demand, with higher prices observed during peak trading intervals than off-peak trading intervals,

and with higher prices observed on high demand days (for instance, during summer and, more recently, during cold periods in June). Prices have also tended to be higher when generation capacity is affected by gas constraints.

While outcomes in the STEM have been encouraging, there is a need for further investigation of patterns of bidding in the STEM, and the causes of high prices. Given that generation capacity in the market remains highly concentrated at this stage, there is a concern that outcomes in the market may not reflect competitive outcomes. Patterns of STEM offers indicate that Market Participants have consistently offered significant quantities at high prices, including prices at, or close to, the energy price limits. The IMO and the Authority continue to work on assessing STEM offers and bids to identify any outcomes that indicate market power. This will provide further insight into the appropriateness of the price signals provided by the STEM.

Given the close link between outcomes in the STEM, and outcomes in the balancing market, the encouraging outcomes observed in the STEM are also observed in the balancing market. Balancing prices have generally been trending downwards since market commencement, and become less volatile. As with the STEM, outcomes in the balancing market indicate that balancing prices provide useful signals by responding to scarcity.

The balancing market has yet to be opened to competition. Outcomes in the market to date indicate that a range of facilities have capacity available that could be provided in the balancing market. However, it is unclear whether this capacity could be used to meet the standards required for the provision of balancing services. It is also apparent that standing balancing prices bid by Market Participants are, for the most part, at levels close to or at the energy price limits.

While these outcomes indicate that the market has been operating effectively since market commencement, the Authority is aware of some potential issues with the operation of the market. These issues, and the Authority's views, are set out in the rest of this section and in Section 6.

5.1 Approach

In its Discussion Paper, the Authority set out the approach it intended to adopt in undertaking this Minister's Report. The Authority noted that, in light of the extensive consultation that was undertaken during the restructuring of the electricity industry in Western Australia and the implementation of the WEM, and the short time since the commencement of the market, the Authority considered that this first Minister's Report should be focused on an assessment of the effectiveness of the WEM at a fairly high level. The Authority noted that it would consider all relevant material but, in the absence of compelling evidence of fundamental problems, the Authority considered that it would be inappropriate to consider fundamental change in the market at this stage.

In general, stakeholders were supportive of this approach. The Office of Energy commented that it supports the view that the first Minister's Report should focus on a high level assessment of the effectiveness of the market, and considers it appropriate for any further refinements of the market to be addressed through the rule change process. The IMO stated that it agreed that, in the absence of compelling evidence of fundamental problems with the design or the operation of the Market, it would be inappropriate to recommend fundamental changes to the Market at this early stage. The IMO also commented that twelve months operational data does not provide sufficient direction for significant change. The Chamber of Commerce and Industry (**CCI**) commented that it is

premature to recommend significant changes to the market structure at this early stage of the operation of the market. The Energy Supply Association of Australia (**esaa**) commented that the WEM is relatively new and it would be premature to draw substantial evidence-based conclusions with respect to the effectiveness and efficiency of the market in meeting the market objectives. The esaa therefore considers that major structural change would not be justified at this point, but should be considered if evidence of market inefficiencies emerges as the market matures.

However, Verve Energy did raise issues with the Authority's approach. Verve Energy commented that there is evidence of major problems in the market, and that adopting an evolutionary approach to reform of the market may fail to address these problems. Verve Energy also noted that the ERTF completed its work in 2003, and that there is now a case for an updated view on electricity market reform in Western Australia.

Authority's view

On balance, the Authority considers that there is not sufficient compelling evidence at this stage to consider fundamental change in the market.

The Authority notes that the reform of the electricity industry in Western Australia and implementation of the WEM was undertaken over a period of 6 years, and included substantial public consultation. The Authority also notes that the rule change process in the Market Rules provides a mechanism for ongoing market evolution. In light of this, the Authority's view is that it would be inappropriate to consider fundamental change in the market on the basis of the evidence available from less than a year of market operations.

The Authority has identified some potential issues with the operation of the market. In most cases, the Authority considers that the rule change process is the appropriate mechanism to address these issues, and to implement any changes to the Market Rules that are required. In some cases, the Authority has identified issues of broader concern. At this early stage, the extent to which these issues impact on the effectiveness of the WEM is unclear. Given this, the Authority will continue to monitor these issues, and their impact on the effectiveness of the WEM.

5.2 The reserve capacity market

Following initial discussions with stakeholders, the Authority invited comment in its Discussion Paper on a range of issues in regard to the reserve capacity mechanism. The responses from stakeholders on these issues, and the Authority's views, are set out below.

5.2.1 The appropriateness of a capacity market

In its Discussion Paper the Authority invited comment on the extent to which, given the current WEM design, the operation of the reserve capacity mechanism is effective in achieving the Wholesale Market Objectives.

Responses from stakeholders primarily focused on the extent to which there has been appropriate investment in new generation plant since the commencement of the reserve capacity mechanism. These comments are addressed in Section 5.2.2 and Section 5.2.3.

Some stakeholders also commented more generally on the appropriateness of the capacity market.

System Management commented that the coming year will be the first true test of the reserve capacity mechanism, as the IMO has responsibility for ensuring system capacity from 1 October 2007. System Management considered that attempting to determine whether the reserve capacity mechanism has met the Wholesale Market Objectives is premature at this time, and that any issues with the operation of the mechanism can be addressed through the rule change process.

The IMO commented that the operation of the reserve capacity mechanism has already contributed to the achievement of the Wholesale Market Objectives. In particular, the IMO noted that: sufficient capacity has been secured to meet peak demand over the next three years; that by 2009/10 three new Market Participants will have significant generation capacity, reducing the share of capacity credits accounted for by Verve Energy to around 60 per cent, compared to around 90 per cent at market commencement; that new entry has occurred with a variety of plant sizes, technologies and fuel types; and that the contribution of renewable energy has increased.

Verve Energy commented that there are significant problems with the reserve capacity mechanism (which are discussed in the sections that follow), and recommended consideration of a timely and managed shift to an energy-only market design.

Authority's view

The Authority considers that a shift to an energy-only market design would represent a fundamental change to the market design. The Authority notes that the existing design of the WEM – with its separate capacity market and energy market – was the result of the reform and implementation work undertaken by the ERTF and the ERISC. As discussed in Section 2.1, this work involved substantial public consultation over a period of six years.

The Authority also notes that there is no compelling evidence at this stage that a move to an energy-only market would better promote the Wholesale Market Objectives. Certainly there are potential issues with the capacity market, which the Authority will continue to monitor, but no compelling evidence that the capacity market is not operating effectively, given the current stage of development of the market.

In the circumstances, the Authority's view is that considering such a fundamental change as a move to an energy-only market would be premature at this stage.

5.2.2 Capacity in the SWIS

In its Discussion Paper, the Authority invited comment on whether the WEM adequately promotes investment in an efficient amount of generation capacity.

In response, some stakeholders noted that sufficient capacity has entered the market. The IMO commented that sufficient capacity has been secured to meet peak demand over the next three years. The CCI commented that the reserve capacity mechanism is generally functioning well to ensure sufficient capacity is available in the SWIS. System Management commented that it believes that the market adequately promotes investment in an efficient amount of generation capacity.

Other stakeholders noted that excess capacity has entered the market In the most recent reserve capacity cycle, for the 2009/10 capacity year, the capacity credits assigned exceed the reserve capacity requirement by 527 MW. Each of Synergy, Verve Energy and Premier Coal commented that the capacity credits assigned for the third reserve capacity cycle are significantly in excess of system load. Synergy and Verve Energy both commented that this excess capacity is a result of the design of the market. Verve Energy

commented that this excess capacity imposes substantial costs. Synergy noted that excess capacity can be efficient if it results from larger plants entering the market and achieving economies of scale, but that there are also significant costs associated with excess capacity.

Authority's view

The Authority notes that capacity credits assigned for the 2009/10 capacity year exceeded the reserve capacity requirement by 527 MW. The Authority also notes that capacity credits assigned for each of the 2007/08 and 2008/09 capacity years also exceeded reserve capacity requirements for those years.

However, the Authority considers that these instances of capacity credits exceeding the reserve capacity requirement do not in themselves provide compelling evidence that the design of the market systematically provides incentives for investment in excess capacity.

As noted in its Discussion Paper, the Authority considers that it is inappropriate to examine capacity in the WEM at a particular point in time, or even over the short term. Patterns of investment in generation plant tend to be lumpy, which can lead to periods when capacity is tight, and other periods when there is excess capacity. There are reasons to think that the excess capacity currently observed will not persist. For example, there are fuel constraints that may deter investment in new plant in the future. The Authority also notes that the timing of the retirement of existing plant affects levels of excess capacity, and that Verve Energy has recently delayed plans to retire some of its existing plant.

Given this, the Authority's view is that there is currently insufficient evidence to conclude that the design of the WEM will systematically lead to investment in excess capacity. The results of the first three reserve capacity cycles certainly raise this as a potential issue for the effectiveness of the WEM, and the Authority will continue to investigate outcomes in the market to assess whether patterns of investment will promote the Wholesale Market Objectives. The Authority will continue to report on this issue in future Minister's Reports.

5.2.3 Mix of generation plant in the SWIS

In its Discussion Paper the Authority invited comment on whether the current WEM provides adequate incentives for an efficient mix of generation plant, bearing in mind the interaction of the capacity market and the energy market.

A number of stakeholders were concerned that the current WEM does not provide adequate incentives for an efficient mix of generation plant.

Alinta commented that at this stage it is too soon to determine whether the reserve capacity mechanism provides adequate incentives for investment in an efficient mix of plant. However, Alinta did raise concerns that the reserve capacity mechanism does not adequately reflect the fact that investment in an efficient mix of generation plant will at some point require investment in a generation plant larger than the annual increase in system load. In particular, Alinta commented that the calculation of the maximum reserve capacity price on the basis of the cost of an open cycle gas turbine may not provide investment incentives that promote long-term efficiency, and that it considers that the excess capacity adjustment acts as a disincentive to investment in a generation plant larger than the annual increase in system load.

Griffin Energy commented that the reserve capacity mechanism is a highly regulated process that may distort market signals relating to the type of plant required in the SWIS.

In particular, Griffin Energy commented that capacity credits are assigned if a Market Participant can prove that a facility has network access and environmental approvals, which distort investment signals in favour of those facilities that can more easily meet these constraints. Griffin Energy also commented that it considers that pricing under the reserve capacity mechanism can provide incentives to undertake excessive investment in peaking plant.

System Management commented that the design of the reserve capacity mechanism does not appear to distinguish between the types of capacity, nor provide incentives for one type of capacity over another. System Management considers that this can lead to an inefficient mix of generation and, in particular, System Management considers that there may be inadequate incentives for investment in wind capacity in the SWIS.

The CCI commented that the reserve capacity mechanism appears to be offering appropriate incentives for investment in base load and peaking plant, but it is less clear that there are appropriate signals for investment in mid-merit plant.

Verve Energy commented that the reserve capacity mechanism appears to provide appropriate incentives for investment in peaking plant, while investment in base load plant is driven by other factors, and there appears to be little incentive for new investment in mid-merit plant. Verve Energy commented that this situation has forced Verve Energy's base load plant to operate more like mid-merit plant in order to fulfil Verve Energy's obligations to provide balancing.

Perth Energy commented that the reserve capacity mechanism leads to a market in which investment in base load plant requires off-take contracts with large loads. Perth Energy noted that this does not necessarily mean that the market should move to an energy-only market like the NEM because there are other advantages of the current market structure.

The esaa noted that it has been suggested that the reserve capacity mechanism may provide inefficient pricing signals, particularly with respect to mid-merit plant. The esaa commented that ongoing monitoring of the appropriateness of pricing signals for peak, mid-merit and base load plant is required.

Synergy commented that the market appears to provide adequate incentives for the entry of peaking and mid-merit plant, but that there are a number of structural impediments to the effective entry of base load plant, including transmission constraints, uncertainty about future greenhouse policies and uncertainty about the response of Verve Energy to new entry. Synergy also commented that it believes the reserve capacity mechanism does not provide adequate incentives for a mix of old and new plant. Synergy recommended a mechanism by which all plant (existing and new) is required to bid into a capacity auction.

The IMO commented that outcomes to date reveal that the market has provided incentives for a variety of plant sizes, technologies and fuel types.

Authority's view

As noted in the Authority's Discussion Paper, in considering incentives for investment it is necessary to consider both the price signals provided in the capacity market and the price signals provided in the energy market. The reserve capacity mechanism alone is not intended to provide incentives for investment in an appropriate mix of generation plant: prices in the energy market, including for bilateral contracts, also play an important role.

Considering the evidence on the operation of the market, the Authority notes that in the course of the reserve capacity cycles to date, five major new generation facilities have

been assigned capacity credits: the Alinta Wagerup cogeneration facility was assigned capacity credits for 2007/08; the coal-fired Bluewaters 1 facility and the combined cycle gas turbine (**CCGT**) NewGen Kwinana facility were assigned capacity credits for 2008/09; and the coal-fired Bluewaters 2 facility and the open cycle gas turbine (**OCGT**) NewGen Neerabup facility were assigned capacity credits for 2009/10. That a mix of coal-fired, CCGT and OCGT facilities, as well as new renewable facilities, have entered the market since the reserve capacity mechanism was put in place provides evidence that the market does not preclude a mix of generation plant coming into the market, including both base load and mid-merit plant.

However, the Authority considers that this alone is not sufficient evidence that the market provides appropriate investment incentives: while a mix of generation technologies has entered the market, it is difficult to judge the appropriateness of this mix. Furthermore, as the Authority noted in its Discussion Paper, it is inappropriate to assess investment outcomes in the short-term.

Given the importance of achieving an efficient mix of generation plant to the achievement of the Wholesale Market Objectives, and the range of concerns raised by stakeholders concerning the incentives for investment in mid-merit and base load plant, the Authority will continue to investigate outcomes in the market to assess whether the market provides adequate incentives for investment in mid-merit and peaking plant. In particular, the Authority will continue to investigate the operation of the market in order to assess whether the market has sufficient mid-merit and base load plant to operate effectively. The Authority will continue to report on this issue in future Minister's Reports or as otherwise appropriate.

5.2.4 Locational price signals

In its Discussion Paper the Authority invited comment on whether the WEM adequately promotes efficient location of generation facilities and promotes the efficient development of transmission and distribution networks.

In response, Western Power commented that locational price signals are a function of the network, not the market *per se*. Price signals provided by Western Power are:

- capital contributions for network connections;
- Transmission Use of System (**TUOS**) prices; and
- loss factors.

Western Power believes that, in combination, these provide reasonably effective price signals, leading to efficient outcomes in terms of location of new generation and the associated network investment.

Other Market Participants noted that network losses are not adequately taken into account in the reserve capacity mechanism. Verve Energy commented that the design of the market does not provide incentives to minimise losses on the network, and recommended that this issue be addressed. Landfill Gas recommended that the application of loss factor adjustment to certified capacity would promote efficient locational price signals. Alinta supported a review of the network loss factor methodology.

Synergy commented that with new generators connecting to the network facing the costs of network connection, existing network capacity favours generators sited in the Kwinana and Collie regions, where there is already access to connect to the high voltage transmission grid. Synergy noted that generators sited at the extremities of the network

have had considerable difficulties in being connected at full capacity, and that this is especially an issue for renewable generators such as windfarms. Synergy commented that it is concerned that these network constraints will continue to have significant implications to the efficient siting of generation plant, and recommended a review to assess, among other things, the state of the network with regard to accommodating potential new generation siting.

Authority's view

In regard to new generators facing the costs of network connection, the Authority considers that, in general, this is an appropriate signal to be provided by the market. That new generators face the costs of network connection provides a mechanism to promote the construction of new generation that provides benefits in excess of its costs (taking into account the costs of the network investments required to connect the facility). In the absence of the signal provided by the costs of network connection, decisions to invest in a new generation facility could be made without regard to the network costs required to provide access to the facility, leading to potentially inefficient locational decisions.

In regard to the treatment of network loss factors, the Authority considers that loss factors are an appropriate means of providing locational price signals. The Authority notes that loss factors act to provide signals in the energy market, but is concerned that loss factors may not act to provide these signals in the capacity market. At this stage, however, the Authority considers that it is too early to conclude that the operation of the reserve capacity mechanism is likely to lead to inefficient locational decisions. The Authority notes that network loss factors are only one means of providing locational signals, and considers that the costs of network connection that new generators face in securing a network access arrangement likely provide effective signals. The Authority is continuing to monitor this issue.

5.2.5 Other issues

In its Discussion Paper, the Authority invited comment on whether there are other issues with the reserve capacity mechanism that materially impact on the effectiveness of the WEM.

In response, stakeholders raised three issues:

- the timing of the reserve capacity mechanism;
- the reserve capacity refund mechanism; and
- the IMO's procedures for certifying capacity.

5.2.5.1 Timing of the reserve capacity mechanism

In regard to the timing of the reserve capacity mechanism, a number of stakeholders raised concerns that the two-year period between the assignment of capacity credits and the commencement of obligations in respect of capacity credits is too short.

Alinta commented that the two-year timeframe imposes limitations on the type of generation technology and the location of generation facilities that Market Participants can construct. The CCI commented that the two-year timeframe can present significant challenges due to labour shortages, delays in governmental approvals, shortages of construction materials and fuel supply constraints. The CCI commented that a three or four year time frame for project delivery may be more realistic. Both Alinta and the CCI

noted that the advantages of a timeframe longer than two years need to be balanced against the difficulty of forecasting system load more than two years in advance.

Griffin Energy commented that it considers the two year cycle to be very short given construction timetables, timing of approvals and network congestion. Griffin Energy recommended a one year extension of the cycle.

The esaa commented that the two year cycle is insufficient to deliver new investment, particularly for base load and mid-merit plant.

Western Power considers that the two-year lead-time for the reserve capacity process may not be adequate from a transmission network perspective. Western Power noted that the planning of the network responds to additional generation requirements once projects become firm, which often does not provide sufficient time for completion of the connection. Western Power noted that there is currently a significant risk that Western Power will not be able to build the infrastructure required to allow unconstrained generation connection within the 2-year capacity auction window run by the IMO.

Western Power has identified the need to review the investment triggers and resultant timing for investment. An option under consideration is the development of 'generation parks', for network facilities to be put in place to enable the connection of generation in those areas. This will require collaboration between industry and Government.

Western Power commented that processing applications by Market Participants for network access can take up to 12 months, or longer in some complex cases. In many cases, Market Participants do not submit their applications to Western Power until a few months before an access offer is required, so that Market Participants are unable to meet the timelines of the reserve capacity mechanism.

Perth Energy commented that once a year capacity certification can create certification bottlenecks, and recommended that provision be made for capacity to be certified throughout the year.

Alinta commented that network capacity constraints severely restrict the ability the Market Participants have to develop generation facilities to respond to expected growth, particularly within the two-year time frame of the reserve capacity mechanism.

Authority's view

In regard to the time taken to process applications by Market Participants for network access, the Authority notes that the IMO is aware of this issue, and continues to advise Market Participants of the need to make applications for network access in sufficient time to meet the reserve capacity mechanism timeframes.

In regard to the timing of the reserve capacity mechanism itself, the Authority notes that the effective operation of the reserve capacity mechanism does not require a facility to be built within the two years between the assignment of capacity credits and the commencement of obligations in respect of capacity credits. The reserve capacity mechanism provides for the certification of all facilities that are in operation or under construction, and which nominate their intention to trade their capacity bilaterally. Market participants are also able to apply for conditional certification for a facility in advance of the reserve capacity mechanism timeframes. If no information upon which conditional certification was based changes, and if all approvals required normally for certification are provided, then the facility will automatically be certified.

The Authority recognises that Market Participants may nevertheless face difficulties in the timing of investments in new capacity. However, there is a need to achieve a balance in the reserve capacity mechanism timeframes that is reasonable for facilities with long lead-times and facilities with short lead-times. While Market Participants investing in facilities with long lead-times may find it difficult to secure financing ahead of the reserve capacity mechanism timeframes if there is uncertainty about network access arrangements or conditional certification, Market Participants investing in facilities with short lead-times may find it difficult to finalise details sufficiently early to meet the reserve capacity timeframes.

At this stage, the Authority considers that the evidence indicates that the balance achieved in the timing of the reserve capacity mechanism is likely appropriate. The Authority notes that, since the commencement of the reserve capacity mechanism, a number of new facilities have entered the market and these new facilities are of a variety of technologies, including renewables (as outlined in Section 5.2.3). However, the Authority notes the concerns raised by stakeholders, and will continue to examine the operation of the market to assess the appropriateness of the timing of the reserve capacity mechanism, and will report on this issue as a matter of priority. In particular, the Authority will continue to investigate whether the reserve capacity mechanism, and particularly the conditional certification process, operate appropriately to facilitate investment in facilities with long lead-times.

5.2.5.2 Reserve capacity refund mechanism

In regard to the reserve capacity refund mechanism, both Alinta and Verve Energy raised concerns. Alinta commented that the IMO's interpretation of the mechanism leads to lower refunds from Market Participant's with facilities subject to unplanned outages than was intended by the drafters of the Market Rules. Verve Energy commented that the method by which the reserve capacity refund mechanism operates has the effect of distorting price signals.

Authority's view

The Authority notes that the issue raised by Alinta was the subject of Rule Change Proposal RC_2007_08. As a result of this rule change proposal, changes to the Market Rules to clarify the operation of the reserve capacity refund mechanism were implemented on 1 November 2007.

5.2.5.3 Certifying new capacity

Verve Energy commented that there is a lack of clear procedures that the IMO follow in certifying new capacity, and that there is too much discretion available to the IMO in certifying capacity that is at varying stages of certainty.

Authority's view

In regard to the procedure that the IMO will follow in certifying new capacity, the Authority notes that in July 2006 the IMO published a Rule Procedure for Certification of Reserve Capacity, which describes the steps that a Rule Participant is required to complete to make an application for certification of reserve capacity and the steps that the IMO must follow in assessing an application for certification of reserve capacity. The IMO has also produced new draft procedures for the certification process in 2007.

In regard to the discretion available to the IMO in certifying capacity, the Authority considers that, in certifying capacity, the IMO is bound by the Market Rules. It is unclear

from Verve Energy's submission what changes to the IMO's obligations in regard to the certification of capacity Verve Energy would propose. In any event, the Authority considers that changes to the IMO's obligations in regard to the certification of capacity are likely better dealt with through the rule change process.

5.3 The market for bilateral contracts for capacity and energy

As discussed in Section 4.6, the bilateral contracts scheduled by the IMO are dominated by the vesting arrangements between Verve Energy and Synergy. Over the period from market commencement to 31 July 2007, the volumes traded between Verve Energy and Synergy account for an average of 752 MWh out of an average 786 MWh of bilateral trades scheduled with the IMO. As the vesting contract rolls-off, other bilateral trades will account for a greater proportion of quantities scheduled by the IMO.

Authority's view

Given the relative scarcity of bilateral contracts other than under the vesting arrangement, the Authority does not at this stage have a view on the extent to which the market for bilateral contracts for capacity and energy promotes the Wholesale Market Objectives. The vesting arrangements themselves are discussed in Section 6.1.

5.4 The STEM

Following initial discussions with stakeholders, the Authority invited comment in its Discussion Paper on a range of issues in regard to the STEM. The responses from stakeholders on these issues, and the Authority's views, are set out below.

5.4.1 Liquidity in the STEM

In its Discussion Paper, the Authority invited comment on any aspects of the STEM design that discourage Market Participants from trading in the WEM.

Synergy commented that it would be unwise for retailers to have significant exposure to the STEM because of the market power of some Market Participants. Synergy noted that the requirement to price at SRMC in the STEM addresses this to some extent, but stated that there are problems with the interpretation of SRMC, which give suppliers some potential to utilise their market power.

Authority's view

In regard to Synergy's concerns with market power in the STEM and problems with the interpretation of the requirement to price at SRMC, the Authority notes that it is currently working on an SRMC Paper. The paper aims to achieve a better understanding of the SRMC concept in the context of the WEM. The Authority and the IMO are also currently finalising an SRMC model, which seeks to evaluate whether the SRMC of generating the relevant electricity is reflected in Market Participant's offers in the STEM. Once finalised, the results of the paper and the model will be used as a basis to improve understanding of the SRMC provision in the Market Rules.

5.4.2 Timing of the STEM

In its Discussion Paper, the Authority invited comment on the day-ahead feature of the STEM. In particular, the Authority invited comment on whether the day-ahead feature of the STEM discourages Market Participants from trading in the STEM, and how the exercise of market power might be mitigated in the event that the STEM were replaced by an arrangement closer to real-time.

In response, stakeholders presented a range of views.

Some stakeholders recommended retaining the current arrangements. Landfill Gas commented that it supports the current day-ahead feature of the STEM. System Management commented that moving to a real-time market would involve significant changes to the market, and entail significant costs. System Management noted that, given the relatively small size of the SWIS, the benefits of such a change may not outweigh the costs. Griffin Energy also commented that the cost of implementing a real-time mechanism is too high given the low volumes traded in the STEM.

The CCI also recommended retaining the current arrangements, but only in the short-term. The CCI commented that it is too early at this stage to consider moving to implement two gate closures, or gate closures closer to real time. Over the longer-term, however, the CCI considers that a change of this type may encourage greater participation in the STEM. Alinta supported a movement to a two-gate process in the next two to three years.

Other stakeholders were less supportive of the current arrangements. Synergy commented that the day-ahead feature of the STEM reduces the flexibility of Market Participants to adjust their trading positions, and can lead to higher generation costs in the WEM. Verve Energy commented that a day-ahead system is less responsive to unexpected events, such as fuel supply curtailments or extreme weather, and that provision should be made for minimizing the financial impact of a mismatch between day-ahead prices and actual market conditions. The esaa also noted that the day-ahead feature of the STEM makes it difficult to adjust to unforeseen circumstances and discourages trading in the STEM, but considered that further consultation would be required before introducing either a two-gate closure or a real-time system.

Authority's view

The Authority recognises that replacing the STEM with an arrangement that is closer to real-time would involve substantial changes to the market, and notes that System Management indicates that the costs of such a change would be substantial. Also, as discussed in the Authority's Discussion Paper, one of the reasons for the introduction of a day-ahead STEM, rather than a real-time STEM, was that the ERTF considered that real-time markets are inherently more susceptible to the exercise of market power. Given the WEM remains dominated by a few large Market Participants at this stage, market power remains a concern. Indeed, Synergy commented that the market power of some Market Participants is likely to deter participation in the STEM under the current arrangements. The Authority notes that stakeholders did not comment on how the potential exercise of market power in a real-time market could be mitigated.

Given these considerations, and the lack of clear support at this stage for a move towards an arrangement closer to real-time, the Authority considers that retaining the current arrangement is appropriate. However, the Authority will continue to assess the extent to which the current arrangement supports the Wholesale Market Objectives in future Minister's Reports.

5.4.3 Other issues

In response to the Authority's Discussion Paper, Verve Energy raised concerns about the appropriateness of the energy price limits in the STEM. Verve Energy commented that it considers the energy price limits (in conjunction with capacity payments) do not provide sufficient incentives to invest in mid-merit plant. Verve Energy recommended that the energy price limits be simplified and increased, and that there should be a transparent mechanism for regularly reviewing the adequacy of energy price limits.

Authority's view

The Authority notes that raising the maximum STEM price has already been the subject of an early rule change proposal to the Office of Energy. This rule change proposal was rejected. The Authority also notes that the Market Rules require the IMO to undertake a review of the energy price limits, and that the IMO is currently undertaking this review. Submissions on the IMO's draft report on energy price limits are currently open. The Authority considers that the IMO's review is the appropriate forum to consider the adequacy of the energy price limits.

5.5 Balancing

In response to the Authority's Discussion Paper, stakeholders commented on the existing balancing arrangements.

Verve Energy commented that the lack of a real-time balancing market is a significant issue, because the lack of real-time balancing means that electricity generators have no real-time price signal to drive generation output. Verve commented that this is unlikely to lead to efficient dispatch.

Verve Energy also commented that the day-ahead market, combined with the fact that balancing prices are based on STEM bids and offers, does not provide appropriate incentives to Verve Energy or other Market Participants. Verve Energy noted that changes in cost inputs in real time (for instance, as a result of changes in plant availability, fuel availability or demand) only ever result in Verve Energy's cost increasing. Verve Energy also noted that Market Participants have the opportunity to influence prices in the STEM through the trade of small volumes, and to then impose large opposing volumes on Verve Energy through the balancing market. Verve Energy provided an example in which a Market Participant bids 1 MW in the STEM, which, in the absence of other bids, sets the STEM price at the lowest available offer. The Market Participant may then sell 101 MW in the balancing market. For the Market Participant, the net effect is that they are able to sell 100 MW at the lowest offer price rather than the appropriate bid price, which could potentially be much lower.

Verve Energy commented that it does not consider that a competitive balancing mechanism would be any more or less complicated than the current market design. Synergy commented that it considers it would be more efficient to implement a competitive balancing mechanism.

In the absence of competitive balancing, however, Verve Energy considers that all Market Participants, including itself, should receive pay-as-bid prices.

Verve Energy also commented that there appears to be no logic to calculating MCAP based on portfolio supply curves from the STEM only where real-time demand deviates from expected demand by more than five per cent. Verve Energy suggested that there

are no operational reasons to prevent MCAP being calculated for every trading interval and, in any case, if there were operational considerations these could be addressed. More broadly, Verve Energy commented that the current balancing arrangement does not provide a balancing price that accurately reflects the physical position of Verve Energy, and that the means by which MCAP is calculated needs to be reviewed.

Authority's view

In its Discussion Paper, the Authority noted that the ability of generators other than Verve Energy to offer real-time balancing at this early stage of the market is substantially constrained, due to the relatively small generation portfolios of these Market Participants. As a result, achieving an effectively competitive balancing market at this stage would be difficult, with Verve Energy likely to be required to provide the majority of balancing services. In the absence of a competitive balancing market, the Authority considers that there is good reason to impose restraints on the balancing prices paid to Verve Energy.

In regard to calculating MCAP prices for all trading intervals, the Authority considers that there may be merit in this proposal, but that it is an issue that may be dealt with through the rule change process.

5.6 The dispatch process

In response to the Authority's Discussion Paper, Synergy commented that it considers that there would be clear advantages from moving from a physical dispatch system to a financial dispatch system. In particular, Synergy considers that financial dispatch – in which dispatch is determined by offer prices rather than contract positions – would place risk upon generators in relation to meeting their contractual positions. Synergy commented that this would encourage the development of derivative products, enabling both generators and retailers to manage their risk.

Authority's view

The Authority considers that adopting a financial dispatch system is likely to require a fundamental change to the market. The Authority's view is that it is too early at this stage to conclude that such a change would promote the Wholesale Market Objectives. However, the Authority will continue to investigate this matter, and report on its findings in future Minister's Reports.

5.7 Planning processes

In its response to the Authority's Discussion Paper, Alinta expressed concerns with the IMO's forecasts of the reserve capacity requirement. Alinta noted that maximum electricity demand forecasts for a given year have varied considerably from year-to-year, and have so far been consistently low.

Authority's view

The Authority notes that the Market Rules require the IMO to undertake regular reviews of the forecasts of maximum electricity demand and energy sales in the SWIS. For the past three years the IMO has retained the National Institute of Economic and Industry Research (**NIEIR**) to forecast maximum electricity demand and energy sales. The IMO has conducted an internal review of the forecasting processes used by NIEIR, and has

engaged an external consultant to undertake an independent review of the forecasting processes used by NIEIR.

The Authority notes that the IMO is currently undertaking a process to review forecasts of maximum demand and energy sales in the SWIS. The Authority will consider the outcomes of the review, and assess the implications, if any, of this review for the effectiveness of the market.

5.8 The administration of the market

5.8.1 Timing of the rule change process

In response to the Authority's Discussion Paper, several stakeholders raised concerns about the timing of the rule change process. Synergy noted that the rule change process can be long. However, Synergy commented that substantial review of rule change proposals is required, so that expediting the process may not be appropriate. Synergy commented that the IMO's current process is appropriate at this stage. Alinta noted that the fast-track rule change process could be improved if Market Participants were held accountable to the designated timeframes. Verve Energy noted that both the fast-track rule change process and the standard rule change process are too slow.

Authority's view

The Authority considers that it is important that rule change proposals are subject to adequate public consultation, and that this requirement imposes certain time constraints. At this stage the Authority considers that it would be inappropriate to shorten the time available for public consultation.

5.8.2 Responsibility for rule change proposals

In response to the Authority's Discussion Paper, Verve Energy, Griffin Energy, Synergy and the esaa commented that they are concerned that the IMO's involvement in the rule change process could lead to a potential conflict of interest. Verve Energy, Griffin Energy and Synergy recommended that rule changes be handled externally to the IMO.

Responding to these comments, the IMO has informed the Authority that it does not consider it has a conflict of interest in administering the rule change process. The IMO noted that it is required to assess rule change proposals to ensure that amendments are consistent with the Wholesale Market Objectives, that the Market Rules require that any amendments are subject to an open, transparent and comprehensive consultation process, and that the Market Rules require that the IMO have regard to the practicality and cost of implementing any rule change proposal as well as views expressed in any submissions on the proposed rule change. The IMO noted that a Rule Participant can apply to the Energy Review Board for a review of a decision by the IMO, although the application for review must be on the grounds that the IMO has not followed the process set out in the Market Rules.

The IMO also informed the Authority that any provisions in the Market Rules in regard to which the IMO would face a possible conflict of interest are identified as protected provisions. The IMO cannot amend protected provisions without approval by the Minister for Energy.

Authority's view

The Authority recognises that there may be benefits to having a body separate to the IMO responsible for rule change proposals. However, the Authority understands that one of the key considerations in making the IMO responsible for rule change proposals was the cost of creating an independent body to manage the process, particularly given the small size of the WEM.

An alternative to creating an independent body responsible for rule change proposals would be to give responsibility to some already existing body, such as the Office of Energy, System Management or the Authority. To the extent that both System Management and the Authority have roles under the Market Rules, there would also be some potential for conflict of interest to arise if one of them were to be responsible for rule change proposals. The Authority considers that there are also likely to be significant costs involved in developing appropriate skills and knowledge within one of these bodies. The IMO, as the organisation that monitors rule compliance, already has these skills and knowledge in place.

The Authority also notes that there are arrangements in place to minimise the potential for conflicts of interest to impact on rule change proposals, including the requirement that the IMO cannot amend protected provisions without approval by the Minister for Energy.

Given these considerations, the Authority considers that the IMO should remain responsible for rule change proposals at this stage. However, the Authority will continue to monitor the processing of rule change proposals in order to assess whether the potential for conflicts of interest to arise is likely to impact on the effectiveness of the market.

5.8.3 Steps to assist the understanding of the Market Rules

In its Discussion Paper, the Authority invited comment on any further steps that could be taken to assist Rule Participants in understanding the Market Rules.

In response, there was broad support for the continuation of the training sessions conducted by the IMO. Western Power commented that further training sessions similar to the pre-market training sessions that were held in 2006 would be useful. The CCI also commented that the IMO should develop training sessions targeting current and new Market Participants. Synergy commented that it sees a clear need for the continuation of the training sessions undertaken by the IMO, and recommended that the IMO is resourced to support this function on an ongoing basis.

Authority's view

The Authority notes that the IMO commented that since market commencement it has continued to provide a two day interactive training program that covers most operational aspects of the Market. The IMO noted that it intends to run this course on a regular three to six monthly basis, depending on interest from the market. The Authority considers that the continuation of the IMO's training program is an appropriate way to assist the understanding of the Market Rules.

5.9 The effectiveness of the IMO

In its Discussion Paper, the Authority invited comment on the effectiveness of the IMO in carrying out its functions.

In response, several stakeholders raised concerns in regard to the IMO's IT infrastructure and invoicing processes.

5.9.1 The IMO's IT infrastructure

In regard to the four STEM suspensions that occurred between market commencement and 31 July 2007, both Landfill Gas and the IMO commented that, considered in the context of the implementation of the market, these suspensions are not an indicator of poor performance.

In regard to the adequacy of the IMO's IT infrastructure, Verve Energy commented that the IMO's IT infrastructure needs to be upgraded. In particular, Verve Energy recommended that a test system that permits Rule Participant interaction is a key requirement that is currently lacking.

The IMO noted that its IT systems will evolve and be upgraded over time. The IMO established, in early 2007, the Market IT Strategy Group (previously known as the Change Management Working Group) providing a forum for all Market Participants to provide input on system changes. The Market IT Strategy Group convenes to discuss a broad variety of issues, including test systems, market software version releases, system availability and system security. All system changes are subject to a cost benefit analysis.

The IMO noted that, at this early stage of market evolution, changes will be focused on areas where there is support from the majority of Market Participants and there are clear efficiency gains and improvements to system effectiveness. Currently underway is a major IT project to improve the availability of the IMO's IT systems. The project involves separating market processes from settlement and metering processes, so that the processes run on separate databases rather than a single database. The project is expected to improve system availability considerably.

In regard to the usability of the IMO's IT Systems, Verve Energy commented that the IMO's IT Systems are in some cases difficult to use and cumbersome, but that a redesign may well prove time-consuming and costly. Landfill Gas commented that IMO's user manual is fit for purpose, and that the manual is supplemented by the availability of experienced IMO staff.

The IMO has informed the Authority that there are three processes by which Market Participants are able to interface with the IMO's systems, including a simple graphical interface, a file transfer process and an automated web-based file transfer process. Different options are likely to be relevant to different Market Participants.

The IMO noted that it has recently completed three two-day training programs, which focused on the design and use of the WEM systems, including system interfaces. The IMO commented that further training sessions will be provided on a regular basis. The IMO also noted that User Guides, including Interface User Guides, are available on the IMO web site and the IMO plans to enhance and regularly update these User Guides.

Authority's view

The Authority considers that there are currently processes in place to address the issues raised by stakeholders in regard to the IMO's IT infrastructure. In particular, the Authority considers that, in the absence of evidence that the IMO's IT infrastructure is impeding the achievement of the Wholesale Market Objectives, the Change Management Working Group is the appropriate forum in which to address issues with the IMO's IT infrastructure.

5.9.2 Invoicing

In regard to invoicing, stakeholders raised concerns about both the accuracy and the transparency of the IMO's invoicing processes.

Landfill Gas commented that transparency of invoicing remains an issue, even given the availability of IMO staff to assist. Alinta supported this view, and noted a lack of transparency in the data and calculations supporting invoices.

The IMO commented that the settlement process in the WEM is necessarily complex, but that the IMO makes available statements and reports that provide Market Participants with all of the input data, internal processing variables and output variables used in, and resulting from, the settlement calculations. The IMO commented that, together, the process followed and reports provided by the IMO result in a fully transparent process.

In regard to invoicing errors, Alinta commented that settlement information provided by the IMO is frequently incorrect, and that there can be significant changes between initial invoices and subsequent monthly adjustments. Verve Energy commented that there remain issues with invoicing errors, and recommended the consideration of further automation of the process and a review of the data items provided to Market Participants to facilitate invoice reconciliation.

The IMO noted that some genuine invoice errors (as opposed to misunderstandings of the Market Rules as they relate to settlement) have occurred. In some cases, this has been the result of incorrect configuration of the settlement system, or the settlement process not being correctly followed. The IMO commented, however, that these problems have been largely resolved. In other cases, this has been due to adjustments to input data or errors in input data.

The IMO noted that the settlement process relies on relatively complex and volatile input data and that adjustments due to changes to input data from Market Participants will continue, and are, to a large extent, outside the control of the IMO. Due to the interactive nature of the settlement process, changes to the invoice amounts of one Market Participant may cause changes to the invoice amounts of other Market Participants. The IMO noted that, in order to increase transparency, it has recently begun publishing regular Settlement Bulletins that provide information regarding factors that have lead to changes in invoice amounts.

Authority's view

The Authority considers that issues with IT systems and invoicing would be expected during the early stage of the market. The Authority notes that the IMO is endeavouring to address issues as they arise. The Authority will continue to monitor the effectiveness of the IMO's systems in future Minister's Reports.

5.9.3 Settlement system

In regard to the appropriateness of the Austraclear system for small Market Participants, the IMO noted that the Market Rules require that the IMO nominate an electronic funds transfer facility to be used by all Market Participants for the purpose of settlements.

The IMO noted that, prior to the start of the energy market, the IMO presented available options for the electronic funds transfer facility to the Transitional Market Advisory Committee, and that the Committee agreed to use Austraclear as it was considered the least expensive option and used widely across Australia.

Authority's view

The Authority considers that work has already been undertaken to identify the least expensive option for settlement, and that the Austraclear system was chosen on this basis. The Authority also considers that there are likely to be costs associated with a movement to a new settlement system, so that a change of systems at this stage would be unlikely to reduce costs.

5.9.4 Audit of the IMO's internal procedures and processes

The Market Rules require the IMO to appoint a market auditor to carry out an audit, at least annually, of the IMO's internal procedures and processes.

Clause 2.14.3 of the Market Rule sets out the requirements for the audit:

> The IMO must ensure that the Market Auditor carries out the audits of such matters as the IMO considers appropriate, which must include:
>
> (a) the compliance of the IMO's internal procedures and business processes with the Market Rules;
>
> (b) the IMO's compliance with the Market Rules and Market Procedures;
>
> (c) the IMO's market software systems and processes for software management.

Since the release of the Authority's Discussion Paper, the market auditor appointed by the IMO – PA Consulting – has completed its audit of the IMO's internal procedures and processes. PA Consulting has provided three audit reports to the IMO:

- Assessment of the IMO's internal procedures and business processes with the Market Rules, and the IMO's compliance with the Market Rules and Market Procedures;
- Test and certification of the Wholesale Electricity Market Software;
- Assessment of the IMO's processes for market software management.

Each of these reports has been published on the IMO's web site.

In conducting its audit of the IMO's compliance with the Market Rules, PA Consulting has, among other things, identified all obligations placed on the IMO by the Market Rules, mapped those obligations to the applicable Market Procedures and Internal Procedures, reviewed the procedures in place for compliance with the Market Rules, and sought evidence that the IMO is following those procedures so as to comply with the Market Rules. PA Consulting has also had discussions with IMO managers and staff to clarify issues.

Having completed this process, PA Consulting concluded that the IMO has complied with its obligations under the Market Rules, with only a small number of instances of non-compliance, none of which PA Consulting considered to be material.

In conducting its test and certification of the Wholesale Electricity Market Software, PA Consulting has tested each of the Reserve Capacity system, the Energy Market systems and the Settlement systems. PA Consulting concluded that each of these systems produced results consistent with the Market Rules under operating conditions that could reasonably be expected to occur over the life of the market. That is, each of the systems passed the testing undertaken by PA Consulting. PA Consulting did identify a couple of issues during the course of its testing, but these issues were satisfactorily addressed by the IMO and confirmed acceptable during re-testing.

In conducting its audit of the IMO's market software systems and processes for software management, PA Consulting has examined the procedures developed by the IMO for the management and control of its market software resources to determine whether these procedures comply with the Market Rules, and has examined evidence to support the appropriate use of those procedures. Having completed this process, PA Consulting concluded that the software management processes employed by the IMO comply with the requirements of the Market Rules. However, PA Consulting did identify two areas in which the IMO might improve its procedures to provide more robust software management.

5.10 The effectiveness of System Management

In its Discussion Paper, the Authority invited comment on the effectiveness of System Management in carrying out its functions.

In response, Synergy, Griffin Energy, Perth Energy and Landfill Gas each commented that they considered that System Management has been effective in carrying out its functions. Alinta commented that it was generally satisfied with the performance of System Management, but noted that a lack of transparency makes a complete assessment difficult.

Authority's view

No specific issues in regard to the performance of System Management were raised. In relation to Alinta's concern that it is unable to make a complete assessment of the effectiveness of System Management, the Authority notes, as discussed in Section 5.10.1, that an independent audit of System Management's compliance with the Market Rules has been undertaken, and the results made public.

5.10.1 Audit of System Management's internal procedures and processes

The Market Rules require the IMO to appoint a market auditor to carry out an audit, at least annually, of System Management's compliance with the Market Rules.

Clause 2.14.6 of the Market Rule sets out the IMO's obligations:

> In accordance with the Monitoring Protocol, the IMO must at least annually, and may more frequently where it reasonably considers that System Management may not be complying with the Market Rules and Market Procedures:
>
> (a) require System Management to demonstrate compliance with the Market Rules and Market Procedures by providing such records as are required to be kept under these Market Rules or any Market Procedure; or
>
> (b) subject System Management to an audit by the Market Auditor to verify compliance with the Market Rules and Market Procedures.

Since the release of the Authority's Discussion Paper, the market auditor appointed by the IMO – PA Consulting – has completed its assessment of the compliance of System Management with the Market Rules and Market Procedures. PA Consulting has provided an audit report to the IMO, which has been published on the IMO's web site.

In conducting its audit of System Management's compliance with the Market Rules, PA Consulting has, among other things, identified all obligations placed on System Management by the Market Rules, mapped those obligations to the applicable Market

Procedures and Internal Procedures, reviewed the procedures in place for compliance with the Market Rules, and sought evidence that System Management is following those procedures so as to comply with the Market Rules. PA Consulting has also had discussions with System Management managers and staff to clarify issues.

Having completed this process, PA Consulting concluded that System Management has generally complied with its obligations under the Market Rules.

However, PA Consulting has identified a number of instances of non-compliance. All but one of these instances of non-compliance were considered by PA Consulting to be not material. One instance of non-compliance was considered to be material: the failure of System Management to provide to the IMO as soon as practical the results of any short-term PASA study undertaken in response to changes that have occurred that would materially affect market outcomes. However, in relation to this instance of material non-compliance, PA Consulting report that System Management have advised that they now report material changes in the PASA to the IMO, and that System Management will prepare an Internal Procedure to provide guidance to staff.

The Authority notes that System Management is planning to submit to the IMO two Pre Market Rule Change Discussion Papers dealing with the short-term and medium-term PASAs.

The first deals with System Management's reporting for the short-term PASA. Currently, Clause 3.17.9(h) of the Market Rules requires that System Management include in the short-term PASA "potential fuel supply, transport or storage limitations that could affect generation capacity of which System Management is aware." System Management considers that it cannot adequately comply with this requirement because fuel supply limitations will not necessarily affect particular generation facilities, nor have a readily determined effect on the system margin. For this reason, System Management proposes a rule change that removes Clause 3.17.9(h) from the Market Rules. System Management considers that this would remove a source of non-compliance for System Management. However, it is understood that System Management will continue to provide information regarding fuel restrictions through alternative means such as dispatch advisories in order to avoid any reduction of information that is available to the market.

The second deals with the provision of information by Market Participants to System Management for the purposes of the short-term and medium-term PASAs. Clauses 3.16.4 and 3.17.5 detail information that must be provided to System Management. System Management notes that it does not currently rely on this information to complete the PASA process. Therefore, System Management proposes a rule change that enables it to direct Market Participants that certain information that they are currently required to provide under the Market Rules is not required until further notice. System Management considers that this would remove obligations that are currently unnecessary for the operation of the PASA process.

5.11 The effectiveness of compliance monitoring and enforcement measures

The Market Rules require that the Minister’s Report include a review of the effectiveness of the compliance monitoring and enforcement measures in the Market Rules and Regulations. Compliance monitoring and enforcement is principally the responsibility of the IMO and System Management.

The IMO has informed the Authority that it continues to develop its approach to undertaking its compliance monitoring and enforcement obligations. During the period from market commencement to 31 July 2007, the IMO fulfilled its compliance monitoring role through analysis of the data items included in the MSDC, as well as additional data from participants, and through discussions with participants.

During the early months of the market there were some outcomes that the IMO identified as anomalous as well as several alleged breaches of the Market Rules. Some of these instances related to breaches by the IMO and System Management of their obligations. These breaches were detected and reported through internal processes. The IMO informed the Authority that it considers that none of these breaches were material, and the majority were rectified as soon as they were detected. The IMO also informed the Authority that an independent audit is currently being conducted of both the IMO's and System Management's compliance with the Market Rules.

There have also been instances of alleged breaches by Market Participants. The IMO informed the Authority that in some cases it was confirmed that a breach had in fact occurred, but in each case of an actual breach there were mitigating circumstances that the IMO considered to provide sufficient explanation, and the affected participants committed to measures to rectify the breach and reduce or remove the probability of recurrence. While warnings have been issued by the IMO in some of these circumstances, no penalties have been triggered under the Market Rules.

The IMO has informed the Authority that it is also in the process of developing a more formal approach to undertaking its market surveillance obligations. The IMO has developed an internal procedure in regard to its market surveillance obligations, which sets out a process for detecting anomalous behaviour by Market Participants, including a schedule for the assessment of market data, and the follow-up actions to be taken by the IMO in the event that anomalous behaviour is identified. It is important to note, however, that the monitoring tools used by the IMO will continue to develop. The IMO has informed the Authority that it has undertaken extensive work on developing these monitoring tools, but further experience of the operation of the market is required before they can be put in place. In particular, the IMO informed the Authority that at this early stage of the market, and given the fuel constraints that occurred during the first few months of the market, there is insufficient experience with the stable operation of the market to finalise its monitoring tools.

System Management has informed the Authority that it has developed an internal procedure outlining its compliance monitoring obligations, and its processes for meeting those obligations. System Management noted that most of its compliance monitoring and enforcement obligations are clear cut, and are capable of being readily addressed and monitored through observation during specific events.

In addition, System Management particularly focuses on its monitoring obligations in regard to correct declaration of forced outages, compliance with resource plan and dispatch instructions by non-Verve Energy Market Generators, and compliance with dispatch orders and ancillary services requirements by Verve Energy. In regard to these obligations, System Management is creating automated systems capable of identifying breaches that are not otherwise readily apparent. As with the IMO's monitoring tools, System Management's tools will have to be developed over time.

Authority's view

The Authority notes that both the IMO and System Management have developed, and continue to develop, systems and processes to fulfil their compliance monitoring and

enforcement obligations. At this early stage of the market, particularly in the absence of any civil penalties being triggered, it is difficult to assess the effectiveness of these systems and processes. The Authority expects to report on this issue more fully in future Minister's Reports.

6 Specific events, behaviour or matters

Clause 2.16.12 of the Market Rules requires that the Minister's Report contain the Authority's assessment of any specific events, behaviour or matters that impacted on the effectiveness of the market.

This section sets out the Authority's assessment of specific events, behaviour or matters that impacted on the effectiveness of the market, including an outline of stakeholders' comments in response to the Authority's Discussion Paper. This section also sets out the Authority's views regarding these specific events, behaviour and matters.

6.1 The vesting contract

In response to the Authority's Discussion Paper, stakeholders commented on the impact of the vesting contract between Verve Energy and Synergy.

Verve Energy noted that the existence of the vesting contract mitigates against any market power Verve Energy or Synergy may have. Verve Energy also commented that the existence of the vesting contract, or any other contractual arrangement, should not provide any reason to contemplate changes to the Market Rules. Verve Energy supported the view that negotiated displacement of the vesting contract is unlikely in the current market environment. Verve Energy commented that this is a result of uncommercial regulated retail tariffs fixed by government and a netback arrangement that assigns all market risk to Verve Energy, which provides Synergy with an incentive to delay displacement while retail tariffs are low.

Synergy commented that increased gas prices in Western Australia may expose retailers to higher wholesale electricity costs. Given this, Synergy commented that there is a clear need to retain the existing vesting arrangements to ensure that Synergy remains protected from the market power of generators until competitive gas or a new coalfield is developed.

The Office of Energy reiterated that the vesting arrangements are a transitional mechanism implemented to support the development of the market. The Office of Energy noted that the vesting contract is a bilateral contract, similar to other bilateral wholesale electricity supply contracts traded through the WEM in terms of the impact on market liquidity. As a result, the Office of Energy noted that the absence of the vesting contract may have little impact on the liquidity of the WEM.

Landfill Gas commented that its understanding is that the vesting contract results in Verve Energy having very little involvement in the capacity market, despite being the largest Market Generator. Landfill Gas noted that this impedes Landfill Gas' ability to bilaterally contract for capacity to cover its capacity credit shortfall, with the result that Landfill Gas is exposed to the reserve capacity price.

Perth Energy and the esaa noted that the vesting contract inhibits the scope for cost reflective price signals. The esaa noted that the result is the vesting contract impairs the efficient operation of the market and the realisation of the Wholesale Market Objectives, and considered that the vesting contract should be removed as soon as practical. However, the esaa also noted that issues associated with the vesting contract are outside the scope of the Authority's review. Perth Energy recommended that the vesting contract be phased out more quickly, applying to no more than one-third of Synergy's sales by September 2009.

Perth Energy also commented that the ability that Synergy has under the vesting contract to bring forward or delay displacement of the vesting contract by one year makes it difficult for other retailers to have any certainty as to when capacity will be displaced from the vesting contract.

Authority's view

The Authority recognises that the Vesting Contract places a restriction on the amount of capacity and energy that Verve Energy is able to offer to the broader market, as it requires Verve Energy to supply Synergy with its capacity and energy requirements for its tariff customers and inherited contract customers. This restriction also plays an important role in supporting market development, as it restricts the exercise of market power by Verve Energy while competition develops in the generation sector.

The Authority notes that the Vesting Contract is a transitional mechanism that is designed to roll-off over time, as the market develops. Given that the Vesting Contract is an important mechanism to support market development, the Authority's view is that it would be inappropriate to consider a change in these arrangements at this early stage of the market. It is noted that only the Minister for Energy has authority to change the Vesting Contract.

The Authority also recognises that, in a market with government regulated retail tariffs that are currently below cost-reflective levels, the netback pricing arrangement in the Vesting Contract exposes Verve Energy to the risk that it will not earn sufficient revenue to cover its costs for the portion of its sales under the Vesting Contract. The Authority considers that this issue is best addressed through changes to the regulated retail tariffs, and notes that the Office of Energy is currently considering this as part of the Electricity Retail Market Review, as discussed in Section 6.2 below.

Nevertheless, the Authority's view is that the risks to which Verve Energy is exposed as a result of the netback arrangement may have implications for the operation of the WEM. The Authority will continue to report on this issue in future Minister's reports or as otherwise appropriate.

6.2 Retail tariffs

In response to the Authority's Discussion Paper, stakeholders commented on the impact of regulated retail tariffs on the market.

Synergy commented that one of the key structural issues associated with the WEM is inadequate retail tariffs.

Verve Energy noted that, where regulated retail tariffs impact on the effectiveness of the market, this should be addressed by the Authority.

The esaa commented that retail price regulation inhibits the scope for cost reflective price signals to contribute to the efficient operation of the market and should be removed as soon as practical. However, the esaa also noted that issues associated with retail tariffs are outside the scope of the Authority's review.

Perth Energy commented that capped retail tariffs in the presence of rising wholesale costs can lead to a California style market meltdown, and that retail tariffs should rise to reflect true costs.

Authority's view

As noted in the Authority's Discussion Paper, the Office of Energy is currently undertaking an Electricity Industry Review, the terms of reference of which include the consideration of the cost-reflectivity of regulated retail tariffs in the SWIS. The Authority considers that the Office of Energy's review is the appropriate process in which to address the cost-reflectivity of regulated retail tariffs. The Authority will continue to monitor the impact of regulated retail tariffs on the effectiveness of the market in light of the Office of Energy's findings.

6.3 Fuel supply problems

In its Discussion Paper, the Authority invited comment on any fuel supply constraints faced by Market Participants, and the impact that any such constraints have on the effectiveness of the market. In particular, the Authority invited comment on what impact, if any, fuel supply problems have on the operation of markets for capacity and energy. The Authority is aware that constraints on either the availability of fuel itself, or with the availability of capacity to transport fuel, can impact on the operation of generation facilities.

The esaa noted that difficultly in securing short-term contracts for gas supply can impact on electricity supply reliability, but contends that the market is best placed to determine the most appropriate generation fuel mix in light of available fuel resources, prices and opportunity costs.

System Management noted that fuel constraints can dramatically affect the security of the market. System Management commented that, while resolution of these constraints is a matter outside the scope of the market, the operation of the WEM does send investment signals, and these signals can mitigate the risk of fuel constraints by leading to investment in generation capacity utilising a mix of fuels.

The Office of Energy noted that it agreed that the investigation of the gas supply issues is beyond the scope of the Minister's Report. Griffin Energy commented that fuel supply issues are not attributable to the WEM.

Premier Coal commented that market pricing signals for fuel, and competition between gas and coal as a fuel source, will ensure the most competitive long-run fuel availability and fuel costs for Market Participants. Premier Coal commented that government intervention in fuel markets is not warranted.

Perth Energy commented that recent increases in gas prices has significant implications for the operation of the market, including limiting gas-fired generation to peaking plants in future. Perth Energy considered that the gas reservation policy is essential, and recommended the development of a pool for trading gas transmission capacity.

Alinta noted that several Market Participants have operational obligations to both the WEM and the Dampier to Bunbury Natural Gas Pipeline (**DBNGP**). Alinta commented that there is currently little alignment between these obligations so that, for instance, Market Generators are required to bid in the STEM after making an assumption as to fuel availability, and are then unable to re-bid in the event that a fuel constraint arises. Alinta noted that a closer alignment in these operational obligations would be welcomed.

Authority's view

In regard to the timing of the STEM, and its relationship with DBNGP operational obligations, the Authority notes that stakeholders were generally not supportive of a change to the timing of the STEM bidding at this stage. The Authority also considers that there are likely to be significant costs associated with changing the timing of the STEM, or introducing two gate closures. Given the absence of widespread support for a change at this stage, the Authority reiterates its intention to continue to assess the extent to which the current STEM arrangement supports the Wholesale Market Objectives in future Minister's Reports.

The Authority recognises that fuel constraints have the potential to impact on the operation of the WEM. In particular, the Authority notes that periods of fuel constraints have typically coincided with high STEM prices. While this may simply reflect the higher costs of generation using liquid fuel, there is also the possibility that actual or expected fuel constraints, and particularly constraints in the capacity of gas pipelines, are leading Market Participants to submit STEM offers that do not reflect SRMC. As discussed, the Authority is currently working on a SRMC paper and, together with the IMO, a SRMC model. Once finalised the results of the paper and the model will assist understanding of bidding behaviour by Market Participants. The Authority also notes that the IMO continues to develop its analysis of variations in STEM bids and STEM offers. As this work progresses, the Authority will continue to monitor bidding behaviour by Market Participants, particularly bidding behaviour during periods of fuel constraints, and will investigate any inappropriate or anomalous behaviour in accordance with its obligations.

More generally, and as noted in its Discussion Paper, the Authority considers that an effective WEM should enable Market Participants to better manage any fuel supply problems that they face. Noting the comments of System Management and Premier Coal, the Authority considers that a key requirement in order for Market Participants to effectively manage any fuel supply problems is that the operation of the market provides efficient investment signals to Market Participants. At this stage, the Authority is unaware of any evidence that the design or operation of the WEM prevents Market Participants from responding to investment signals provided by either the price and availability of fuel or the price and availability of fuel transport.

6.4 Consequential outages

In its Discussion Paper, the Authority invited comment on the materiality of the financial impact of consequential outages, and the extent to which Market Participants are able to manage their exposure to consequential outages.

In response, Western Power noted that Market Participants seeking connection to the network usually request minimal connections with no redundancy, such as a single radial line to their operation. In these circumstances, Western Power considers it unreasonable for customers to expect Western Power to bear liability for consequential outages. Western Power noted the Market Rules are silent on compensation related to consequential outages, and considers that it may be appropriate to investigate a compensation mechanism.

Verve Energy commented that the Market Rules currently allow a consequential outage to be approved only if the event was unplanned; this excludes planned network outages that force generating capacity from the system when the generating plant is available to generate. Verve Energy noted that in the case of planned network outages that force generating capacity from the system, Western Power ordinarily requests that affected

generators submit a request for planned outages. Verve Energy considers this arrangement is not appropriate, and recommends that it be subject to review. Verve Energy notes that System Management has previously indicated that it intends to make a rule change proposal on this matter.

Authority's view

As discussed in the Authority's Discussion Paper, the Authority considers Market Participants have some ability to manage their exposure to consequential outages through their contracts for network access. The Authority notes Western Power's comment that Market Participants seeking connection to the network usually request minimal connections with no redundancy. The Authority considers that there is a lack of evidence that the treatment of consequential outages is impacting on the effectiveness of the market.

Issues relating to planned network outages are discussed in Section 6.5.

6.5 Planning network outages

In its Discussion Paper, the Authority invited comment on whether the process for scheduling network outages affects the achievement of the Wholesale Market Objectives.

Alinta commented that scheduling network outages could be improved by aligning network outages with generation outages, by timing network outages to occur during non-peak periods, and by advising generators if a planned network outage has the potential to trip a generator.

System Management noted that coordination of network outages is an extremely difficult matter. System Management is currently redesigning its outage management system to improve the planning and coordination of network outages.

Authority's view

The Authority considers that, in principle, the operation of the market can be improved by timing network outages so that the network is available during those times when users of the network value it most. There is reason to expect that this would be during peak periods. However, it is important that a balance is achieved between scheduling outages so that the network is available when it is valued most and providing predictability of network outages, so that Market Participants are able to incorporate network outages into their plans.

The Authority recognises that the scheduling of network outages is a difficult issue, and one that is faced in other markets. In the National Electricity Market (**NEM**), following a review undertaken by the Australian Energy Market Commission (**AEMC**), Chapter 6A of the National Electricity Rules requires the Australian Energy Regulator (**AER**) to develop and publish an incentive scheme that, among other things, provides incentives to each transmission network service provider to provide greater reliability of the transmission system at times when users of the system place greater value on its reliability. The AER is currently developing an incentive scheme for transmission network service providers aimed at reducing the market impact of outage constraints.

The Authority considers that developing appropriate arrangements for planning network outages is likely to be an on-going process. The Authority's view is that it considers that its considerations on this issue should be informed by the results of the AER's process.

The Authority will continue to monitor the development of network planning arrangements in the NEM, and investigate the appropriateness of these arrangements for the WEM. The Authority expects to report further on this issue in future Minister's Reports.

6.6 Confidentiality issues

In its Discussion Paper, the Authority invited comment on whether the confidentiality of information has impacted on the effectiveness of the market.

Western Power noted that it is required to keep certain details of network access applications and contracts confidential, but considers that sharing some of this information with the IMO would benefit the market.

Authority's view

The Authority considers that this issue is better addressed through the rule change process.

6.7 Ancillary services

In its Discussion Paper, the Authority invited comment on whether a more competitive process for the supply of ancillary services would promote the effectiveness of the market, and whether the current requirements under the Market Rules prevent or deter participants from supplying ancillary services.

In response, some stakeholders supported the promotion of competitive supply arrangements for ancillary services. The Office of Energy commented that the promotion of competitive supply arrangements for the provision of ancillary services should be given further consideration. Alinta commented that the provision of ancillary services could now be opened to a competitive process.

As discussed in Section 4.17, a competitive tendering process for ancillary services is expected to begin for the 2008/09 financial year. The process to be followed is set out in *PSOP: Ancillary Services*[13]. However, System Management commented that, given the size of the SWIS and the infancy of the market, it would not be prudent or beneficial to the market for System Management to enter into an ancillary service contract with a Market Participant other than Verve Energy at this stage.

Authority's view

The Authority notes that *PSOP: Ancillary Services* sets out a process that System Management is required to follow in entering into ancillary services contracts. The Authority also notes that *PSOP: Ancillary Services* has a provision which exempts System Management from complying with the PSOP process, during the transitionary arrangement period in the first year of WEM operation, to introduce a competitive ancillary services procurement process. Subject to a consultation with the IMO, the transitionary arrangement may be extended by System Management.

The first stage in the PSOP process is the issuing of a request for expressions of interest for the supply of ancillary services by 1 March each year. System Management is to determine from the responses to the request for expressions of interest whether there is

[13] http://www.imowa.com.au/Attachments/SMProcedures/PSOP%20-%20Ancillary%20Services.pdf.

sufficient interest to proceed with a competitive tender. The Authority understands that System Management is currently in the process of developing standards for the delivery of ancillary services, which will be used to assess the expressions of interest and competitive tenders.

System Management has informed the Authority that it has concerns about meeting the timeframes set out in *PSOP: Ancillary Services* given the work still to be undertaken in developing these standards. In addition, System Management has informed the Authority that a competitive ancillary services procurement process in the WEM may not be necessary at this stage given that ancillary service arrangements are already in place. Accordingly, System Management may seek to extend the transitionary arrangement period.

The Authority, in consultation with the IMO, will consider whether the extension of the transitionary period, if sought by System Management, is warranted.

In addition, if an extension of the transitionary period is not warranted, the Authority considers that the issuing of a request for expression of interest, by 1 March 2008, is an appropriate way to gauge the potential for implementing more competitive arrangements for the supply of ancillary services. The Authority will monitor the process outlined in *PSOP: Ancillary Services* as it develops, including System Management's progress in developing standards for the delivery of ancillary services, and expects to report on this more fully in future Minister's Reports.

6.8 Demand-side management

In its Discussion Paper, the Authority invited comment on any aspects of the participation of DSM in the market that remain unclear to Rule Participants.

In response, stakeholders raised a range of issues in regard to DSM.

Several stakeholders commented that there are barriers to the participation of DSM. Alinta commented that there is a lack of clarity in regard to the provision of DSM, in particular in relation to notice periods and the continuous hours of availability that are required of DSM. System Management commented that it believed that DSM has not been fully understood or explored by Market Participants, and that an examination of the use and obligations of DSM in the market would be warranted.

The CCI commented that there is considerable unexplored potential for DSM in the market. In particular, the CCI noted that, in its view, non-Market Participants are unaware of the opportunities that exist to engage in DSM in the market. The CCI recommended better education of potential Market Participants as to the role of DSM, and that market reforms should encourage greater participation of DSM. Griffin Energy also commented that customers have understood little about DSM and that this has a large impact on the effectiveness of DSM.

Landfill Gas commented that the participation of DSM is impeded by a combination of long lead-times and the requirement for a high educational commitment for participants. In particular, Landfill Gas noted that the majority of prospective DSM participants are relatively small and unsophisticated users who need to have the obligations and benefits explained to them and need to see financial outcomes relatively quickly.

Synergy raised several issues in regard to DSM. First, Synergy noted that the Market Rules require the IMO, when assigning the quantity of certified reserve capacity to a

facility, have regard to the total amount of capacity available over the period December to July. Synergy commented that DSM is often only available from December to March, which can restrict the participation of DSM. Second, Synergy noted that there is a significant risk that customers will churn over the period of the reserve capacity cycle. Synergy commented that since the Market Rules do not allow customers to hold multiple contracts for the provision of energy and/or capacity, if customers do churn, retailers will need to contract for new DSM capacity from alternative sources in order to meet capacity commitments. In light of these issues Synergy recommended a review of DSM to be conducted by the IMO.

Authority's view

The Authority notes that DSM can play an important role in promoting the Wholesale Market Objectives.

The most common concern raised by Market Participants in regard to DSM is the difficulty of involving end-consumers in the process in an effective way. The Authority recognises that this is a difficult issue, and one that is significantly impacted by arrangements for retail supply and, in particular, the structure of retail tariffs. The Authority notes that retail tariffs for small customers in Western Australia remain regulated, while large customers are able to negotiate competitive supply arrangements. The Authority considers that, as a result, there is greater scope to involve larger customers in providing DSM. The Authority will continue to investigate whether there are constraints to the involvement of large customers in providing DSM, including constraints due to lack of information or due to the operation of the reserve capacity mechanism.

6.9 Network control services

Western Power commented that there is some ambiguity in Section 5 of the Market Rules in respect to the network control service procurement process.

Authority's view

The Authority considers that these issues are better addressed through the rule change process.

6.10 Wind energy

Verve Energy and Premier Coal commented that the treatment of wind energy in the Market Rules can lead to inefficient generation.

Verve Energy commented that the reserve capacity mechanism discriminates in favour of wind energy by assigning capacity credits on the basis of average energy output rather than its contribution to peak demand. Premier Coal noted that the Market Rules require that wind energy be dispatched when available. Premier Coal commented that this can impact on the efficient operation of Verve Energy's base load coal plants, especially over night, when Verve Energy is required to shut down base load plant in response to variations in the load available from wind energy.

Authority's view

The Authority recognises that the participation of wind energy in the market can create issues for both the network and for other generators. In particular, as long as Verve

Energy is primarily responsible for the provision of balancing services, Verve Energy's facilities will be required to respond to changes in the dispatch of energy from windfarms.

To the extent that the concerns of Verve Energy and Premier Coal relate to the impact on Verve Energy of the dispatch of windfarms, the Authority considers that a movement to more competitive balancing arrangements as the market develops over time are likely to mitigate these concerns.

To the extent that the concerns of Verve Energy and Premier Coal relate to the impact on the market as a whole, the Authority notes that these are difficult market design issues. The current arrangements for the treatment of wind energy are the result of consideration given to this issue during the market reform and implementation process. At this early stage of the market, the Authority's view is that it would be inappropriate to consider a change to the treatment of wind energy. In particular, at this early stage of the market, the Authority considers that there is insufficient evidence on the impact of the treatment of wind energy on the network and on the provision of balancing services. The Authority will continue to monitor the impact that the dispatch of wind energy has on the effectiveness of the market, and the extent to which the current arrangements contribute to the Wholesale Market Objectives.

6.11 Other issues

In addition to the issues discussed in Section 5 and Section 6 of this Minister's Report, stakeholders raised some other issues in their responses to the Authority's Discussion Paper. In assessing the effectiveness of the WEM, the IMO and System Management, the Authority has given consideration to all matters raised in stakeholders' responses to the Discussion Paper.

APPENDICES

Appendix 1: Abbreviations

AER	Australian Energy Regulator
AEMC	Australian Energy Market Commission
CCGT	Combined cycle gas turbine
CCI	Chamber of Commerce and Industry Western Australia
CPI	Consumer price index
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DDAP	Downwards deviation administrative price
DSM	Demand-side management
ERISC	Electricity Reform Implementation Steering Committee
ERTF	Electricity Reform Task Force
esaa	Energy Supply Association of Australia
IMO	Independent Market Operator
MAC	Market Advisory Committee
MCAP	Marginal cost administrative price
MRDG	Markets Rules Development Group
MSDC	Market Surveillance Data Catalogue
MW	megawatt
MWh	megawatt hour
NIEIR	National Institute of Economic and Industry Research
NEM	National Electricity Market
OCGT	Open cycle gas turbine
PSOP	Power System Operation Procedure
SOO	Statement of Opportunities Report
SRMC	Short run marginal cost
STEM	Short term energy market
SWIS	South West Interconnected System
UDAP	Upwards deviation administrative price
WEM	Wholesale Electricity Market

Appendix 2: Submissions received

Alinta Sales Pty Ltd

Chamber of Commerce and Industry Western Australia

Energy Supply Association of Australia

Griffin Energy

Independent Market Operator (two submissions)

Landfill Gas and Power Pty Ltd

Office of Energy

Perth Energy

Synergy

Verve Energy

Wesfarmers Premier Coal Ltd

Western Power (including separate comments from System Management)

Appendix 3: MSDC summary

STEM price duration curves and MCAP duration curves

Figure 25: Price duration curves during off-peak periods (21 September 2006 to 31 July 2007)

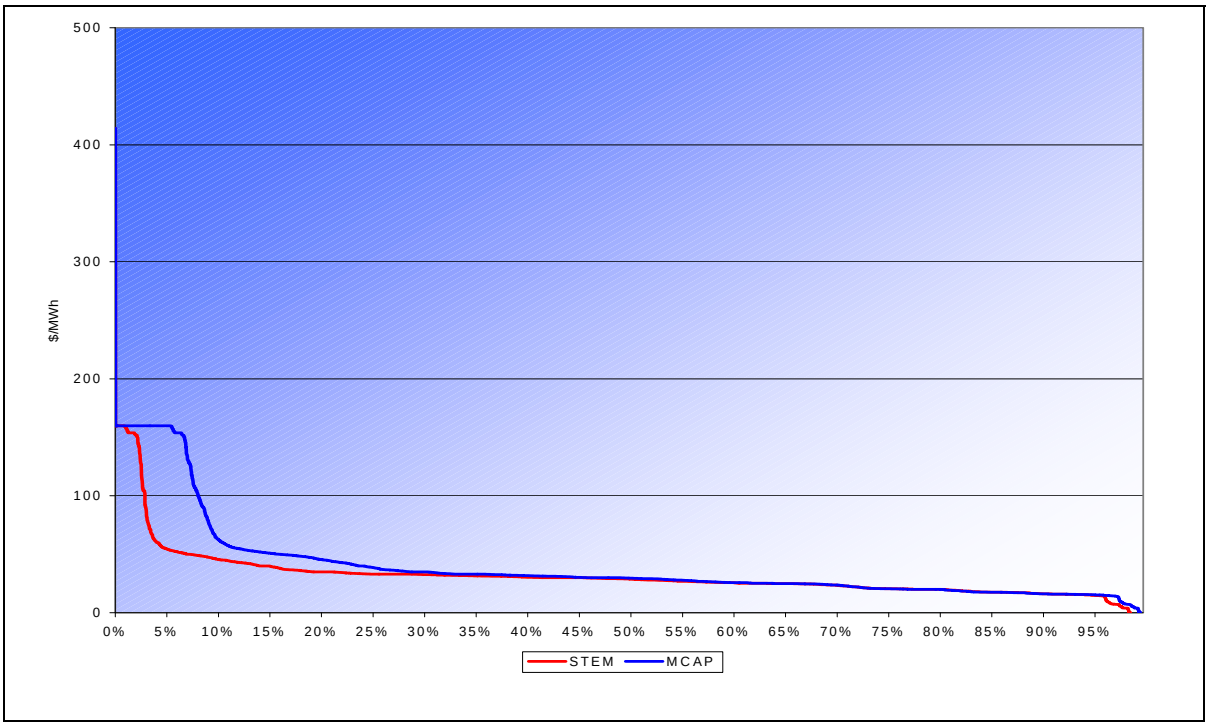
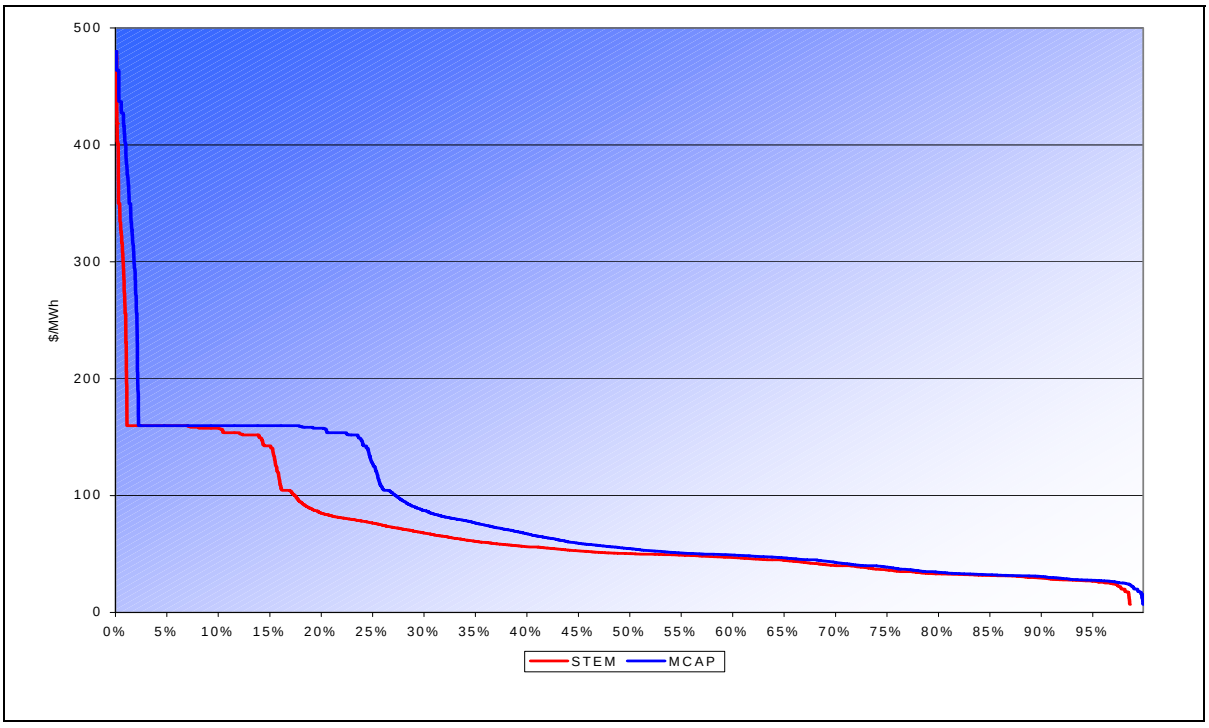
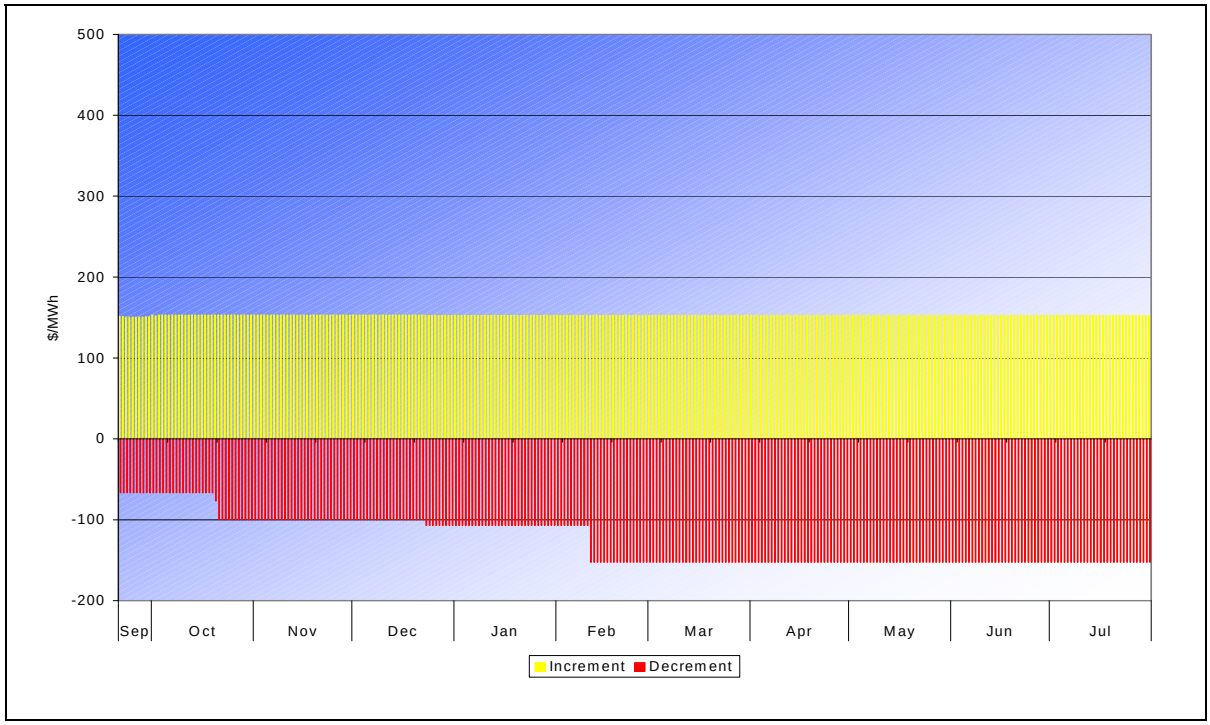


Figure 26: Price duration curves during peak periods (21 September 2006 to 31 July 2007)



Standing data prices used in balancing

Figure 27: Average daily standing data balancing prices for non-liquid facilities[14]



[14] Average daily standing data balancing prices during peak and off-peak intervals are equal, or less than $0.50/MWh different, for both increment and decrement. Since the magnitude of any difference is so small, a single series has been presented, representing prices during peak and off-peak trading intervals.

Figure 28: Average daily standing data balancing prices for liquid facilities[15]

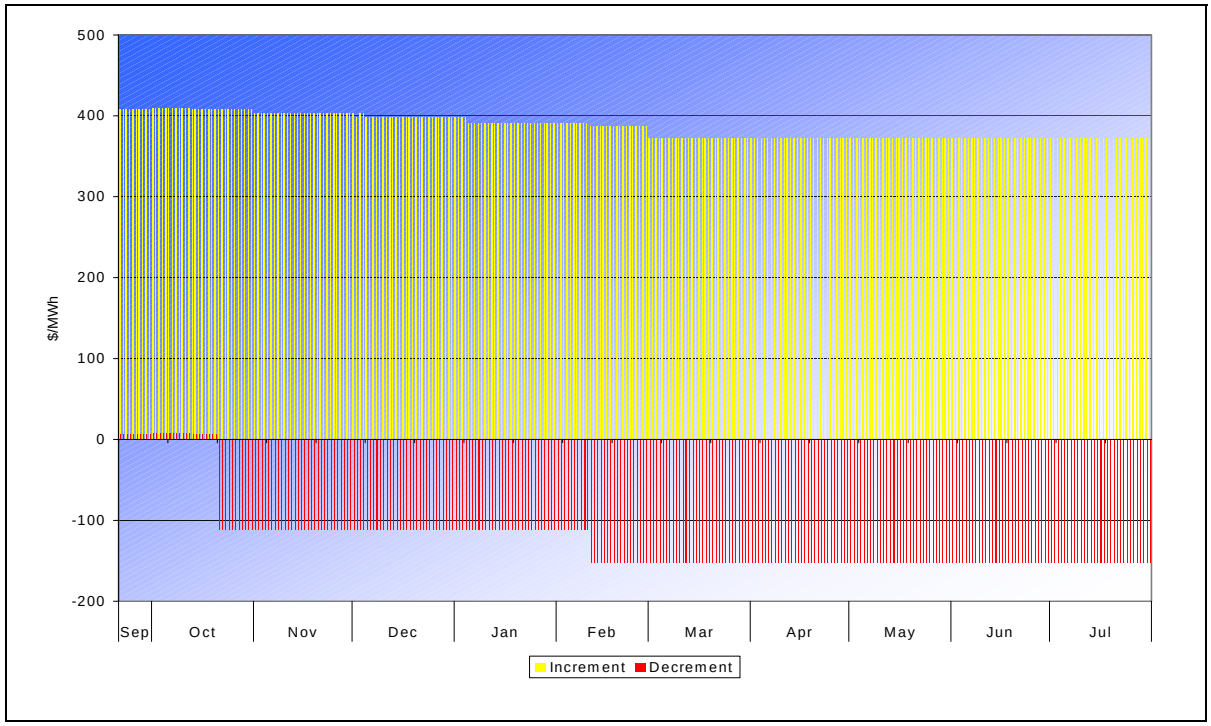
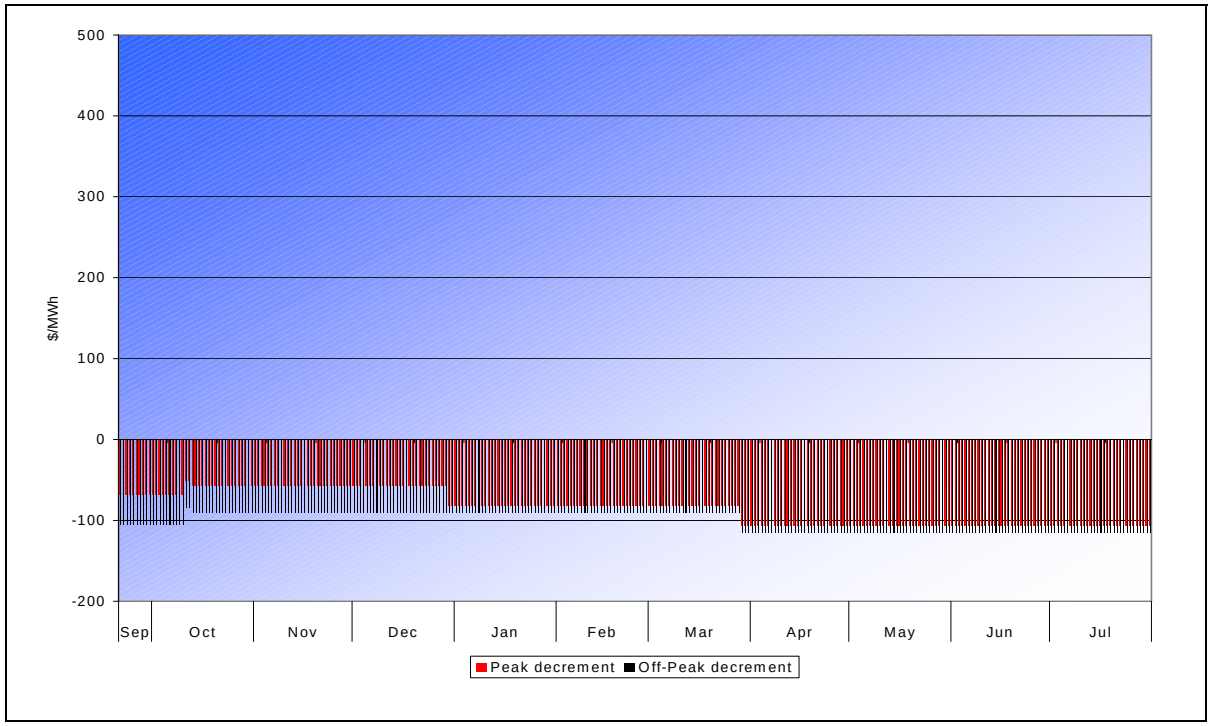
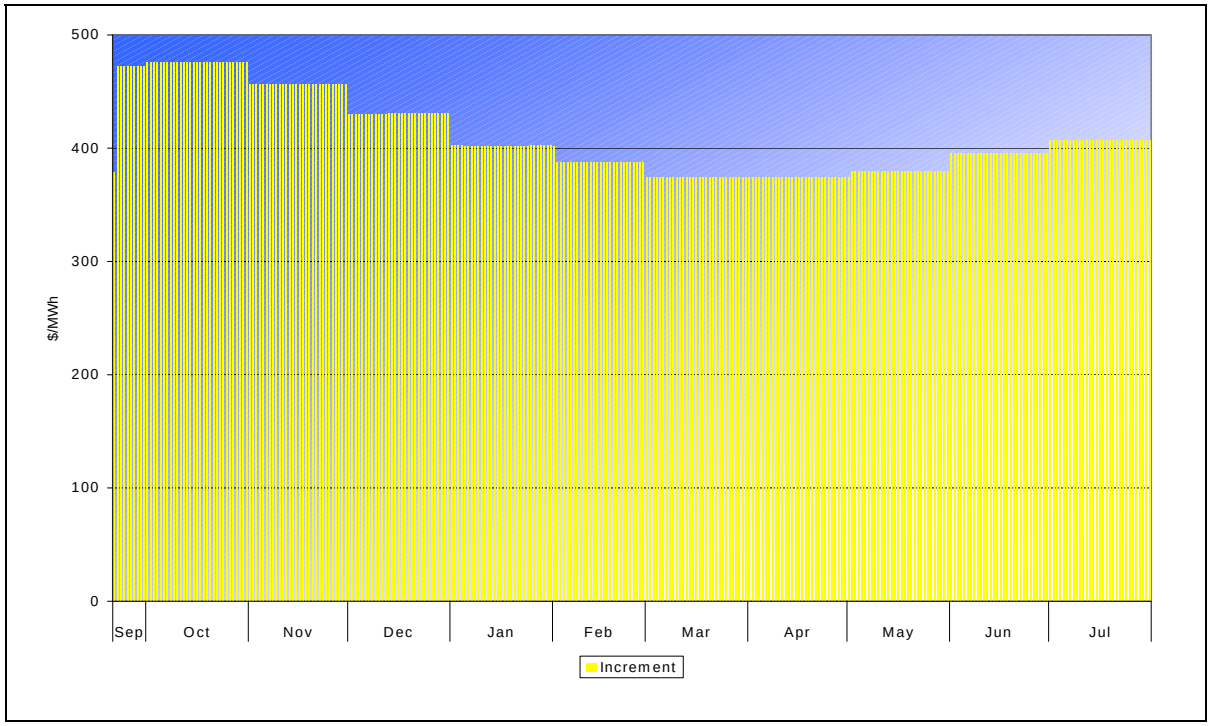


Figure 29: Average daily standing data balancing prices for intermittent generation



[15] Average daily standing data balancing prices during peak and off-peak intervals are equal for both increment and decrement. Since there is no difference, a single series has been presented to represent prices during peak and off-peak trading intervals.

Figure 30: Average daily standing data balancing prices for curtailable load [16] [17]



[16] Average daily standing data balancing prices during peak and off-peak intervals are equal for both increment and decrement. Since there is no difference, a single series has been presented to represent prices during peak and off-peak trading intervals.

[17] In this Figure, for consistency with the other Figures relating to standing data balancing prices, a reduction in curtailable load is represented as an 'increment' of energy.

Volatility of balancing prices

Figure 31: Summary statistics for MCAPs during off-peak trading intervals, by month

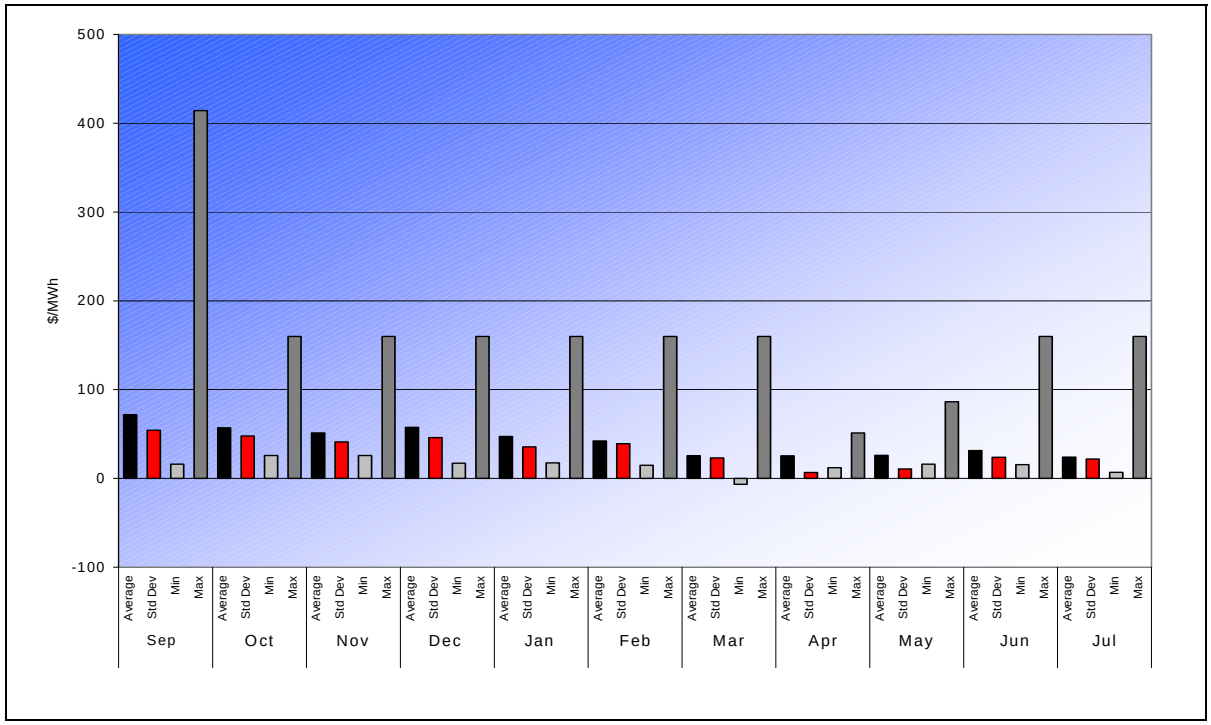


Figure 32: Summary statistics for MCAPs during peak trading intervals, by month

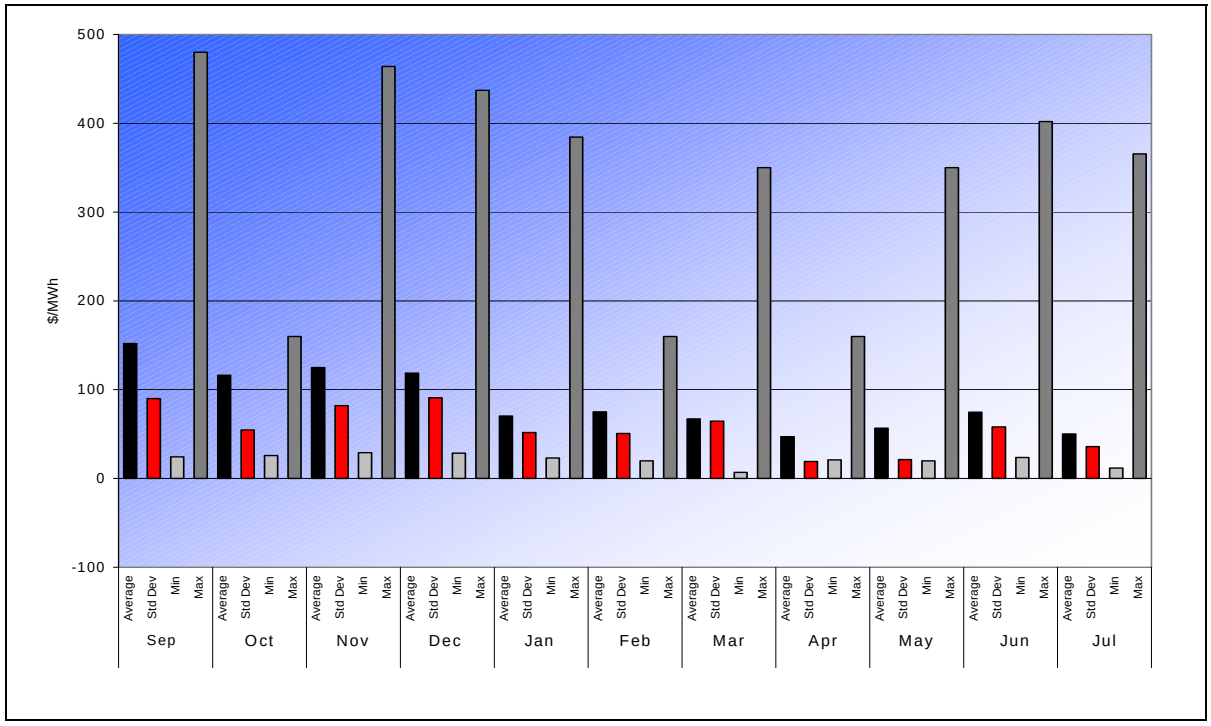


Figure 33: Summary statistics for DDAPs during off-peak trading intervals, by month

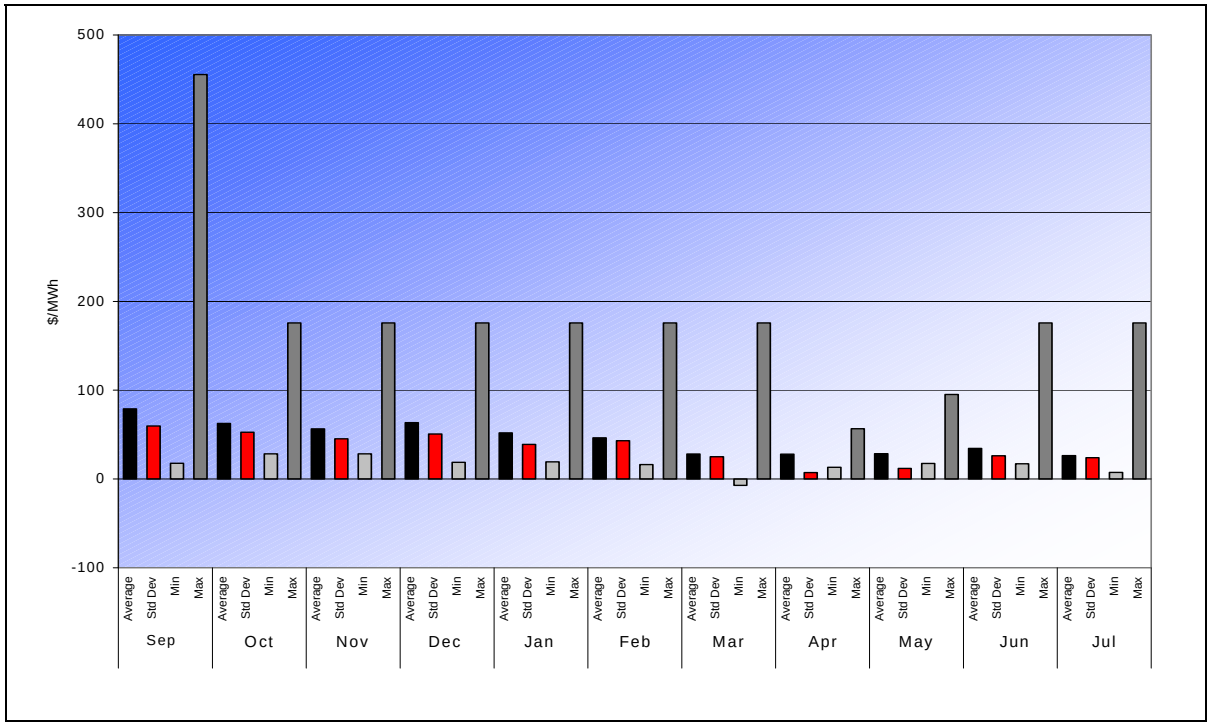


Figure 34: Summary statistics for DDAPs during peak trading intervals, by month

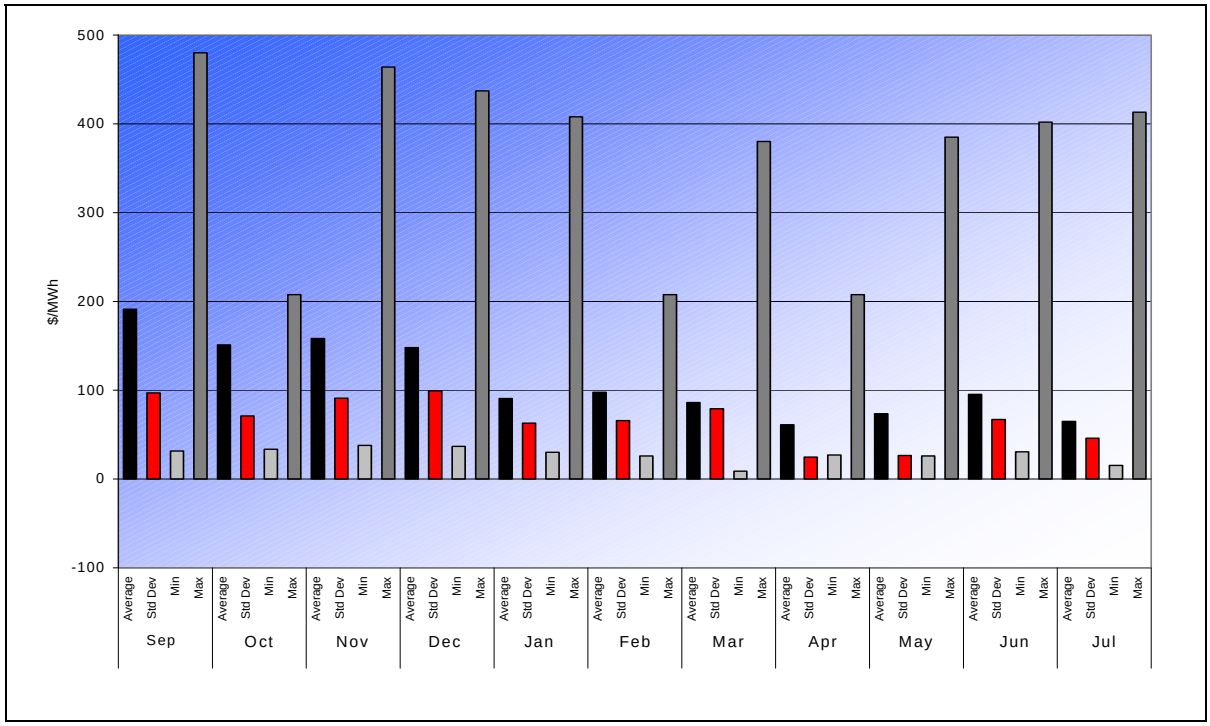
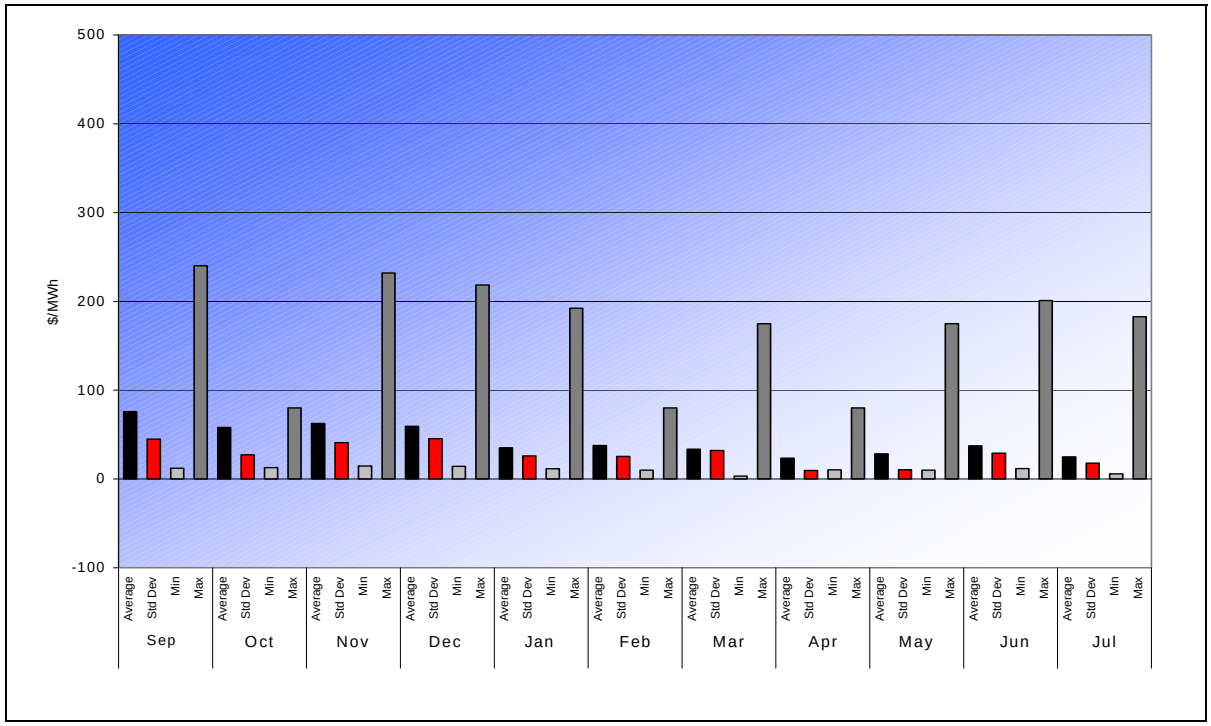


Figure 35: Summary statistics for UDAPs during peak trading intervals, by month[18]



[18] No summary statistics for UDAPs during off-peak trading intervals are presented because the Market Rules specify that UDAP is equal to zero during off-peak trading intervals.

STEM offers and STEM bids

STEM offers

Figure 36: Alcoa's daily average STEM offers (cumulative MWh per trading interval)

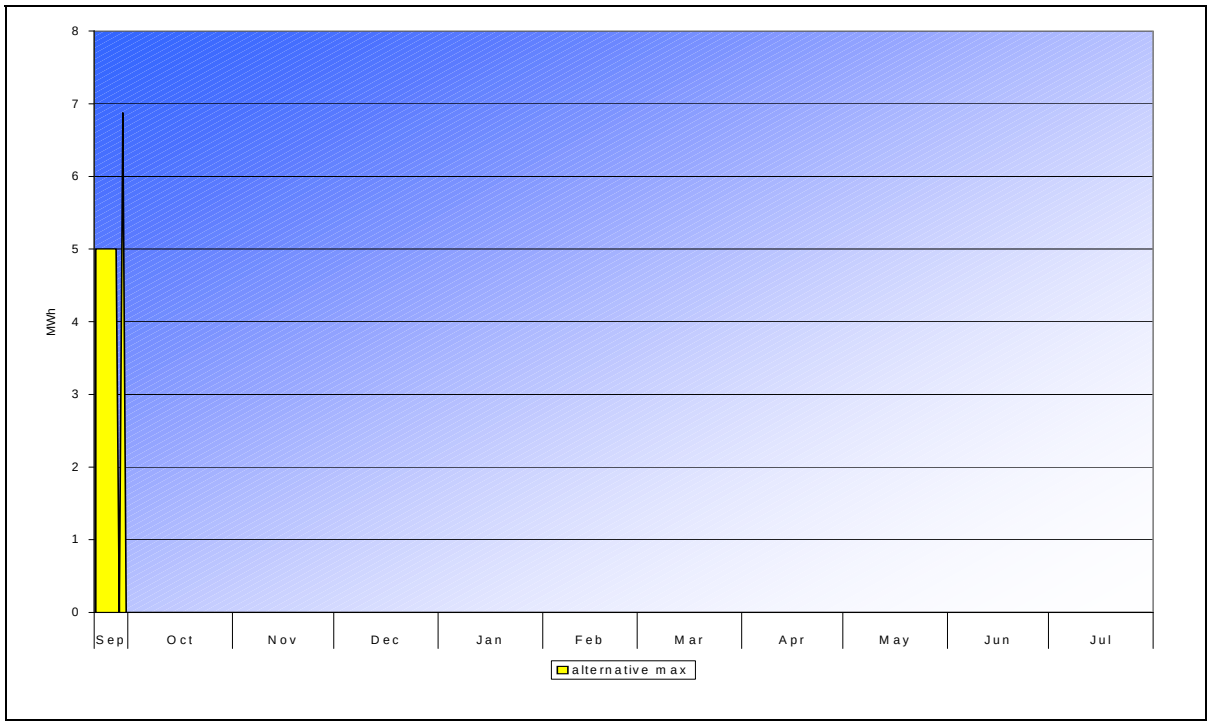


Figure 37: Alinta's daily average STEM offers (cumulative MWh per trading interval)

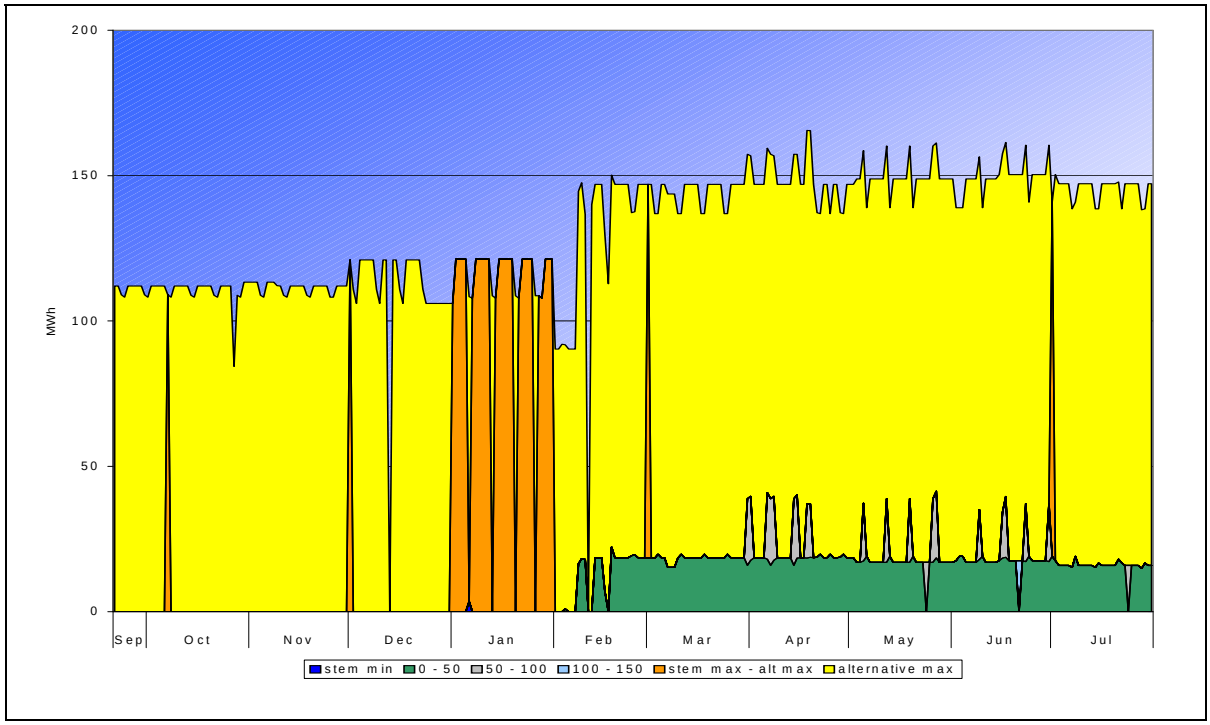


Figure 38: Goldfields Power's daily average STEM offers (cumulative MWh per trading interval)

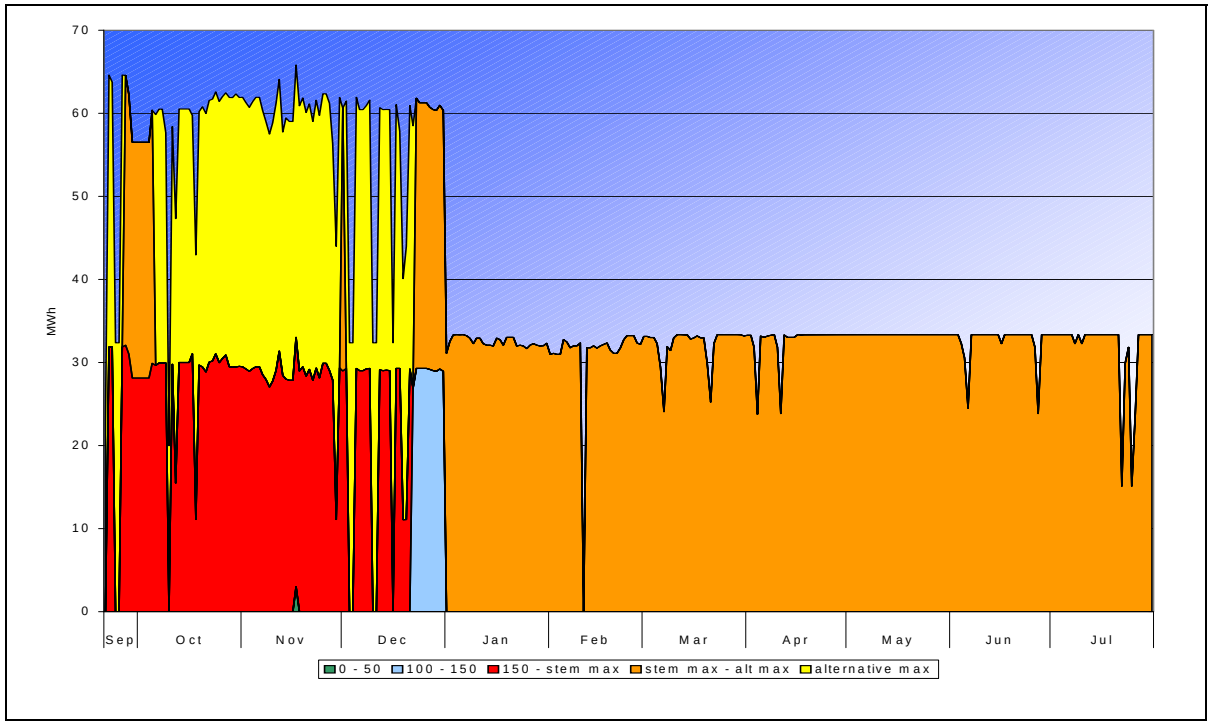


Figure 39: Perth Energy's daily average STEM offers (cumulative MWh per trading interval)

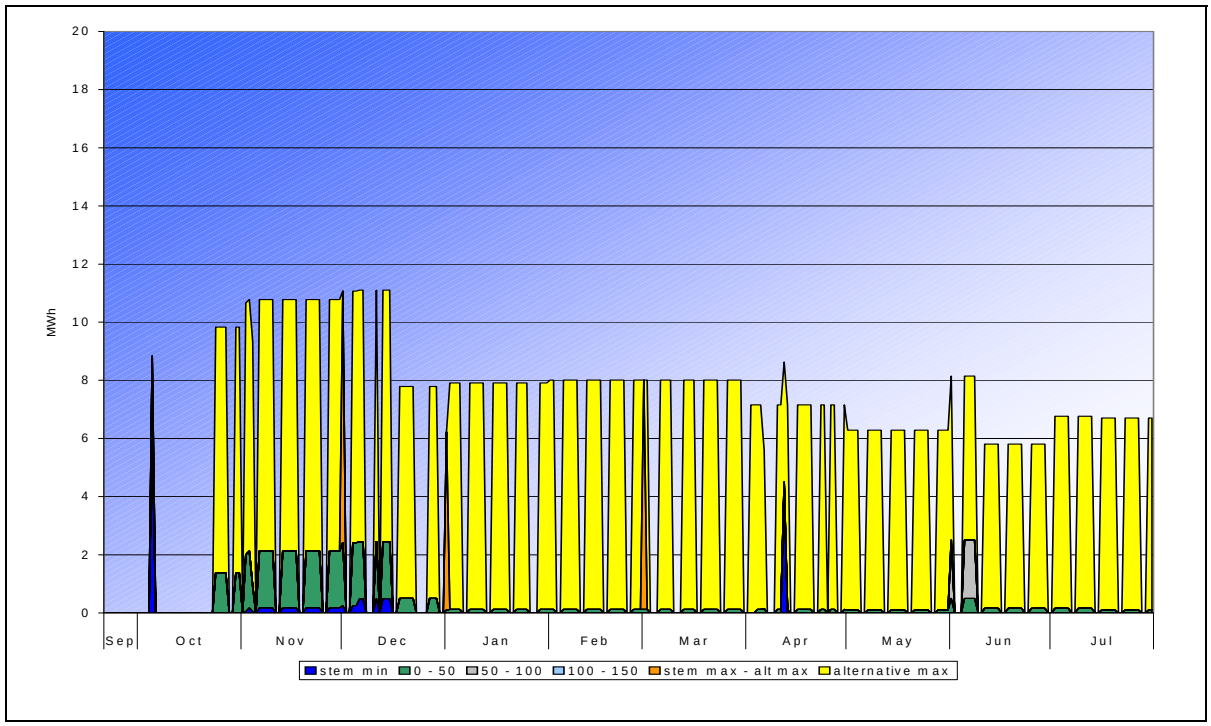


Figure 40: Southern Cross Energy's daily average STEM offers (cumulative MWh per trading interval)

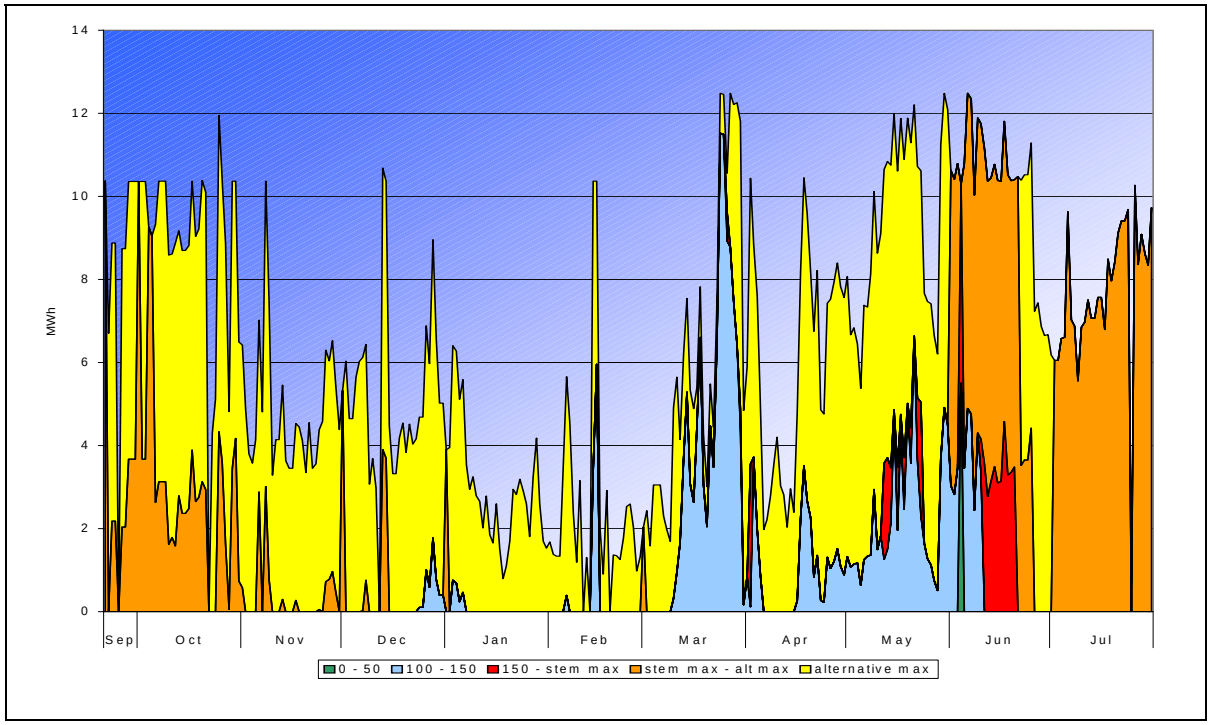


Figure 41: Synergy's daily average STEM offers (cumulative MWh per trading interval)

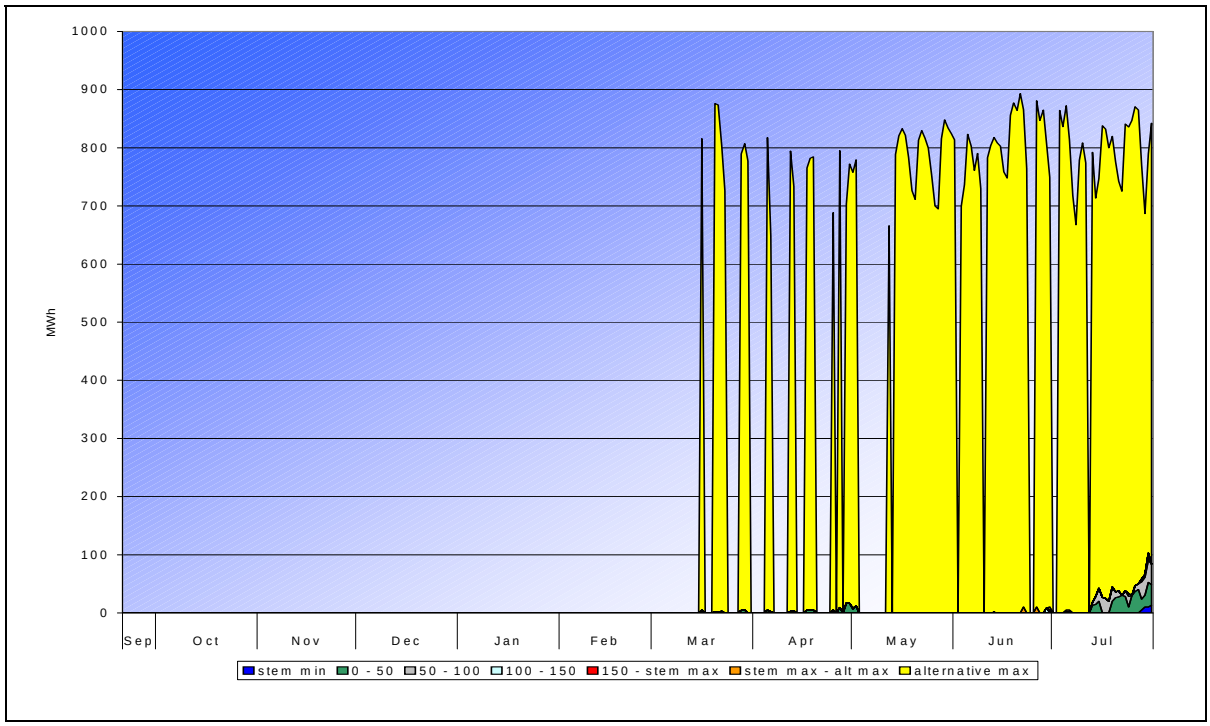
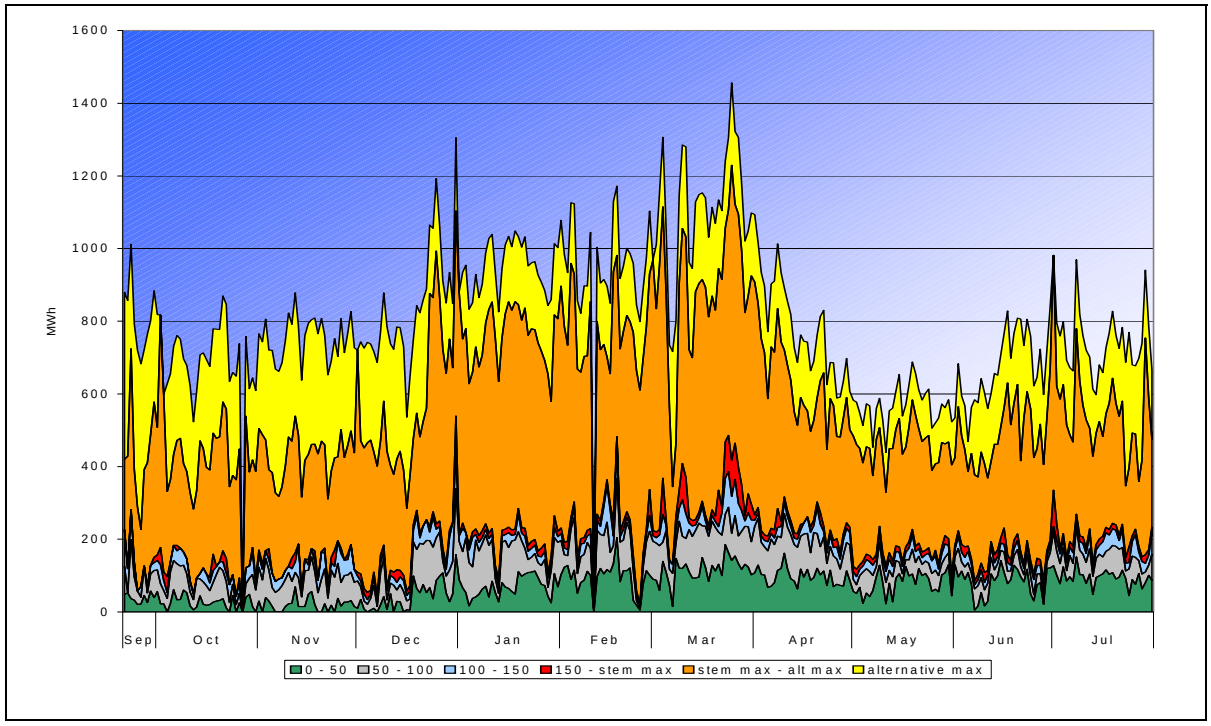


Figure 42: Verve Energy's daily average STEM offers (cumulative MWh per trading interval)



STEM bids

Figure 43: Alcoa's daily average STEM bids (cumulative MWh per trading interval)

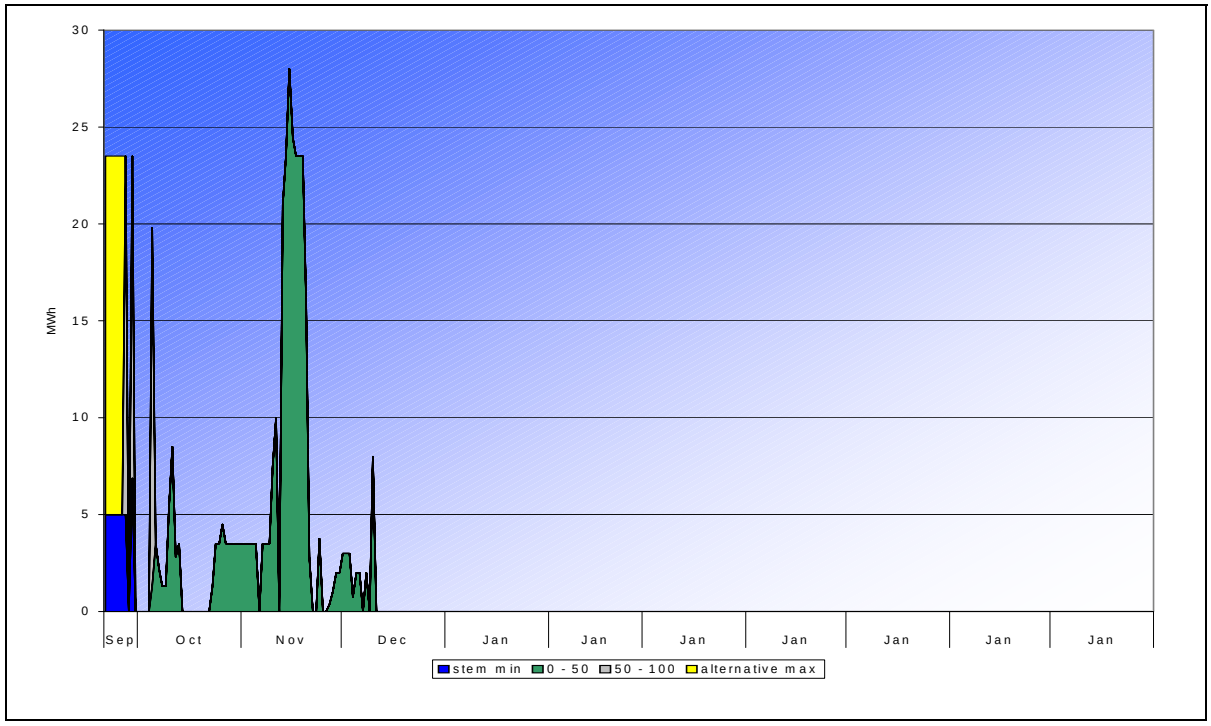


Figure 44: Alinta's daily average STEM bids (cumulative MWh per trading interval)

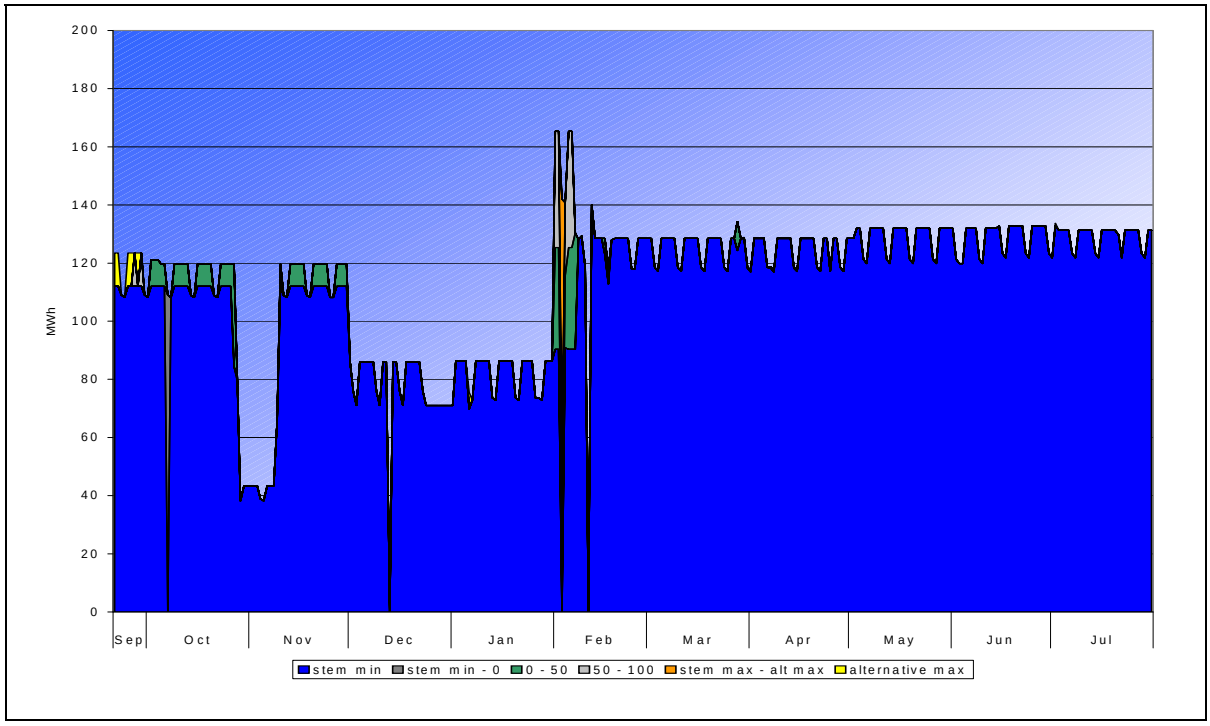


Figure 45: Goldfields Power's daily average STEM bids (cumulative MWh per trading interval)

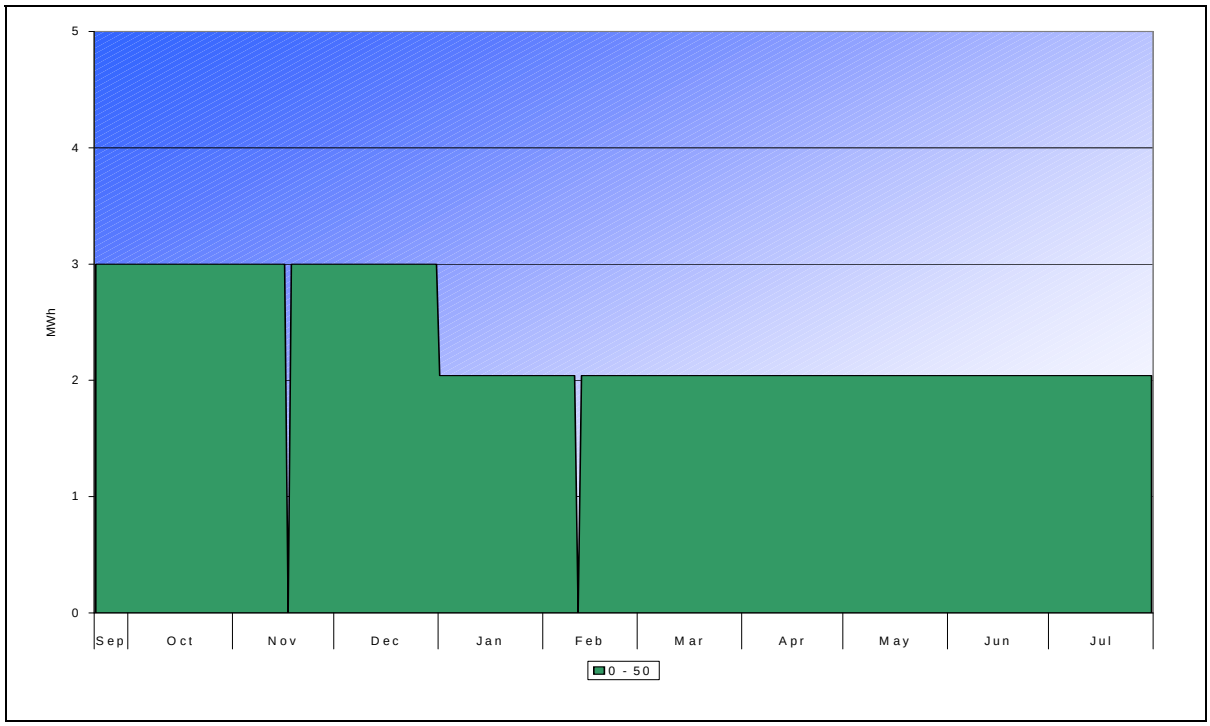


Figure 46: Perth Energy's daily average STEM bids (cumulative MWh per trading interval)

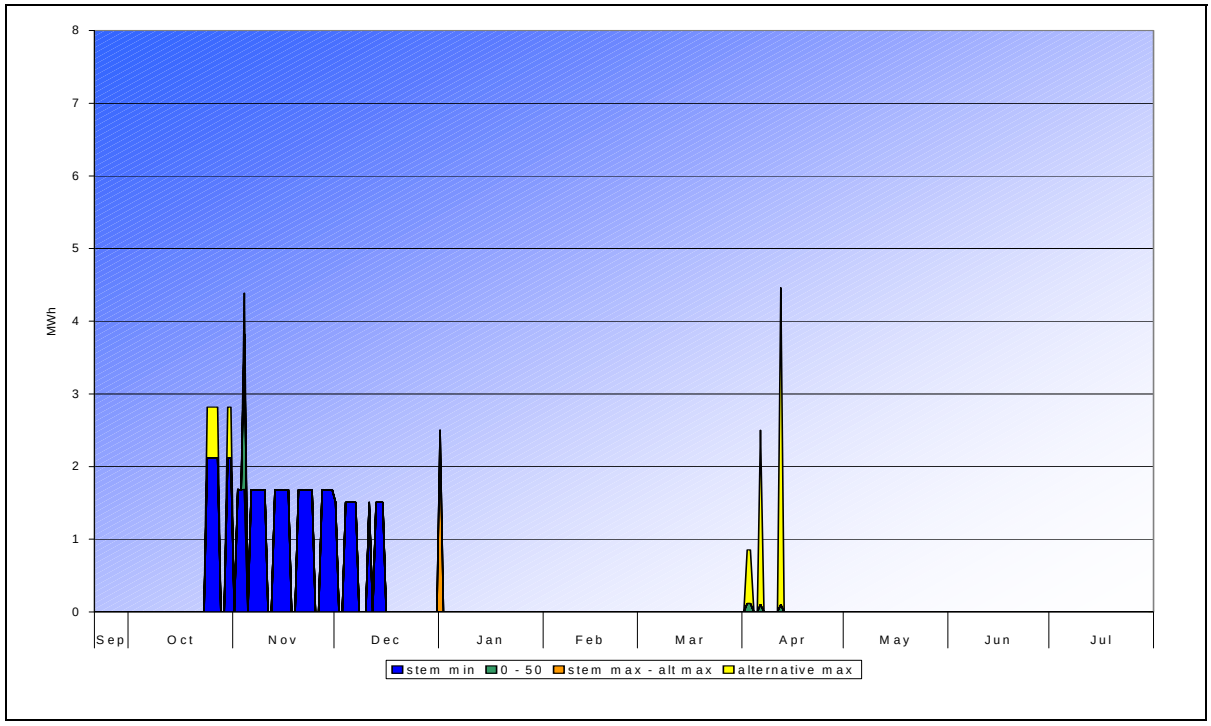


Figure 47: Southern Cross Energy's daily average STEM bids (cumulative MWh per trading interval)

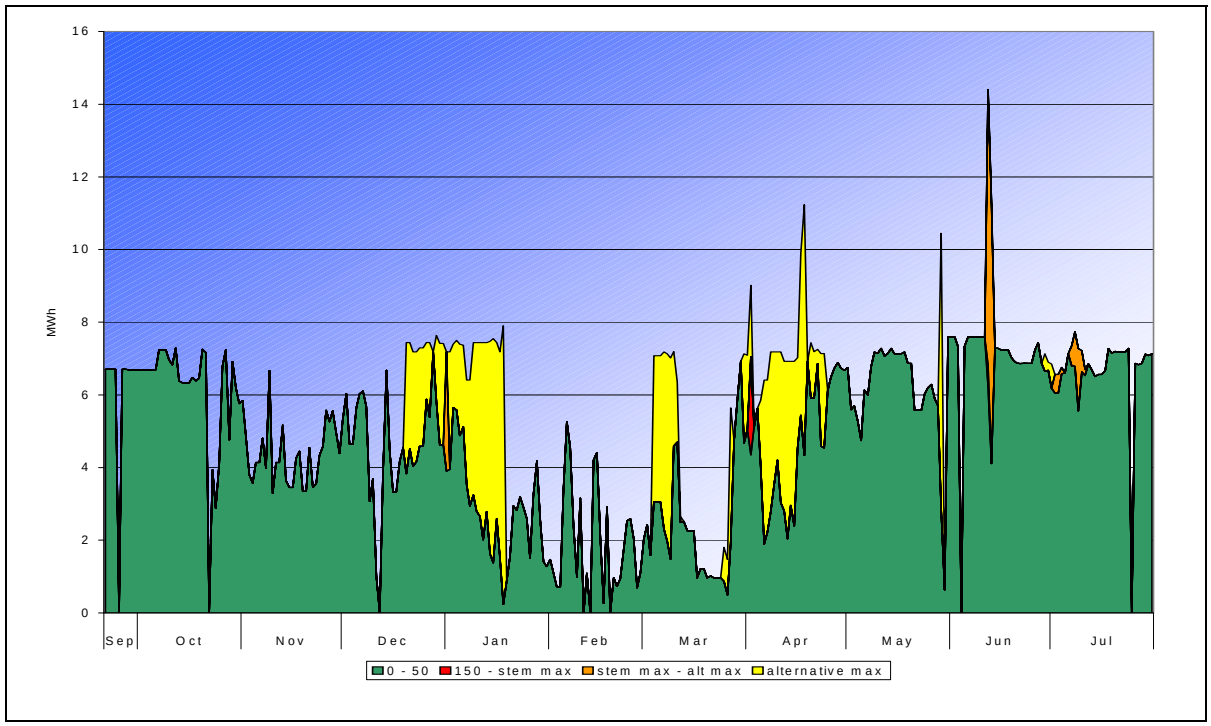


Figure 48: Synergy's daily average STEM bids (cumulative MWh per trading interval)

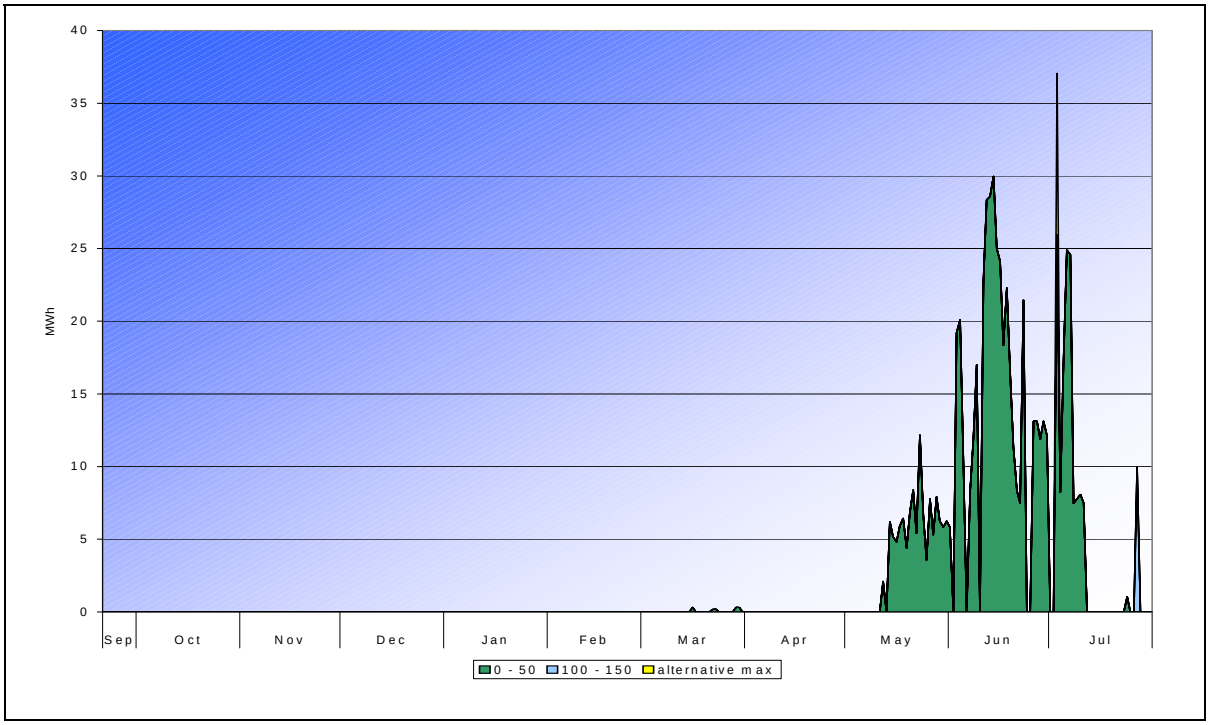


Figure 49: Verve Energy's daily average STEM bids (cumulative MWh per trading interval)