Public Version

Annual Wholesale Electricity Market Report for the Minister for Energy

5 November 2008

Economic Regulation Authority
WESTERN AUSTRALIA

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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 Authority considers that this report fulfils the Authority's obligations under the Market Rules, providing an assessment of the effectiveness of the WEM.

As required by the Market Rules, the Authority has been guided by the Wholesale Market Objectives in assessing and reporting on the effectiveness of the market. In assessing the performance of the WEM against these objectives, the Authority has again been mindful of the relatively short life of the market to date, and that both the broader industry structure and the WEM itself are in the process of evolution. Recognising this, the Authority has assessed the performance of the WEM from a number of viewpoints:

- the performance of the WEM in meeting the Wholesale Market Objectives within the constraints of the current industry structure and market design;
- market design issues that will need to be addressed in order to ensure that, given its existing industry structure and regulatory policy settings, the WEM continues to evolve to best promote the Wholesale Market Objectives; and
- issues outside of the market design that relate to the broader industry structure and regulatory settings that impact on the extent to which the WEM can promote the Wholesale Market Objectives irrespective of the chosen market design.

Market outcomes under the current settings

In the first instance, the Authority has assessed the performance of the WEM in meeting the Wholesale Market Objectives while recognising the fact that the market is intended to evolve over time. In particular, the WEM has been designed to reflect the concentrated industry structure in Western Australia at the commencement of the market, and the fact that a competitive structure will take time to evolve. Recognising this, and based on data provided by the Independent Market Operator (**IMO**) and submissions received from stakeholders, the Authority considers that the market appears to be performing well. In particular, the Authority notes that:

- since market commencement, new participants have entered the market, with the result that the share of generation capacity in the market that is provided by Verve Energy will fall from around 77 per cent in 2007/08[1] to 61 per cent by 2009/10[2] and 60 per cent in 2010/11[3];

[1] See IMO web site at: http://www.imowa.com.au/Attachments/RC_Attachments/13%20Sep%2005%20-%20Assignment%20of%20capacity%20credits1.pdf. Note – all of these numbers include the capacity credits referable to facilities operated *but not owned* by Verve Energy.

[2] See IMO web site at: http://www.imowa.com.au/Attachments/RC_Attachments/Summary%20of%20Capacity%20Credits%20assigned%20for%20the%20Third%20Reserve%20Capacity%20Cycle.pdf.

[3] See IMO web site at: http://www.imowa.com.au/Attachments/RC_Attachments/SummaryofCapacityCreditsfor2008ReserveCapacityCycle.pdf.

- since market commencement, the market has attracted strong interest from investors in new generation with 699 MW of new generation capacity in service and over 1,100 MW of additional independent generation under construction[4];
- with the entry of new generation facilities operated by Market Participants other than Verve Energy over the next few years there may be a broader range of Market Participants scheduling bilateral quantities and participating in the short term energy market (**STEM**), although this will also depend on the wholesale procurement arrangements of Synergy, the dominant retailer in the market;
- outcomes in the market to date indicate that, at least until the recent Varanus Island incident, prices had 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.

While outcomes in the first two years of the market's operation are generally positive, the Authority is aware of a number of issues affecting the performance of the market in meeting its objectives within the context of its current design. In order to address these issues, the Authority has made a number of recommendations:

- Western Power should address its processes and resourcing constraints for assessing network connection applications. This is likely to require a review of Western Power's processes and capability for handling connection applications.
- Western Power should provide greater transparency around its processes for dealing with network applications by proponents of proposed new generation plant and the status of the applications in the queue. This would need to be balanced against participants' commercial needs for confidentiality.
- Western Power should examine the scope for providing more detailed information to the market on existing network capacity and constraints, above and beyond the information contained in its Annual Planning Report.
- Liquidated damages payments should be incorporated into arrangements for delivery of network connections by Western Power and, if they occur, should not impact on network tariffs.
- While the Authority recognises that Western Power is seeking guidance on the application of the New Facilities Investment Test, Western Power should formalise and publish its deep connection charge-setting methodology as soon as possible, so that participants will be in a better position to predict what their connection charges will be and make their connection application decisions accordingly.
- Wind energy should pay for the costs it imposes on the power system on a causer pays basis.
- There should be greater transparency around the actions of System Management to ensure its actual and perceived independence, such as potentially more robust informational and organisational ring-fencing arrangements.

The Authority considers that most of these recommendations could be dealt with through existing WEM processes, including the Rule change process.

[4] See ERA web site –IMO's submission in response to the ERA's Discussion Paper http://www.era.wa.gov.au/cproot/6790/2/20080811 D087210 Public Submission - Independent Market Operator.pdf

Longer term market design issues

While the Authority considers that, currently, the WEM is generally performing well given the relatively early stage of the reform process in Western Australia, the Authority is aware of a number of more fundamental market design issues that will affect the extent to which the WEM will continue to meet the Wholesale Market Objectives as the market evolves. In particular, the Authority considers that the following issues need to be resolved:

- the appropriateness of the continued use of an 'unconstrained'[5] approach to network planning and connections;
- moving to a market-determined capacity price;
- moving the STEM closer to real-time or adopting multiple gate closures[6];
- appropriateness of separate liquid and non-liquid STEM price caps to prevent market manipulation;
- removal of STEM SRMC bidding rules and maximum prices;
- the desirability of moving towards a single maximum STEM price;
- the introduction of competitive balancing;
- the appropriate institutional allocation and location of responsibilities of system management, network management and market operation; and
- for the longer term, consideration of the merits of an energy-only market.

The Authority recommends that decisions about these key elements of the market design should be addressed through the development of a 'road map' laying out a strategy for the future development of the WEM so as to continue to promote the Wholesale Market Objectives. In the Authority's view, the direction, shape and timing of the road map ought to be driven by the Office of Energy as the key policy-making body in the WEM. However, it should take input from stakeholders including participants, the IMO and the Authority.

The road map should separately identify issues that need to be resolved in the medium and long-term, respectively. For example, of the issues listed above, the Authority considers that the regime for network planning and connections is a key priority that needs to be resolved in the medium term. By comparison, consideration of a shift away from having a capacity market towards an energy-only market design should be a matter to be resolved in the longer-term.

Importantly, given the relatively small size of the Western Australian electricity market, consideration of the above issues should incorporate analysis of the costs and benefits of any change.

Also, the Authority believes that the terms of reference for the road map must specify the fundamental requirement for full cost reflectivity to be included in any market (re)design.

[5] Western Power's current unconstrained approach to network connection refers to its obligation to ensure it is able to connect a new generator without compromising the reliability and security of the network or the ability of other (existing) generators delivering their certified capacity through the network.

[6] Gate closure refers to the cut-off time for STEM submissions to the IMO in respect of the relevant Scheduling Day.

Broader structural and regulatory issues affecting the WEM

The Authority considers that the road map process will play an important role in developing a strategy for the future development of the WEM. However, the Authority is also extremely mindful of the fact that a number of broader policy settings external to the WEM design have a substantial impact on the extent to which the Wholesale Market Objectives are likely to be achieved going forward. In particular, the Authority refers to:

- Level of regulated retail tariffs. Regulated tariffs in the South West Interconnected System (**SWIS**) are currently set at levels that are well below costs. The Office of Energy is currently undertaking a review of regulated retail tariffs and has indicated that significant increases in regulated tariffs are necessary to achieve cost-reflectivity. However, the timetable for tariff adjustments to reach cost-reflectivity remains unclear. In the absence of cost-reflective tariffs, retailers will not be able to compete with Synergy for those customers who have the option of remaining on the regulated tariff (currently, all customers consuming less than 160 MWh per annum). This will delay the entry and expansion of new retailers and preserve a concentrated retail sector. Fewer retailers buying in the wholesale market will also act to deter new entrant generation. Among other things, this will have adverse implications for the competitiveness, liquidity and efficiency of the WEM.
- The introduction of full retail competition (**FRC**). FRC is yet to be introduced in Western Australia, with customers in the SWIS consuming 50 MWh per annum or less still only able to be supplied by Synergy. The Office of Energy is currently undertaking a review of the costs and benefits of the introduction of FRC, but has yet to make any recommendations. In the absence of a clear timetable for the introduction of FRC, existing retailers will be unable to achieve critical scale and the entry and expansion of new retailers into the market will be delayed. Both of these outcomes will have adverse implications for the prospect for new entrant generation investment. As with retail tariffs that are below cost-reflective levels, this will, in turn, have adverse implications for the competitiveness, liquidity and efficiency of the WEM.
- Market structure. Both retail and generating activities within the WEM are currently dominated by state-owned businesses, namely, Synergy and Verve Energy, respectively. As illustrated by analysis in this report, this concentrated structure has led to a quasi-bilateral monopoly market structure in the WEM. Such a structure is likely to reinforce the barriers to new entry resulting from non-cost reflective tariffs and the absence of FRC. In addition, the Authority understands that the new government may be considering a merger of Verve Energy and Synergy. The Authority considers that the existence of such a dominant 'gentailer'[7] in the WEM would destroy effective competitive tension in the market with adverse impacts on efficiency.
- Greenhouse and renewable schemes. The Authority considers that both the introduction of a carbon pollution reduction scheme (**CPRS**) and the expansion of the Mandatory Renewable Energy Target (**MRET**) imply some additional risks for the WEM, particularly as a result of the expansion of wind power in the WEM.

[7] A gentailer is a business with both a significant generation portfolio and significant direct exposure to the retail market.

For these reasons, the Authority considers that cost-reflective retail tariffs, the introduction of FRC and a competitive market structure are important pre-requisites for the WEM to best promote the Wholesale Market Objectives in the future.

Summary of Recommendations and Findings

Effectiveness of the WEM, the IMO and System Management

Network planning and connection issues

Recommendation 1

Western Power should address its processes and resourcing constraints for assessing network connection applications. This is likely to require a review of Western Power's processes and capability for handling connection applications.

Recommendation 2

Western Power should provide greater transparency around its processes for dealing with network applications by proponents of proposed new generation plant and the status of the applications in the queue. This would need to be balanced against participants' commercial needs for confidentiality.

Recommendation 3

Western Power should examine the scope for providing more detailed information to the market on existing network capacity and constraints, above and beyond the information contained in its Annual Planning Report.

Recommendation 4

Liquidated damages payments should be incorporated into arrangements for delivery of network connections by Western Power and, if they occur, should not impact on network tariffs.

Recommendation 5

While the Authority recognises that Western Power is seeking guidance on the application of the New Facilities Investment Test, Western Power should formalise and publish its deep connection charge-setting methodology as soon as possible, so that participants will be in a better position to predict what their connection charges will be and make their connection application decisions accordingly.

Recommendation 6

The proposed road map process for the development of the market should consider the appropriate approach to network planning in the South West Interconnected System, focussing on the competing 'constrained' and 'unconstrained' planning frameworks as a matter of priority.

Reserve capacity mechanism issues

Recommendation 7

The development of retail competition and options to encourage competition and liquidity should be considered as part of the proposed road map process recommended in this report.

Finding 1

The incentives for investment in new capacity would be significantly affected by a merger between Synergy and Verve Energy. Such a merger would be likely to substantially undermine the liquidity of bilateral contracting and make it harder for new generation proponents to secure contract support for new generation development.

Recommendation 8

The proposed road map process should consider a move to a competitive reserve capacity price in the context of the future direction of market development.

Recommendation 9

Any review or enhancements of the Reserve Capacity Refund regime should be reviewed and considered through the rule change mechanism.

Bilateral, STEM and balancing markets

Recommendation 10

The proposed road map process should consider the case for greater alignment between short term energy market timing and the timing for gas pipeline nominations in the context of the future direction of market development.

Recommendation 11

The proposed road map process should consider the case for a move to competitive balancing in the Wholesale Electricity Market, in the context of the respective roles of balancing and the short term energy market in the future direction of market development.

Administrative matters

Recommendation 12

The proposed road map process should consider the appropriate level of transparency in the market for bilateral contracting, given the existing and likely future nature of the Wholesale Electricity Market design.

Specific events, behaviour or matters

Retail market reform

Finding 2

Cost-reflective retail tariffs are necessary to avoid distortions at both retail and wholesale market levels.

Finding 3

Distortions at the retail and wholesale market levels would be compounded by a merger of Synergy and Verve Energy, which – if it proceeded – would, among other things, be likely to seriously deter new generation and retail entry.

Fuel Availability

Recommendation 13

The proposed road map process should consider the extent to which the design of the market enables participants to manage short-term and long-term fuel constraints in a way that promotes efficient market outcomes.

Impacts of wind energy

Recommendation 14

Wind generators should pay for the costs they impose on the power system on a causer pays basis.

Impacts of demand side management

Recommendation 15

Alternative arrangements to govern the participation of demand side management, including auctions for the right to receive power during periods that would otherwise be subject to blackouts, should be considered as part of the road map process recommended by the Authority in this report.

System Management

Recommendation 16

System Management should be made subject to more robust informational and organisational ring-fencing to ensure greater transparency and independence.

Recommended measures to increase the effectiveness of the market

Recommendation 17

A 'road map' for the market should be developed, laying out a strategy for the future development of the Wholesale Electricity Market to further promote the Wholesale Market Objectives.

The direction, shape and timing of the road map ought to be driven by the Office of Energy as the key policy-making body in the Wholesale Electricity Market.

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.

In this second Minister's Report, the Authority provides an assessment of the effectiveness of the WEM from market commencement in September 2006 to 31 July 2008. The Authority's first Minister's Report[8] (**2007 Minister's Report**) provided an assessment of the effectiveness of the WEM from market commencement to 31 July 2007.

1.1 Process

In preparing this Minister's Report, the Authority conducted a public consultation process. During April and May 2008, the Authority held informal meetings with key stakeholders, inviting these stakeholders to provide their preliminary views on the effectiveness of the WEM over the last year. Subsequently, the Authority released a Discussion Paper on 6 June 2008 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 4 July 2008. However, in light of the disruption to the State's gas supply resulting from the incident at Varanus Island in June, a second notice was published extending the time

[8] http://www.era.wa.gov.au/cproot/6444/2/20080319 Annual Wholesale Electricity Market Report for the Minister for Energy 2007.pdf.

for submissions to be lodged with the Authority to 8 August 2008. A list of the submissions received is provided in Appendix 2 and are also available on the Authority's web site.[9]

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 Approach

In the 2007 Minister's Report, the Authority took the view that the Report should focus on an assessment of the effectiveness of the WEM at a fairly high level. This view was taken in light of the extensive consultation that had been undertaken as part of the restructuring of the electricity industry and the implementation of the WEM, as well as the short time that had elapsed since the commencement of the market. The Authority noted that it would consider all relevant material but, in the absence of compelling evidence of fundamental problems, it would be inappropriate to consider fundamental change in the market at that stage. In general, stakeholders were supportive of this approach.

With respect to this year's Minister's Report, the Authority considers that there are a range of persistent or emerging issues that warrant attention. These include:

- the appropriateness of the continued use of an 'unconstrained'[10] approach to network planning and connections;
- implications of the existing structure of the Western Australian electricity generation and retail sectors;
- moving to a market-determined capacity price;
- moving the short term energy market (**STEM**) closer to real-time or adopting multiple gate closures[11];
- appropriateness of separate liquid and non-liquid STEM price caps to prevent market manipulation;
- removal of STEM SRMC bidding rules and maximum prices;
- the desirability of moving towards a single maximum STEM price;
- the introduction of competitive balancing;
- the appropriate institutional allocation and location of responsibilities of system management, network management and market operation; and
- for the longer term, consideration of the merits of an energy-only market.

[9] http://www.era.wa.gov.au/2/532/42/annual_wholesal.pm

[10] Western Power's current unconstrained approach to network connection refers to its obligation to ensure it is able to connect a new generator without compromising the reliability and security of the network or the ability of other (existing) generators delivering their certified capacity through the network.

[11] Gate closure refers to the cut-off time for STEM submissions to the IMO in respect of the relevant Scheduling Day.

In the Discussion Paper, the Authority asked stakeholders whether existing processes such as the Rule change process are sufficient to provide adequate transparency and direction as to how these issues would be addressed. Most stakeholders supported the view that the long-term development of the market should be dealt with in a more systematic manner. The Authority's response to these views is discussed in section 6 below.

1.3 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.

1.4 Structure of this report

This report is structured as follows:

- Section 2 sets out the requirements for the Minister's Report;
- Section 3 provides a summary of the Market Surveillance Data Catalogue (**MSDC**);
- Section 4 sets out the Authority's assessment of the effectiveness of the WEM, the IMO and System Management;
- Section 5 sets out the Authority's assessment of the specific events, behaviour and matters that impacted on the effectiveness of the WEM; and
- Section 6 provides the Authority's recommended measures to improve the effectiveness of the market.

REPORTING REQUIREMENTS

2 Requirements for the Minister's Report

The Market Rules require the Authority to report on the effectiveness of the market in meeting the Wholesale Market Objectives and set out 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.

As noted, the Authority's reporting requirements are addressed in the sections that follow:

- Section 3 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 4 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;
- Section 5 sets out the Authority's assessment of specific events, behaviour or matters that impacted on the effectiveness of the market; and
- Section 6 sets out the Authority's recommended measures to increase the effectiveness of the market in meeting with Wholesale Market Objectives to be considered by the Minister.

3 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 2008.

3.1 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 at 2 September 2008 the following participants were registered with the IMO:

- 14 entities registered as Market Generators only;
- 8 entities registered as Market Customers only; and
- 8 entities registered as both Market Generators and Market Customers.

This is a total of 30 registered entities and represents an increase from 15 entities at market commencement, and 23 entities as at 31 July 2007. Table 1 provides a list of these participants, at market commencement, 31 July 2007 and 2 September 2008.

In addition to these Market Generators and Market Customers, there are other classes of Market Participants. As of 2 September 2008, there were two entities registered as Network Operators: Western Power and Alinta Sales Pty Ltd.

Table 1: Registered Market Participants

	Market commencement (21 September 2006)	31 July 2007	2 September 2008
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 Griffin Power 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 Griffin Power Pty Ltd Griffin Power 2 Pty Ltd Landfill Gas and Power Pty Ltd Perth Energy Pty Ltd Southern Cross Energy Verve Energy
Market Generators (only)	EDWF Manager Pty Ltd Goldfields Power Pty Ltd Mount Herron Engineering Pty Ltd Waste Gas Resources Pty Ltd	Bioenergy Limited EDWF Manager Pty Ltd Eneabba Gas Limited Eneabba Energy Pty Ltd Goldfields Power Pty Ltd Mount Herron Engineering Pty Ltd Namarkkon Pty Ltd NewGen Power Kwinana Pty Ltd Wambo Power Ventures Pty Ltd Waste Gas Resources Pty Ltd Western Australia Biomass Pty Ltd	Bioenergy Limited Coolimba Power Pty Ltd EDWF Manager Pty Ltd Eneabba Gas Limited Eneabba Energy Pty Ltd Goldfields Power Pty Ltd Mount Herron Engineering Pty Ltd Namarkkon Pty Ltd NewGen Power Kwinana Pty Ltd NewGen Neerabup Pty Ltd SkyFarming Pty Ltd Wambo Power Ventures Pty Ltd Waste Gas Resources Pty Ltd Western Australia Biomass Pty Ltd
Market Customers (only)	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	Barrick (Kanowna) Limited Clear Energy Pty Ltd Energy Response Pty Ltd Karara Energy Pty Ltd Newmont Power Pty Ltd Premier Power Sales Pty Ltd Synergy Water Corporation

3.2 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.

3.2.1 Supplementary reserve capacity

Despite the lack of need for a reserve capacity auction to date, the IMO identified a requirement for supplementary reserve capacity to be available within the South West Interconnected System (**SWIS**) for the summer of 2008. The required supplementary reserve capacity of 120 MW was needed from 29 January 2009 to 20 March 2009 and was procured by the IMO through contracts negotiated directly with potential suppliers of supplementary capacity in accordance with clause 4.24 of the Market Rules. The terms of these contracts are confidential.

3.3 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.

3.3.1 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 2008.

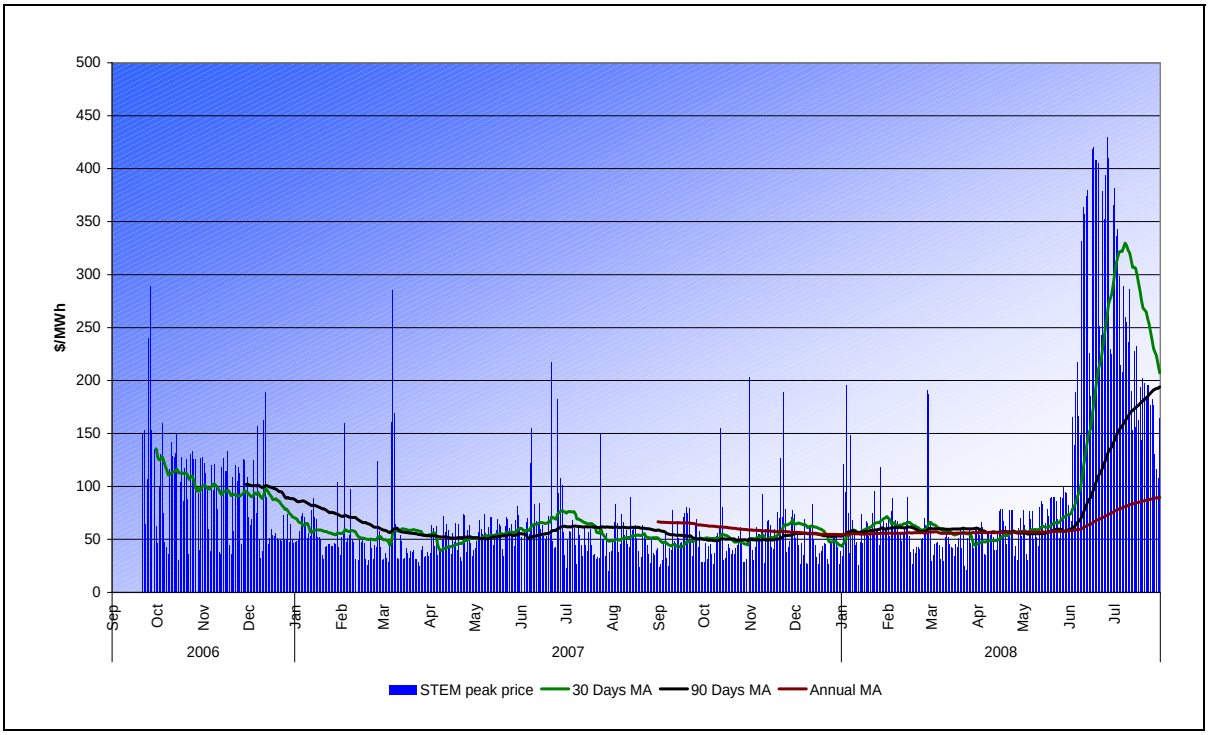
Table 2: Mean and standard deviations of STEM prices (21 September 2006 to 31 July 2008)

Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	38.1	37.7
Peak	80.2	76.1

Figure 1 illustrates average daily off-peak STEM prices for each trading day from market commencement up to 31 July 2008, as well as 30-day, 90-day and annual moving average prices. 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 trended in a fairly stable fashion over the period May 2007 to May 2008, with mild peaks in June, September and November 2007. Off-peak prices started to rise in May 2008, and peaked on 16 June 2008 at a daily average of $198/MWh.

While some increase in prices could be expected with the onset of winter, the initial increase in prices in May 2008 appears to have been due to a large increase in the quantity of energy subject to planned outages (see section 3.15 below). This was followed by a rapid increase in prices from early June 2008, which was due mainly to gas curtailment as a result of the Varanus Island incident and the resulting large increase in the quantity of energy subject to forced plant outages (see also section 3.15 below).

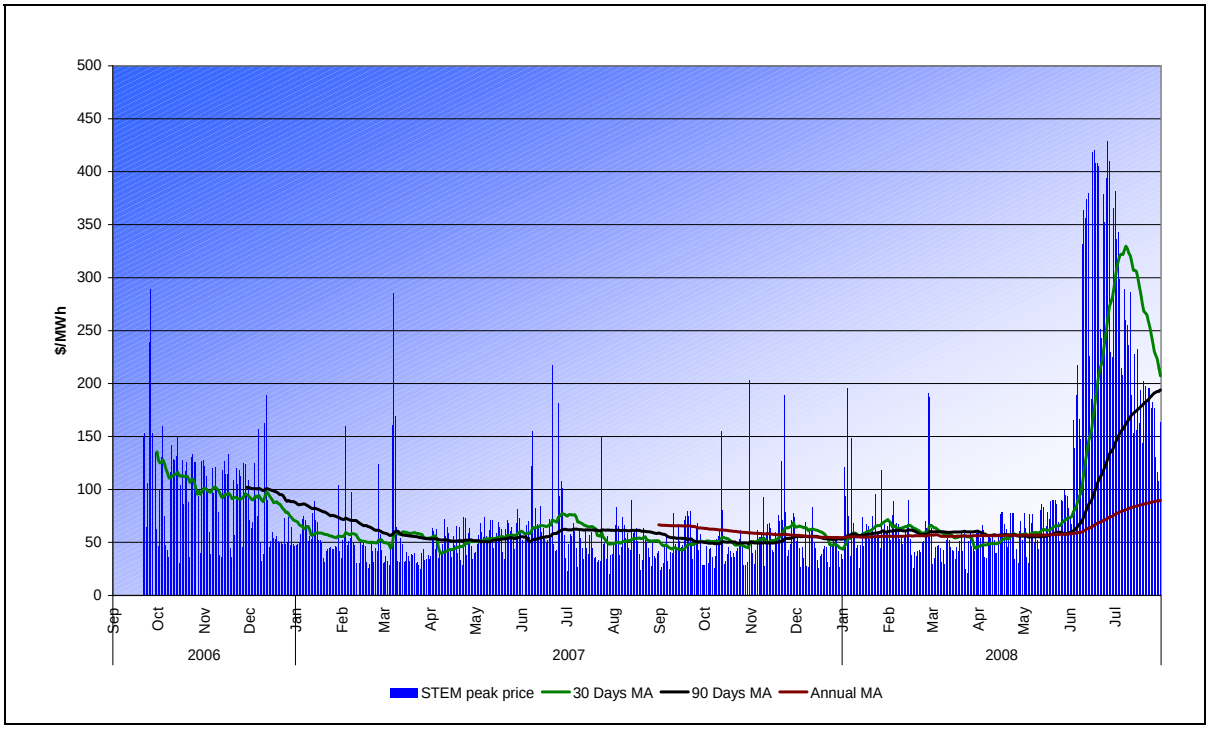
Figure 1: Average daily off-peak STEM prices [12]



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

Figure 2 illustrates average daily peak STEM prices for each trading day from market commencement to 31 July 2008, as well as 30-day, 90-day and annual[13] 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 noted that this was due, at least in part, to fuel restrictions and low levels of generator availability over this period.[14] Prices then followed a fairly regular seasonal pattern with higher prices and some spikes in summer and winter with lower prices in between. Then, as with off-peak prices, peak prices started to increase from May 2008 and significantly so in early June due to the Varanus Island incident, resulting in increased forced outages. Average daily peak prices peaked on 26 June 2008 at $429/MWh.

Figure 2: Average daily peak STEM prices [15]



Price outcomes in the STEM, and particularly the significant increase in off-peak and peak prices observed in June and July 2008 following the Varanus Island incident, highlight the importance of fuel availability to outcomes in the market. Fuel availability was raised as an issue by a number of stakeholders during public consultation, and is discussed further in section 5.2.

3.3.2 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 up to May 2008. Further, peak prices were considerably more volatile than off-peak prices.

[13] The term "annual moving average" referred to in Rule 2.16.4(b) is interpreted as a 365-day moving average.

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

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

The Market Rules require the Authority to publish statistical analysis of the volatility of prices in STEM auctions. Based on this analysis, volatility increased substantially post-May 2008, following the Varanus Island incident. Figure 3 shows the means and standard deviations (as well as maxima and minima) of STEM prices by month for off-peak trading intervals from market commencement up to 31 July 2008. Figure 4 does the same for peak trading intervals for the same period.

During both peak and off-peak trading intervals, the standard deviations of STEM prices indicate that price volatility was high 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 as a result of an expansion to the Dampier to Bunbury Natural Gas Pipeline (**DBNGP**) not being commissioned until December 2006 and low levels of availability from coal-fired generators over this period. Volatility in off-peak prices stabilised in October 2006 and remained reasonably constant up until June 2008, with spikes in February/March 2007 and June/July 2007. Volatility in peak prices, while diminishing somewhat after the first month of trading in September 2006, has remained higher than for off-peak periods, with a substantial increase in June and July 2008, again indicating the impact of fuel availability of STEM outcomes. Volatility in both off-peak and peak prices during June 2008 exceeded what was experienced at market start in September 2006, and represents the most volatile month recorded to date.

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

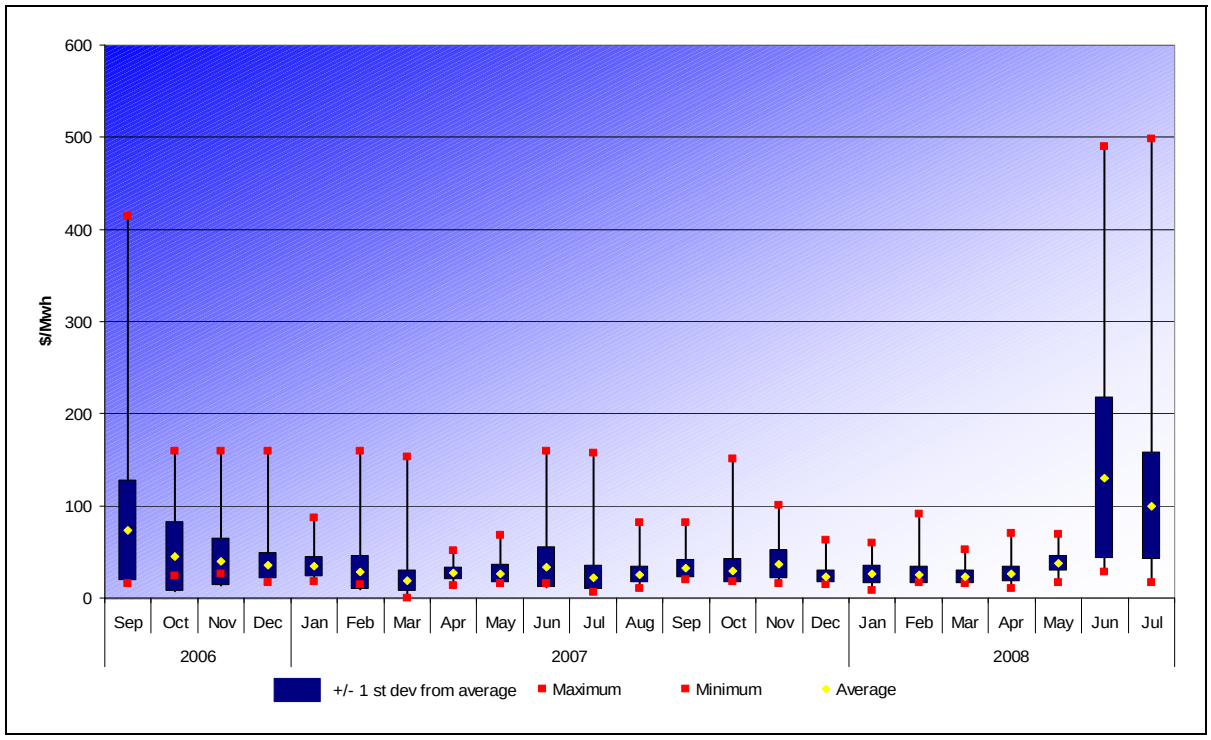
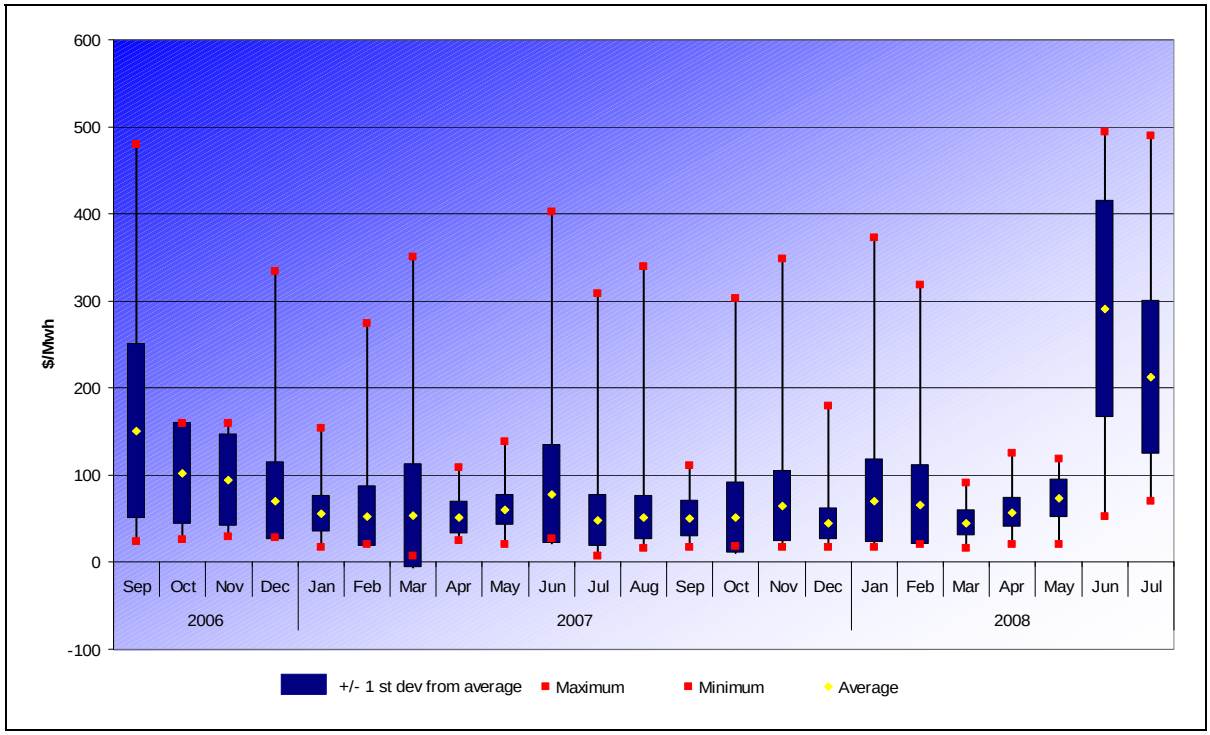


Figure 4: Summary statistics for STEM prices in peak trading intervals, by month



3.3.3 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 excluding 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 period from 1 November 2007 to 1 October 2008 the maximum STEM price was $206/MWh.
- The alternative 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/MWh and as high as $779/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. More recently in June and July this year both off-peak and peak prices

have reached the maximum STEM price. Again, peak prices have had a greater tendency to reach the maximum STEM price, particularly in July.

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

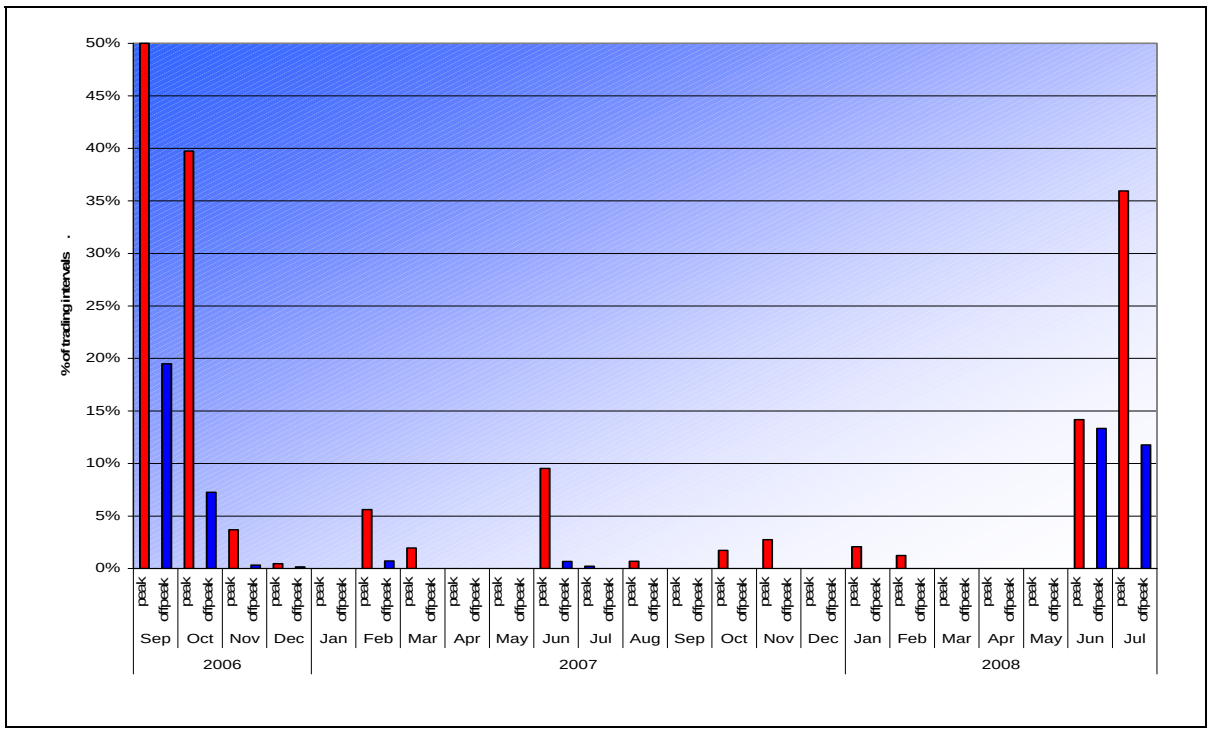
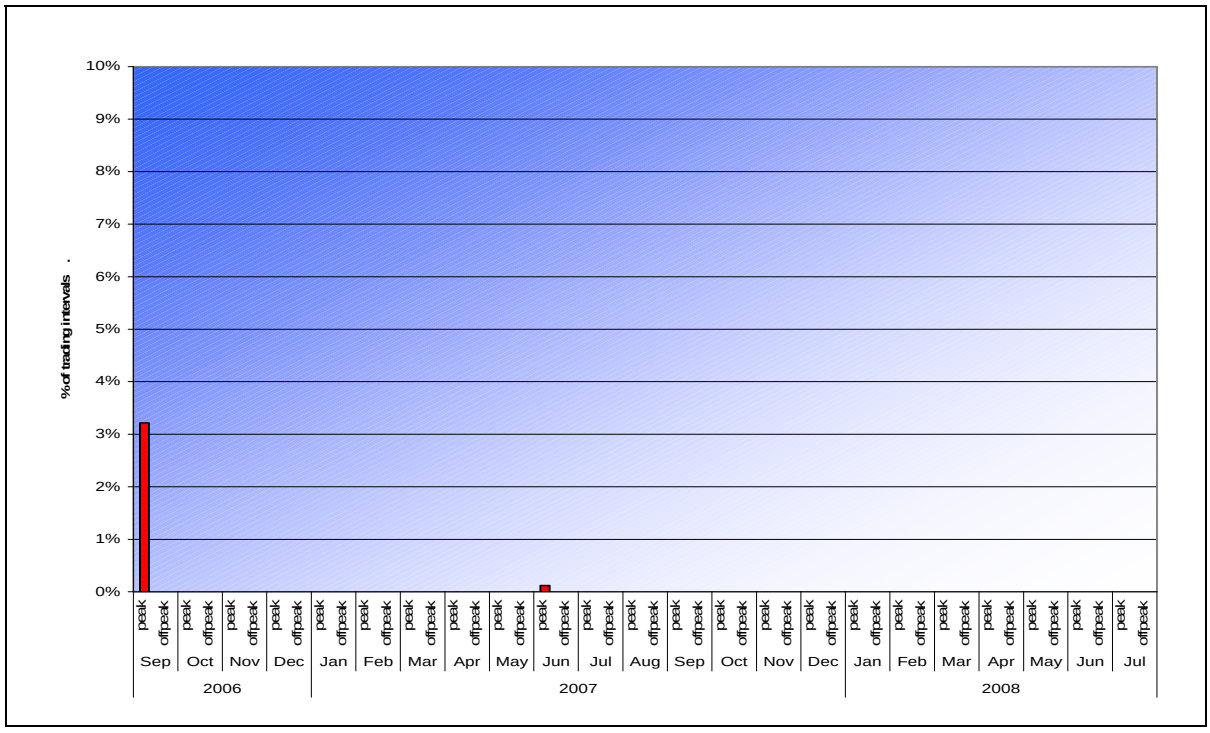


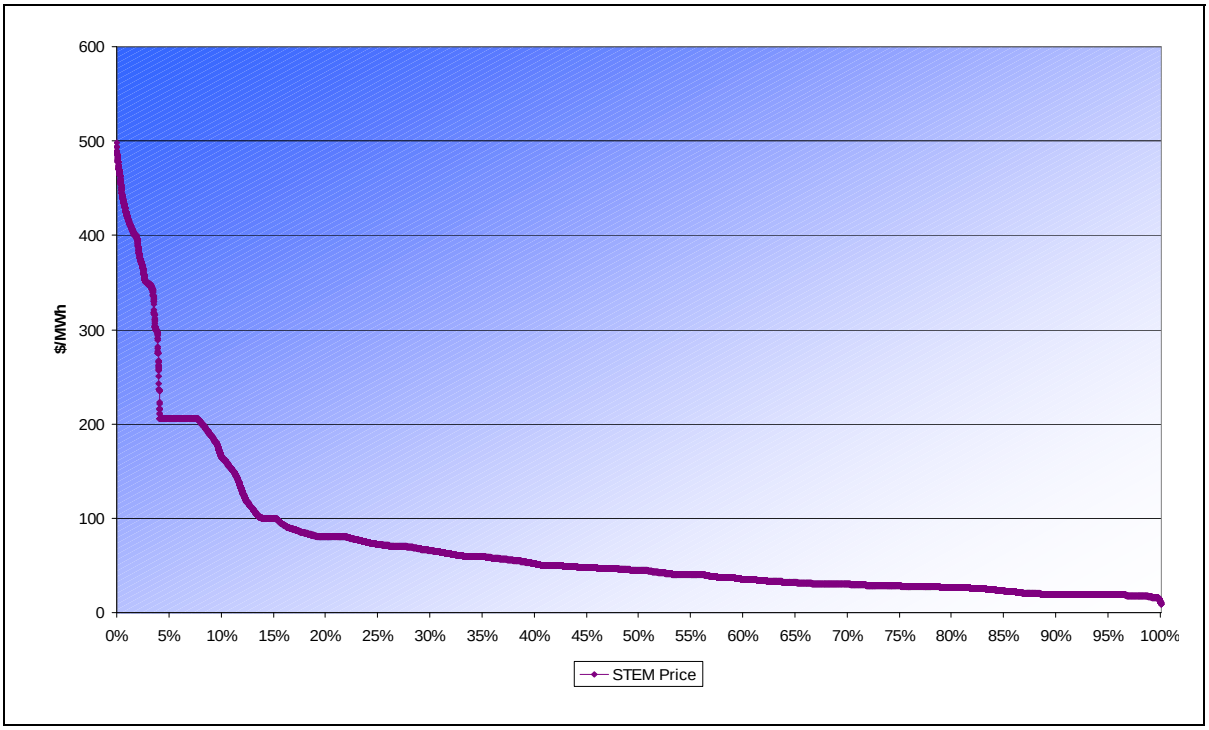
Figure 6: Proportion of trading intervals STEM prices are at alternative maximum STEM price, by month



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 trading intervals for one year from 1 August 2007 to 31 July 2008.[16]

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 84 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 $206/MWh for around 7 per cent of total trading intervals. Prices had exceeded the maximum STEM of $206/MWh for roughly 4 per cent of total trading intervals this year, as compared with less than 1 per cent for the maximum STEM price last year of $159.84.

Figure 7: Price duration curve for STEM prices (1 August 2007 to 31 July 2008)



Clause 2.16.4(e) of the Market Rules requires the IMO to calculate the correlation between capacity offered into STEM auctions and the incidence of high prices. The 2007 Minister's Report discussed two ways in which this requirement could be interpreted, and how they were related.[17] The 2007 Minister's Report also provided information on correlations between STEM prices and quantities offered. However, the 2007 Report highlighted that a simple correlation between capacity and prices will fail to capture other factors that can influence STEM prices, such as bidding behaviour and demand conditions. It commented that understanding the key determinants of high prices in the STEM requires more detailed analysis. For these reasons, correlations between STEM prices and quantities offered are not included in this report, but the Authority will work with the IMO to develop a more appropriate approach to this analysis.

[16] Price duration curves for peak and off-peak periods are set out Figure 29 and Figure 30 in Appendix 3.

[17] Economic Regulation Authority, *Annual Wholesale Electricity Market Report for the Minister for Energy*, 21 December 2007, pp.18-20.

Clause 2.16.4(g) requires the IMO to explore the key determinants for high prices in the STEM and balancing. The Authority understands that the IMO intends to work co-operatively with the Authority to develop the most appropriate approach for undertaking this analysis.

As set out in section 3.3.1, the Authority's analysis to date indicates that high STEM prices have typically been coincident with high demand (particularly during the summer months of February and March) and/or with fuel constraints. The recent period of high prices over June-July 2008 coincides with the Varanus Island incident and illustrates the dramatic impact of fuel constraints on forced plant outages and hence prices. In this context, the Authority notes the status report published by the IMO on this incident,[18] and the announcement by the former Government of a review to be undertaken by the Office of Energy and to report within six months.[19] The Office of Energy's review is to consider future gas security options. The Authority will monitor the results of this review in order to understand whether any of the findings or recommendations of the review have implications for the operation of the WEM.

3.4 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.

3.4.1 Balancing prices

Balancing enables Market Participants to adjust their net contract position so that supply equals demand in real time. Generally, System Management will match supply and demand in the system using Verve Energy's facilities. However, there are circumstances in which System Management can issue dispatch instructions to other Market Participants.

3.4.1.1 Standing data prices used in balancing

Where Market Participants other than Verve Energy are issued dispatch instructions by System Management, these deviations are settled on a pay-as-bid basis. The standing

[18] http://www.imowa.com.au/Attachments/VaranusIslandGasReport_20080718II.pdf

[19] http://www.mediastatements.wa.gov.au/Pages/RecentStatements.aspx?ItemId=130664&days=7

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 used in balancing are summarised in Figure 31 through to Figure 35 in Appendix 3, for the period from market commencement to 31 July 2008. 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.[20]

The Figures indicate that until the start of 2008, Market Participants other than Verve Energy tended to bid close to the applicable price caps for increasing supply for both liquid and non-liquid facilities. For instance, the average daily price bid by non-liquid facilities to increase supply was generally in excess of $150/MWh. However, from January 2008 to June 2008, average daily bid prices by non-liquid facilities fell to $131/MWh for peak periods and $126/MWh for off peak periods, opening up a sizeable gap under the maximum STEM price. Most recently, since June 2008, bid prices have again been approaching the applicable price caps, likely as a result of the impact of the Varanus Island incident on gas prices.

Market Participants also tended to bid close to the applicable price cap for liquid facilities during the first 12 months of market operation. However, since November 2007, the gap between bid prices and the alternative maximum STEM price cap has widened fairly dramatically. But unlike the case of non-liquid facilities, the gap has not closed since June. This is because the alternative maximum STEM price (which varies monthly) has increased strongly since November 2007 as diesel prices rose in line with higher oil prices.

The tendency to bid close to the price caps was and remains stronger for curtailable loads, with the prices bid to increase supply (decrease load) closely following the monthly changes in the alternative maximum STEM price.[21]

Similar patterns of bidding by Market Participants other than Verve Energy can be observed for decreases in supply. Over the first months of the market, non-liquid and liquid facilities tended to bid around -$100/MWh to decrease supply. Then, from February 2007 to October 2007 these generators consistently bid close to the minimum STEM price of -$159.84/MWh. However, this tendency has greatly diminished since January 2008, with a gap opening up between decrement bids and minimum STEM prices of well over $50 (for non-liquid facilities) or $150 (for liquid facilities) over this period.

On the other hand, prices bid by intermittent generation to decrease supply have closely followed minimum STEM prices at peak periods and settled at about -$110/MWh for off-peak periods since April 2007.

While care is needed in drawing conclusions from these prices, the fact that standing data prices for balancing have tended to be close to the applicable price caps suggests that any move in the long-term to introduce competitive balancing – as supported by some stakeholders and discussed in section 4.5.3 – would need to give careful consideration to likely price outcomes in a competitive balancing market and what these might imply about the need for bidding rules.

[20] Curtailable load is a metered point through which electricity is consumed, where consumption can be curtailed at short notice.

[21] Over the period from market commencement to 31 July 2007, all curtailable loads, with one exception, have bid at the alternative maximum STEM price to increase supply. The exception is a curtailable load bid by Synergy at $0/MWh. The Authority understands that this is a 'shell' bid, associated with the provision of demand side management by Synergy, and that it is not dispatched at that price.

3.4.1.2 MCAP, UDAP and DDAP

In addition to standing data balancing prices, there are three other balancing prices determined by the IMO:

- 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. In other words, rather than receiving pay-as-bid prices for deviations, these facilities receive MCAP. 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.[22]

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. UDAP is set at a discount to MCAP to discourage upward deviations without instruction from System Management and DDAP is set at a premium to MCAP to discourage downward deviations without instruction from System Management. 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 3, Table 4 and Table 5 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 2008. 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 3: Mean and standard deviations of the MCAP (21 September 2006 to 31 July 2008)

Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	45.7	53.1
Peak	100.3	104.0

[22] Following rule change decision RC_2008_05, MCAP has been recalculated for each trading interval, rather than only being recalculated in the event that the load for a trading interval does not fall within 95 per cent and 105 per cent of the scheduled system load.

Table 4: Mean and standard deviations of the UDAP (21 September 2006 to 31 July 2008)

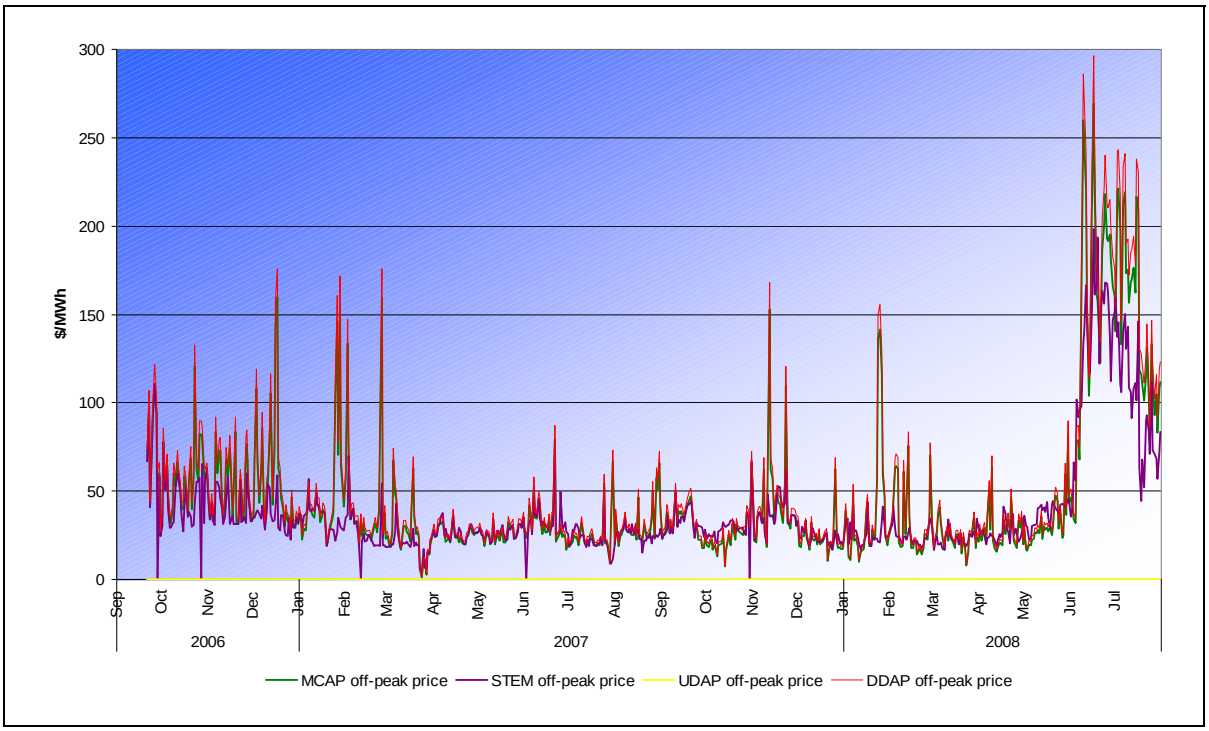
Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	0.0	0.0
Peak	50.1	52.0

Table 5: Mean and standard deviations of the DDAP (21 September 2006 to 31 July 2008)

Trading interval	Mean ($/MWh)	Standard deviation ($/MWh)
Off-peak	50.2	58.4
Peak	128.4	128.3

Figure 8 illustrates average daily off-peak balancing and STEM prices for each trading day from market commencement up to 31 July 2008. Because the DDAP is set equal to the MCAP multiplied by 1.1 during off-peak periods, a clear link between the two can be observed in Figure 8.

Figure 8: Average daily off-peak balancing prices



As can be seen, there is a strong correlation between off-peak balancing prices and off-peak STEM prices, with the former generally exhibiting greater volatility. This similarity is shown more clearly in Figure 9, which compares 30-day moving averages of off-peak STEM and balancing prices, and in Figure 10, which compares 90-day moving averages of off-peak STEM and balancing prices.

During off-peak periods, both STEM prices and balancing prices trended downwards from market commencement to March or April 2007. During this period, MCAPs were consistently greater than STEM prices. The IMO suggested 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. Off-peak MCAPs have become much more closely aligned with off-peak STEM prices from around April 2007. However, the divergence between STEM and balancing prices is also evident more recently, during periods of high prices in June/July 2008. According to the IMO, this was due to a number of participants not being able to operate their generation plant to supply their native loads, and hence having to source power through balancing. The Authority would observe that the design of the WEM intends that such purchases ought to occur through the STEM rather than through balancing. The fact that participants sourced energy through balancing goes to the question of the usefulness of the STEM, which is discussed in more detail in section 6.

Figure 9: 30-day moving average off-peak STEM and balancing prices

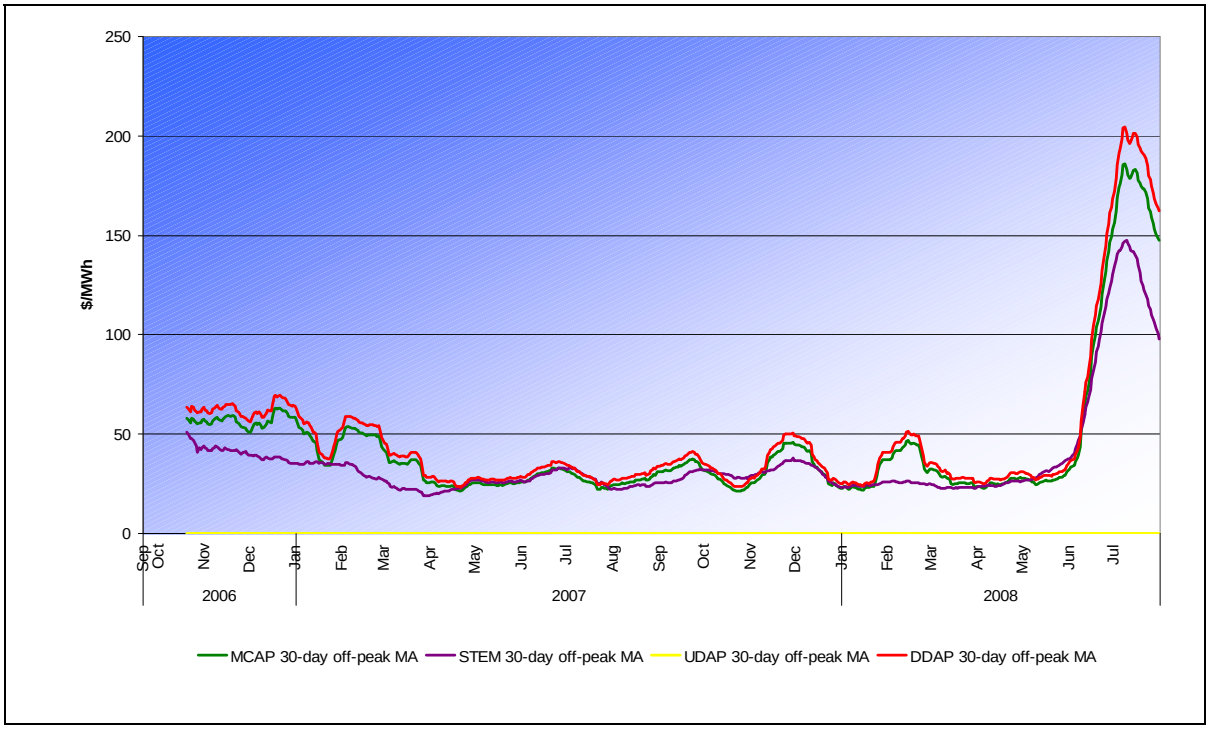


Figure 10: 90-day moving average off-peak STEM and balancing prices

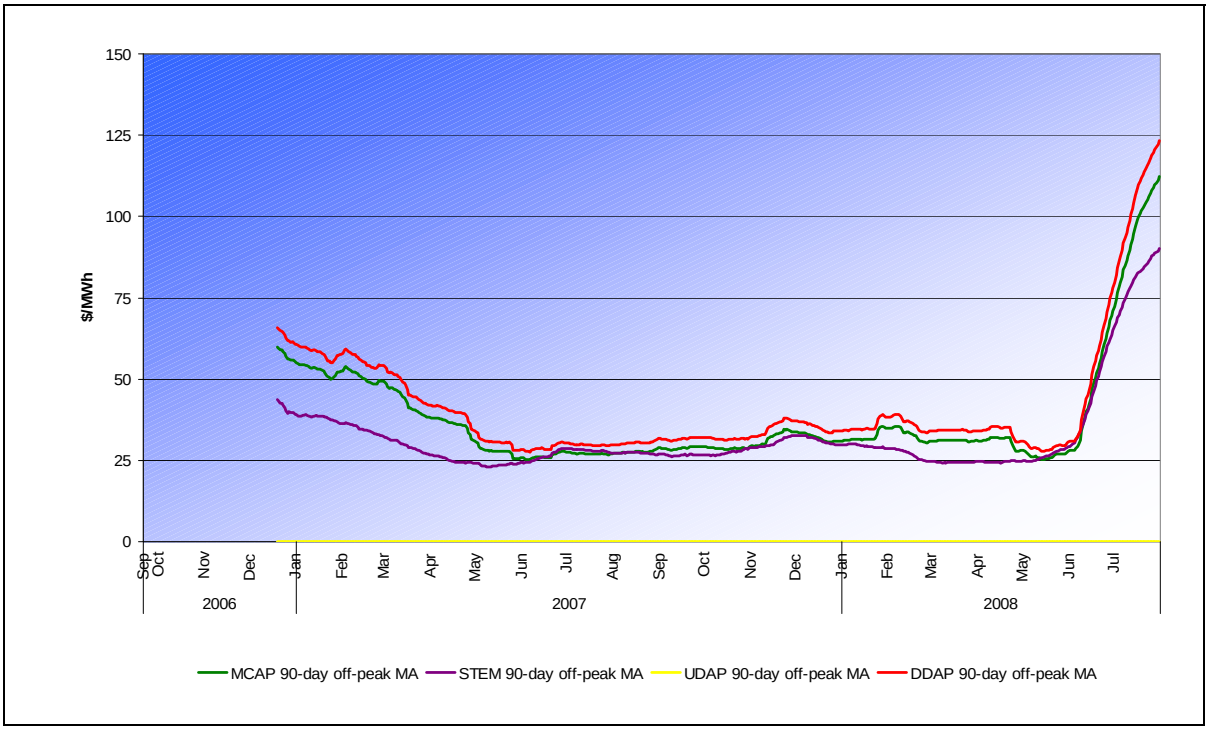
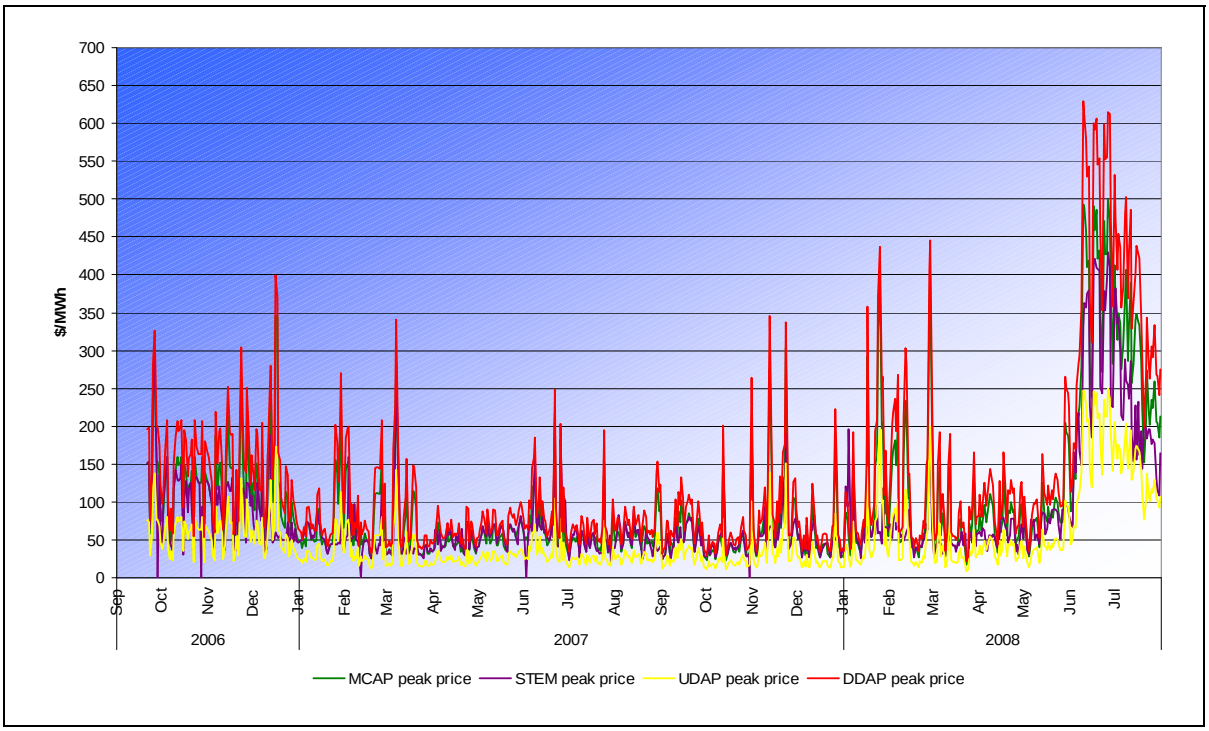


Figure 11 illustrates average daily peak balancing prices for each trading day from market commencement to 31 July 2008. Because the UDAP and the DDAP are set with reference to the MCAP, a clear link between the three is observed in Figure 11.

Figure 11: Average daily peak balancing prices



As with off-peak trading intervals, the pattern of balancing prices during peak periods is similar to the pattern of peak STEM prices. This similarity is shown more clearly in Figure 12, which compares 30-day moving averages of peak STEM and balancing prices, and in Figure 13, which compares 90-day moving averages of peak STEM and balancing prices.

During peak trading intervals, both STEM prices and balancing prices trended downwards from market commencement to April 2007. Balancing prices then followed predictable seasonal patterns, with spikes to over $400/MWh in winter 2007 and summer 2007/08 led to elevated moving averages in the following months. Average prices stabilised to slightly above their historical trends in April and May 2008 before rising dramatically in June and July 2008.

Figure 12: 30-day moving average peak STEM and balancing prices

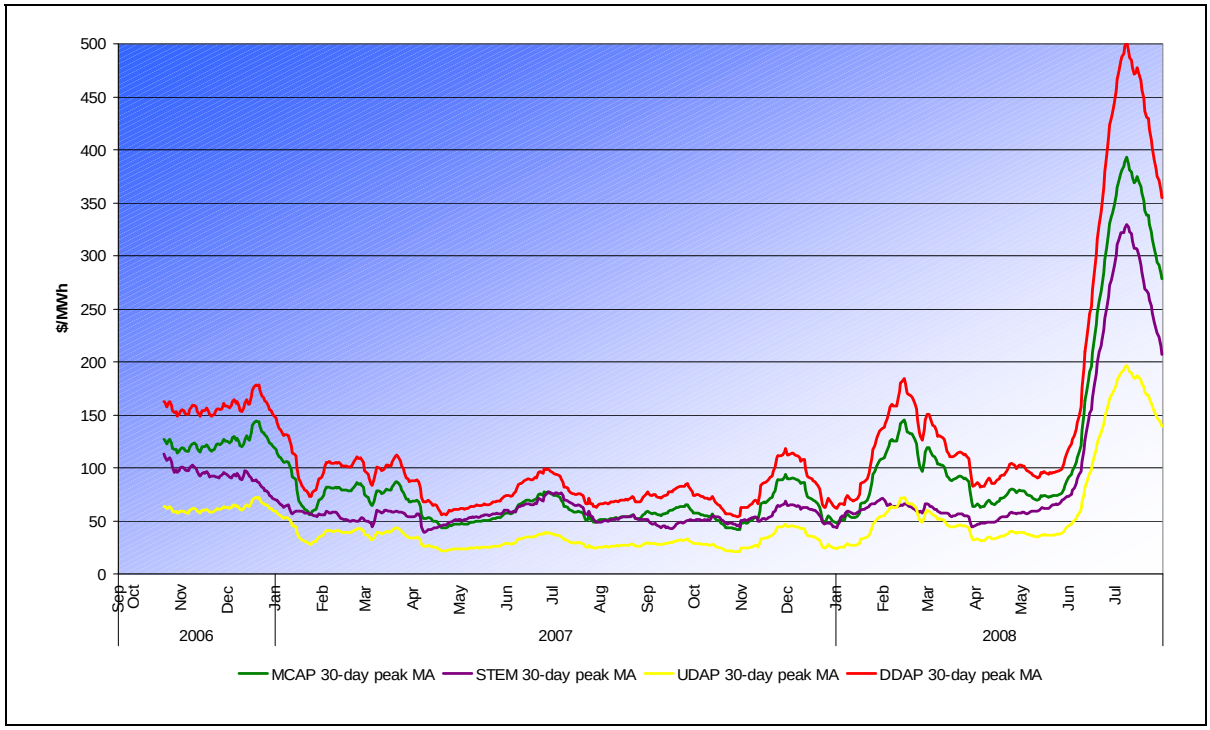


Figure 13: 90-day moving average peak STEM and balancing prices

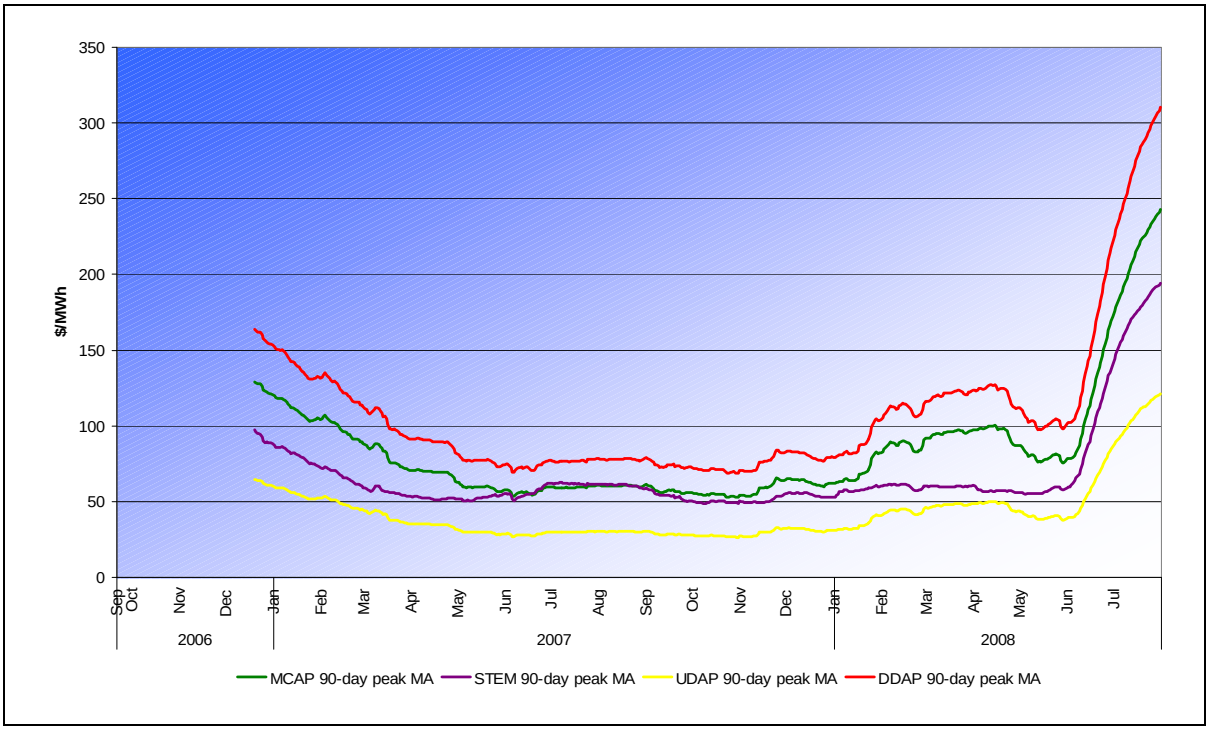


Figure 14 and Figure 15 show annual moving average STEM and balancing prices for off-peak and peak prices respectively. Given the market start date of September 2006, annual moving average data is only available from October 2007 to July 2008. While this small sample of time-series observations makes inferring trends difficult, it is evident that both peak and off-peak annual moving average prices steadily fell to their lowest average by the first quarter of 2008, before beginning to increase.

Figure 14: Annual moving average off-peak STEM and balancing prices

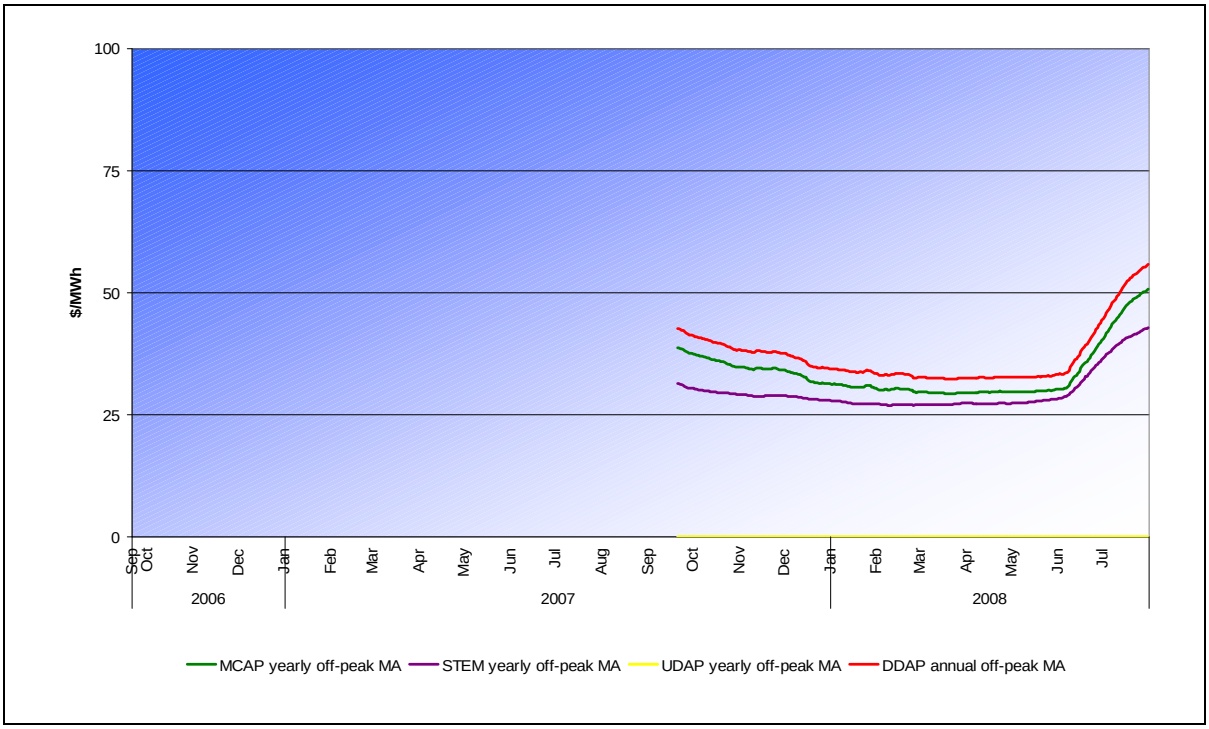
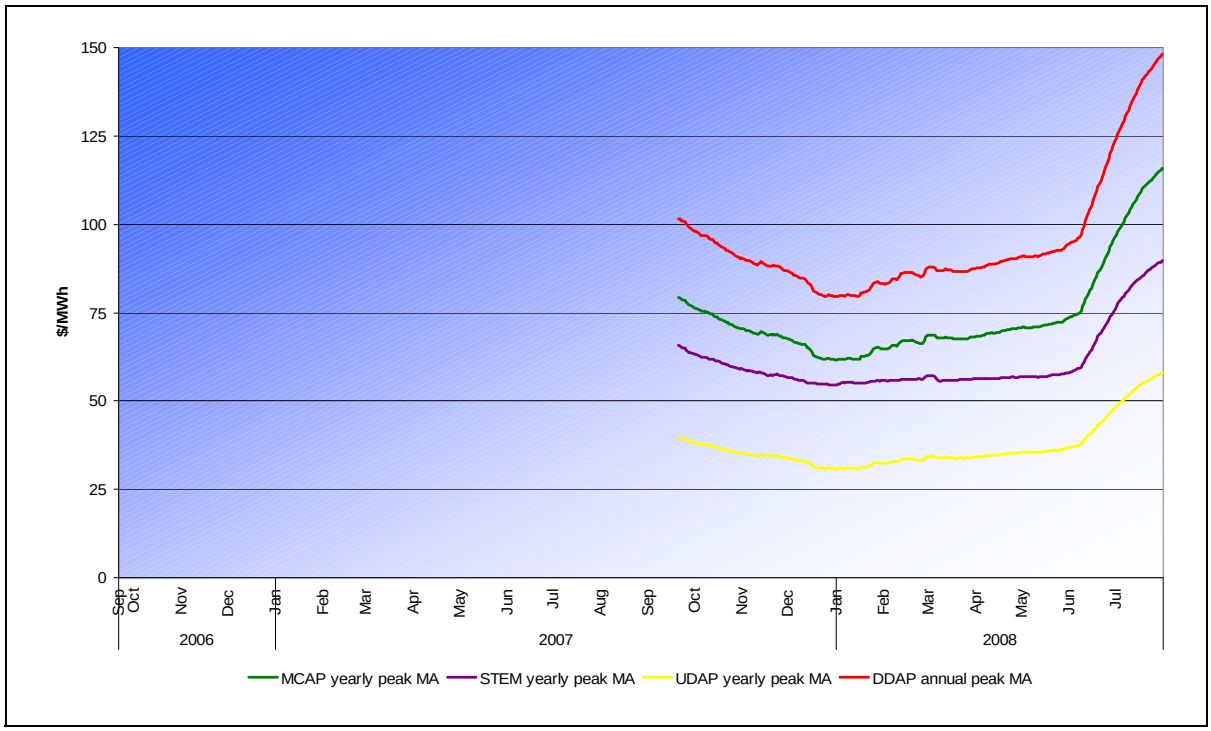


Figure 15: Annual moving average peak STEM and balancing prices



3.4.2 Volatility of balancing prices

As indicated by Figure 8 and Figure 11, both STEM and balancing prices were higher and more volatile up until April 2007. There was a period of reasonable price stability from April to October 2007. However, November 2007 and January to March 2008 were both periods of high volatility. Increased prices and volatility are evident across both STEM and balancing prices over June and July 2008.

Volatility in balancing prices is more accurately examined and analysed by determining means and standard deviations. The means and standard deviations (as well as the maximum and minimum) of balancing prices are illustrated in Figure 36 through to Figure 40 in Appendix 3. In general, peak prices are more volatile than off-peak prices for MCAP and DDAP, as was the case for STEM prices. As with off-peak STEM prices, off-peak MCAPs and DDAPs were volatile at market start, remained reasonably stable for much of the period and increased significantly in volatility in June/July 2008 where volatility was greater than any period yet recorded. Peak MCAPs and DDAPs, again much like STEM prices, tend to be more volatile and exhibit less of a trend – the notable exception being greater volatility than previously recorded in June/July 2008.

3.4.3 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 16 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. While MCAP hit the maximum STEM price on relatively few occasions between March 2007 and May 2008 (the exceptions being in January and February 2008), recent high prices and price volatility in June/July 2008 has seen an increased incidence of MCAP hitting the maximum STEM price. Comparing Figure 5 with Figure 16, it is clear that MCAPs have been at the maximum STEM price more often than have STEM prices.

The Authority notes that MCAPs were at the maximum STEM price more often in July 2008 than June 2008, notwithstanding the Varanus Island incident in June. This is largely because June temperatures are relatively milder than July temperatures, and hence, June demand was not as high as demand in July.

Figure 16: Proportion of trading intervals MCAPs are at maximum STEM price, by month

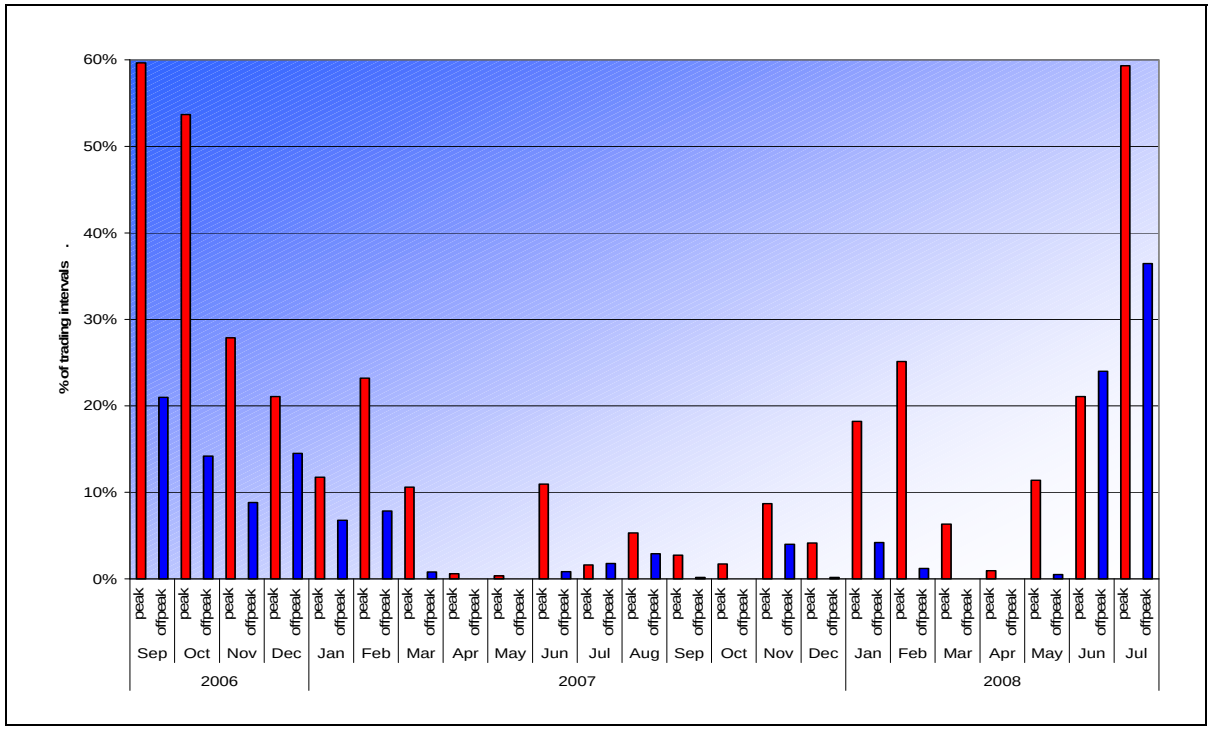


Figure 17 illustrates the proportion of peak and off-peak trading intervals during which MCAPs were at the alternative maximum STEM price. MCAPs have rarely reached the alternative maximum STEM price, although again, it has been more common for MCAPs to do so than for STEM prices to do so.

Figure 17: Proportion of trading intervals MCAP prices are at alternative maximum STEM price, by month

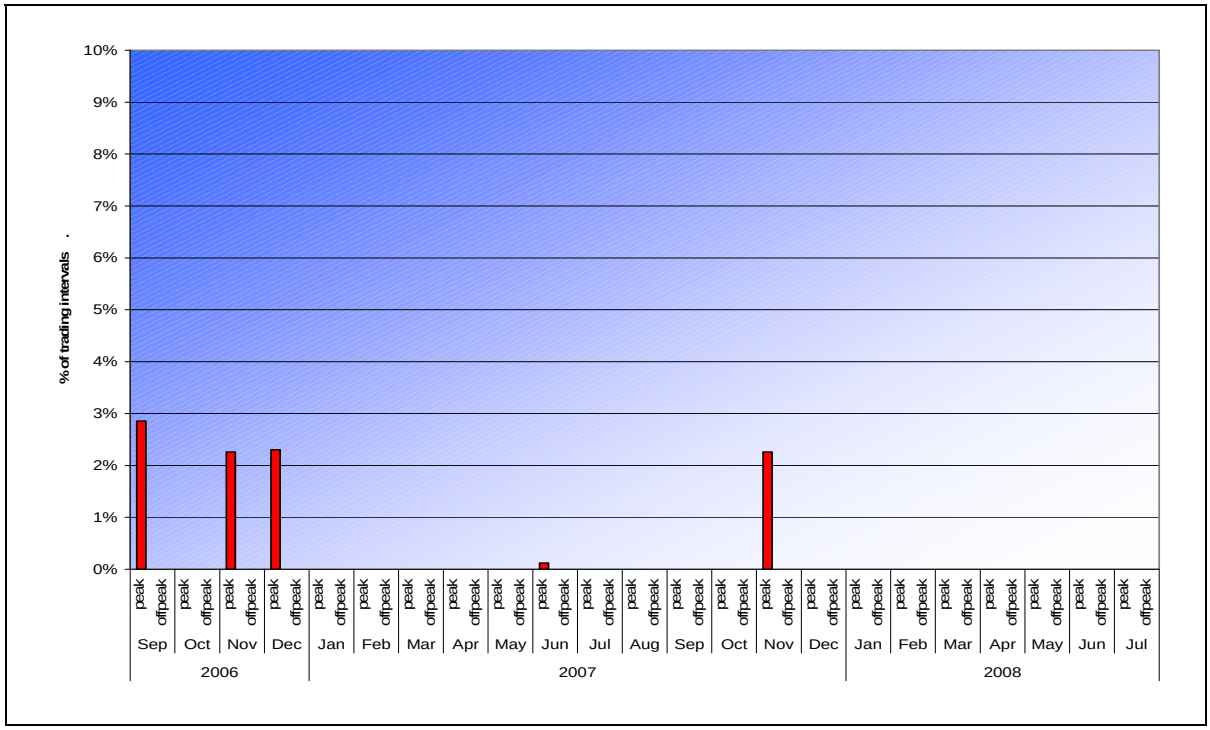
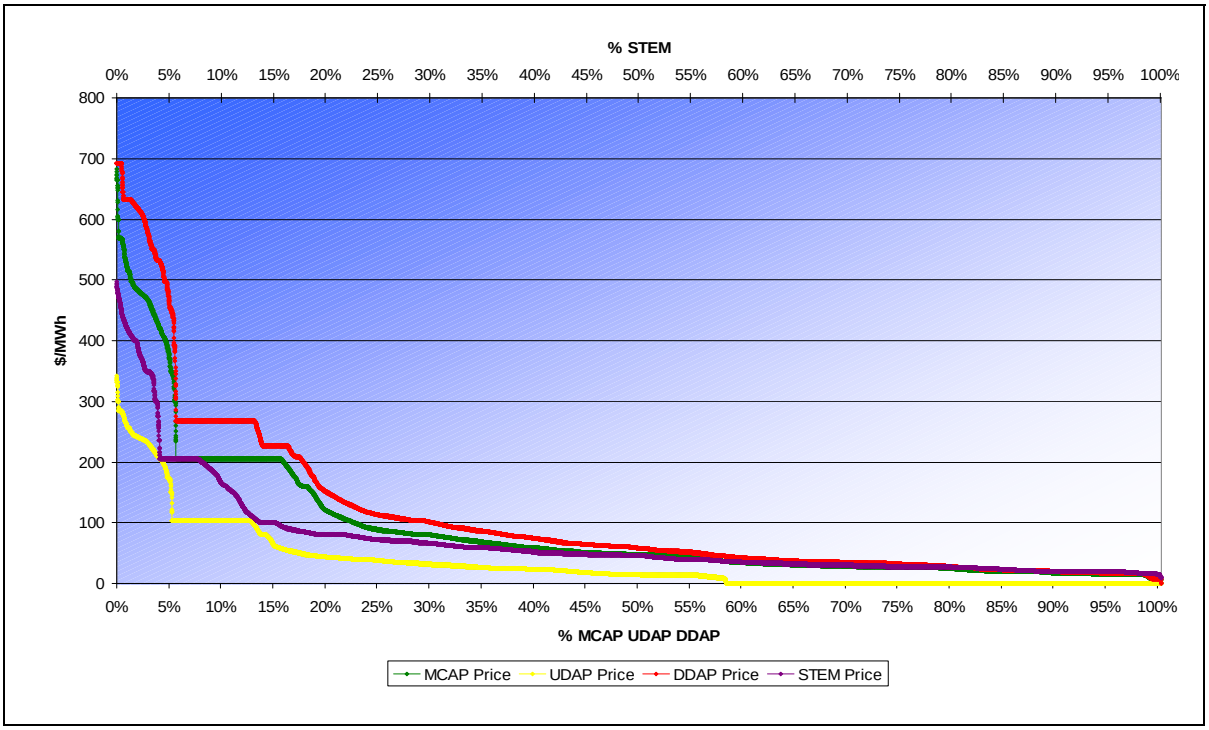


Figure 18 sets out the MCAP duration curve, covering trading intervals for one year from 1 August 2007 to 31 July 2008. For the purposes of comparison, Figure 18 also includes the UDAP, DDAP and STEM price duration curves for the same period.[23]

As can be seen in Figure 18, 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. As expected, the MCAP is bounded by the UDAP and the DDAP. A notable divergence between the MCAP and STEM prices is around $150/MWh – while STEM prices fall in this range for around 11 per cent of trading intervals, MCAPs fall in this same range for around 19 per cent of trading intervals.

[23] The price duration curves for peak and off-peak periods are set out in Figure 29 to Figure 30 of Appendix 3.

Figure 18: Price duration curve for MCAPs (1 August 2007 to 31 July 2008)



Clause 2.16.4(f) of the Market Rules require the calculation of the correlation between capacity available in balancing and the incidence of high prices. For the reasons discussed, when considering the correlation between STEM prices and quantities offered into the STEM, the correlation between capacity available in balancing and the incidence of high prices will fail to usefully capture key determinants of prices. Therefore, correlations are not included in this report, but the Authority will continue to work with the IMO on more appropriate forms of analysis to explain balancing prices.

In addition to analysing the key determinants of high prices in the STEM, clause 2.16.4(g) requires the IMO to explore the key determinants for high balancing prices. The Authority understands that the IMO intends to work cooperatively with the Authority on the development of an appropriate methodology for this analysis.

3.5 Reserve capacity auction offers

Clause 2.16.2(dA) of the Market Rules requires that the MSDC identify all reserve capacity auction offers. As no reserve capacity auction has been required to date, no auction offers can be reported.

3.6 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. Certainly, total bilateral quantities show a seasonal trend, with greater quantities and some spikes in quantities occurring during summer, but, on the whole, quantities have remained relatively steady.

3.7 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.

In addition, this section provides information on volumes traded in the STEM.

3.7.1 STEM offers

STEM offers reflect an increase in generation or a decrease in consumption. Figure 19 illustrates the daily average quantity of STEM offers per trading interval, for all Market Participants, from market commencement to 31 July 2008. 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. As can be seen in Figure 19, significant quantities of energy have consistently been offered in the STEM at prices above $100/MWh. The Authority understands that this was partly a result of certain participants with combined load and generation facilities seeking to ensure they could continue to self-supply their native loads. There have also been significant quantities offered in the STEM at prices in excess of the maximum STEM price, although this lessened over the summer of 2008.

STEM offers for each Market Participant are separately set out in Figure 41 to Figure 47 in Appendix 3. These figures show clear differences in the prices at which Market Participants have offered quantities into the STEM.

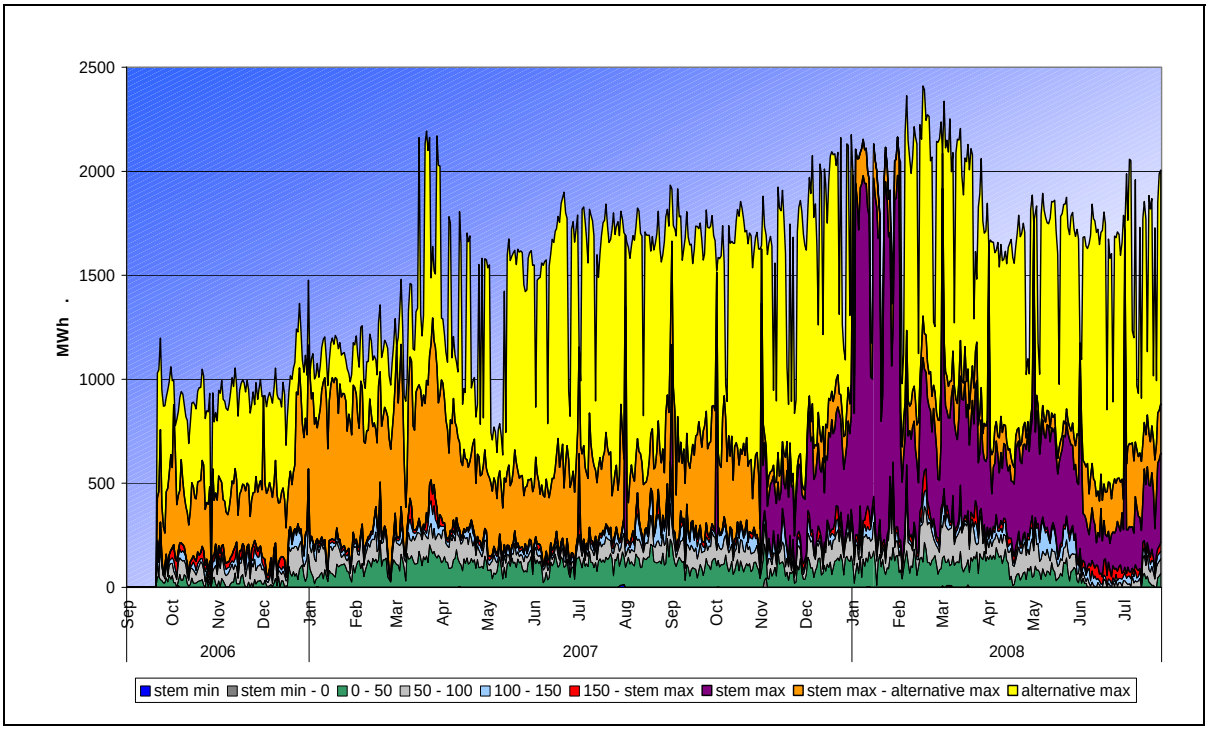
As seen in Figure 47 in Appendix 3, Verve Energy has tended to offer quantities into the STEM at a range of price bands, although the majority of its STEM offers are priced above $100/MWh. Notably, since November 2007, Verve Energy has priced a large proportion of its STEM offers at the maximum STEM price instead of between the maximum STEM price and the alternative STEM price, which was its previous practice. The Authority understands that this change is linked to changes in Verve Energy's fuel declarations, as discussed in section 3.8. Since November 2007, Verve Energy has submitted a greater number of non-liquid declarations, perhaps due to less pipeline curtailment reducing uncertainty for bidding non-liquid fuel or increased surveillance of fuel declarations by the IMO.[24] Quantities that Verve Energy had previously offered as liquid but has more recently offered as non-liquid must now be offered at or below the maximum STEM price

[24] Market generators that have plant capable of running on either liquid or non-liquid fuel must declare in their daily STEM offers which fuel the offer is based on for the relevant trading day. The IMO closely monitors such bids.

(rather than the higher alternative maximum STEM price). The data indicates that Verve Energy has favoured offering these quantities at the maximum STEM price.

Similarly, both Alinta and Synergy reduced the pricing of the bulk of their STEM offers for the month of January 2008, from the alternate maximum STEM price to the maximum STEM price (see Figure 42 and Figure 46 in Appendix 3). The Authority understands that the IMO views this change as a result of these participants' increased familiarity with the STEM.

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



3.7.2 STEM bids

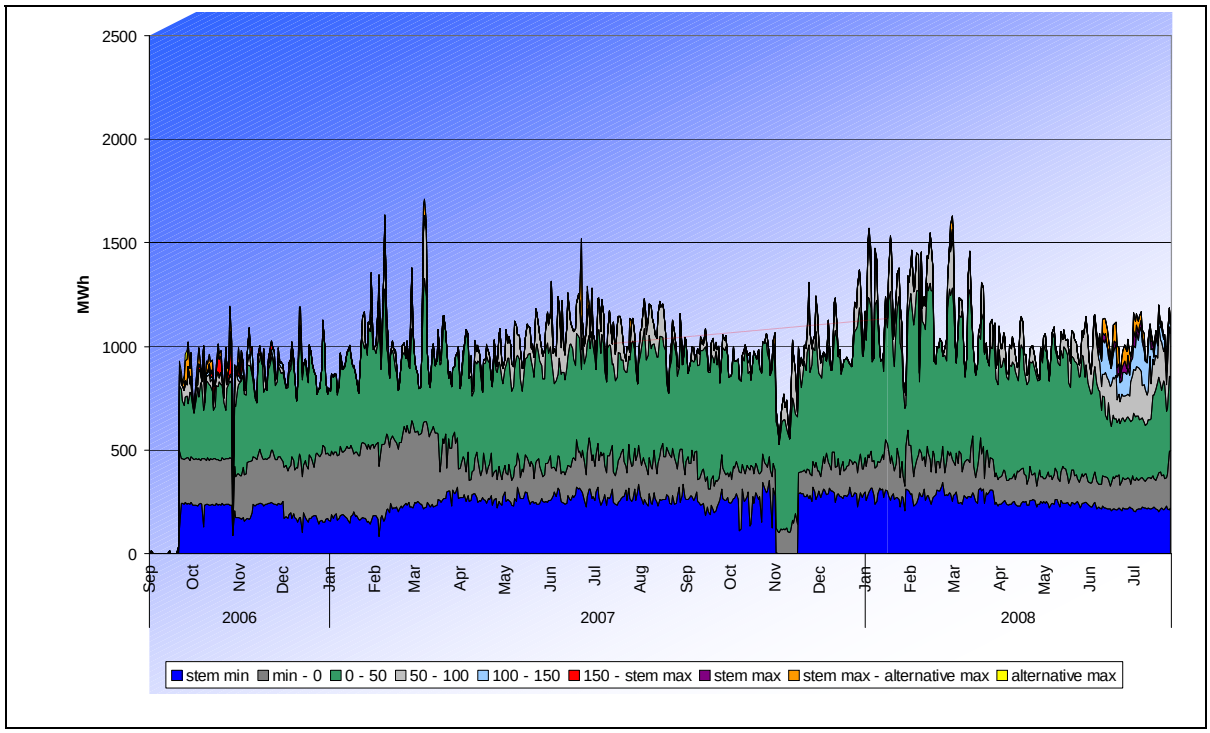
STEM bids reflect a decrease in generation or an increase in consumption. Figure 20 illustrates the daily average quantity of STEM bids per trading interval, for all Market Participants, from market commencement to 31 July 2008. As for STEM offers, the daily average quantity is broken down by price levels 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 Figure 48 through Figure 54 of Appendix 3.

As can be seen in Figure 20, 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/MWh, and between $0/MWh and $50/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. Also, quantities have been bid at higher prices in June to July 2008 to reflect the Varanus Island incident, and hence higher cost of supply.

The total quantity of STEM bids is dominated by the two largest generators: Verve Energy and Alinta. The STEM bids of Alinta and Verve Energy show different patterns, as seen in

Figure 49 and Figure 54 in Appendix 3. Alinta has tended to bid large blocks of energy at the STEM minimum price and has done so consistently. The volumes bid at the STEM minimum price in Figure 20 are predominantly Alinta's bids. By contrast, Verve Energy has tended to bid quantities at higher prices: most consistently between the STEM minimum price and \$0/MWh and between \$0/MWh and \$50/MWh. The quantities shown bid at these price bands in Figure 20 are predominantly Verve Energy's bids. However, as the marginal cost of supply for the plant that Verve Energy dispatches to meet its bilateral commitments is not known, it is not clear whether such bids are cost-reflective.

Figure 20: Daily average quantity of STEM bids (cumulative MWh per trading interval)



3.7.3 STEM traded volumes

Although not required under the Market Rules, this section provides data on STEM traded volumes. This information can assist in understanding the price at which energy would need to be offered into the STEM in order to be regularly cleared at volumes that encourages some risk-taking from both sides, but particularly from Market Customers as part of their sourcing strategies.

The Authority notes that volume traded in the STEM has tended to increase over time, but has remained relatively low. This can be seen in Figure 21 and Figure 22.

The Authority understands that part of the reason for this is the alignment problem between the timing of the STEM and the timing for gas pipeline nominations, as discussed further in section 4.5.2.

Figure 21: Monthly quantities bought in the STEM (MWh)

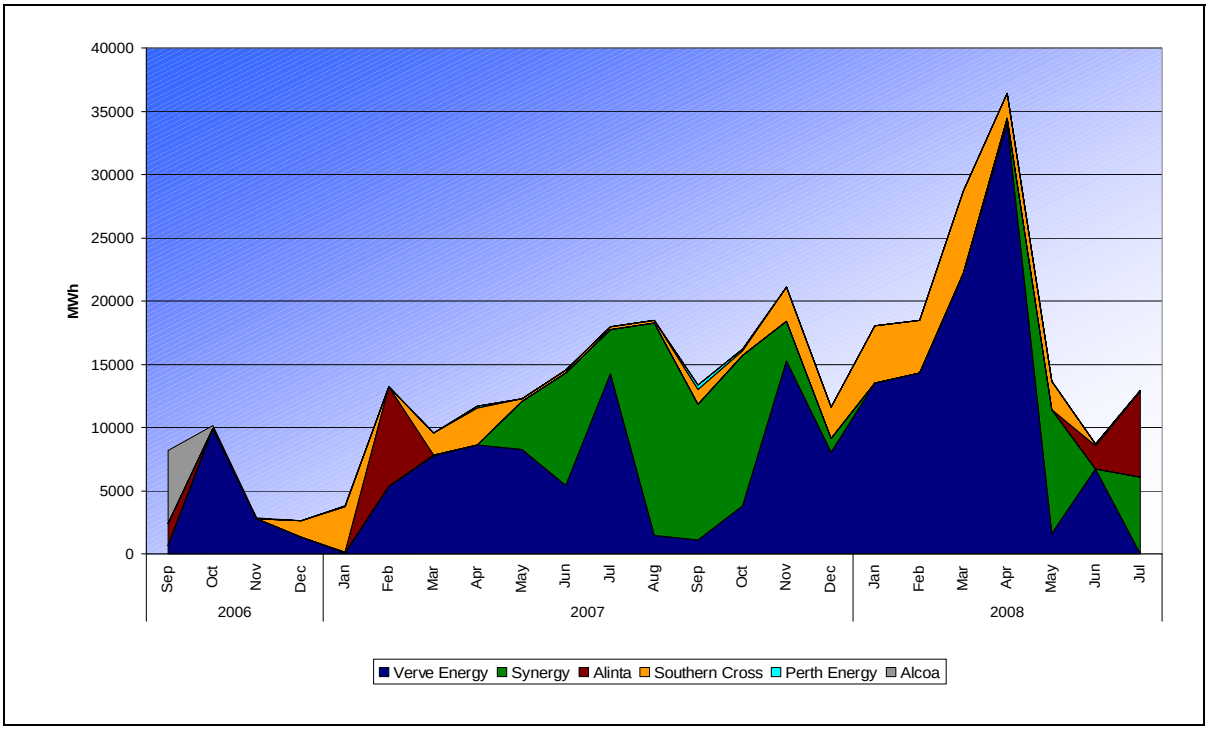
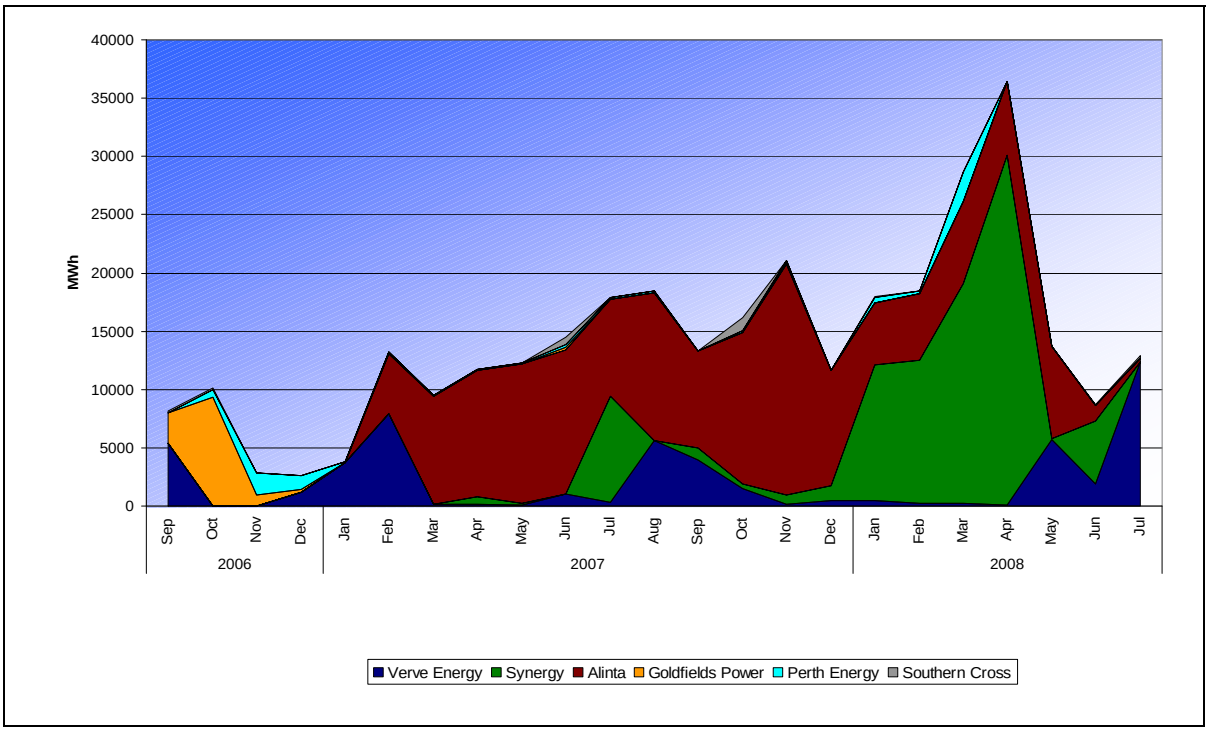


Figure 22: Monthly quantities sold in the STEM (MWh)



3.8 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(cA) 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.[25] 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.

Table 6 summarises the fuel declarations for each dual-fuel facility. Table 6 shows the percentage of all trading intervals between market commencement and 31 July 2008 for which each dual-fuel facility was assumed to be operating on non-liquid and liquid fuels. The most noticeable differences this year are Verve Energy facilities submitting higher non-liquid declarations compared to last year.

[25] See clause 6.6.1.

Table 6: Fuel declarations (21 September 2006 to 31 July 2008)[26]

Participant	Facility ID	Non-liquid declaration (% of all trading intervals)	Liquid declaration (% of all trading intervals)
Alcoa	ALCOA_KWI	11.20%	0.00%
Alcoa	ALCOA_PNJ	10.20%	0.00%
Alcoa	ALCOA_WGP	11.30%	0.00%
Alinta	ALINTA_WGP_GT	0.10%	43.20%
Goldfields Power	PRK_AG	5.60%	94.30%
Southern Cross	STHRNCRS_EG	0.00%	4.30%
Verve Energy	KEMERTON_GT11	81.10%	18.70%
Verve Energy	KEMERTON_GT12	19.00%	80.90%
Verve Energy	KWINANA_G3	73.30%	21.90%
Verve Energy	KWINANA_G4	75.00%	22.10%
Verve Energy	KWINANA_G5	77.80%	4.40%
Verve Energy	KWINANA_G6	80.20%	1.90%
Verve Energy	KWINANA_GT1	0.00%	99.90%
Verve Energy	PINJAR_GT1	42.10%	57.70%
Verve Energy	PINJAR_GT2	10.20%	89.70%
Verve Energy	PINJAR_GT3	42.10%	57.10%
Verve Energy	PINJAR_GT4	7.80%	92.00%
Verve Energy	PINJAR_GT5	37.60%	62.20%
Verve Energy	PINJAR_GT7	5.00%	94.70%

Thus, 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.

The issue of whether separate STEM price caps for liquid and non-liquid fuels ought to continue to apply, in order to deter market manipulation, is a matter that the Authority believes should be considered as part of the road map process discussed further in section 6 below.

[26] Note that Market Participants are not required to make a fuel declaration for dual-fuel facilities for each trading interval (but only for those trading intervals for which they submit a STEM submission regarding that facility), so the sum of the percentage of trading intervals for which a non-liquid declaration was made, and the percentage of trading intervals for which a liquid declaration was made need not equal 100 per cent.

3.9 Availability declarations

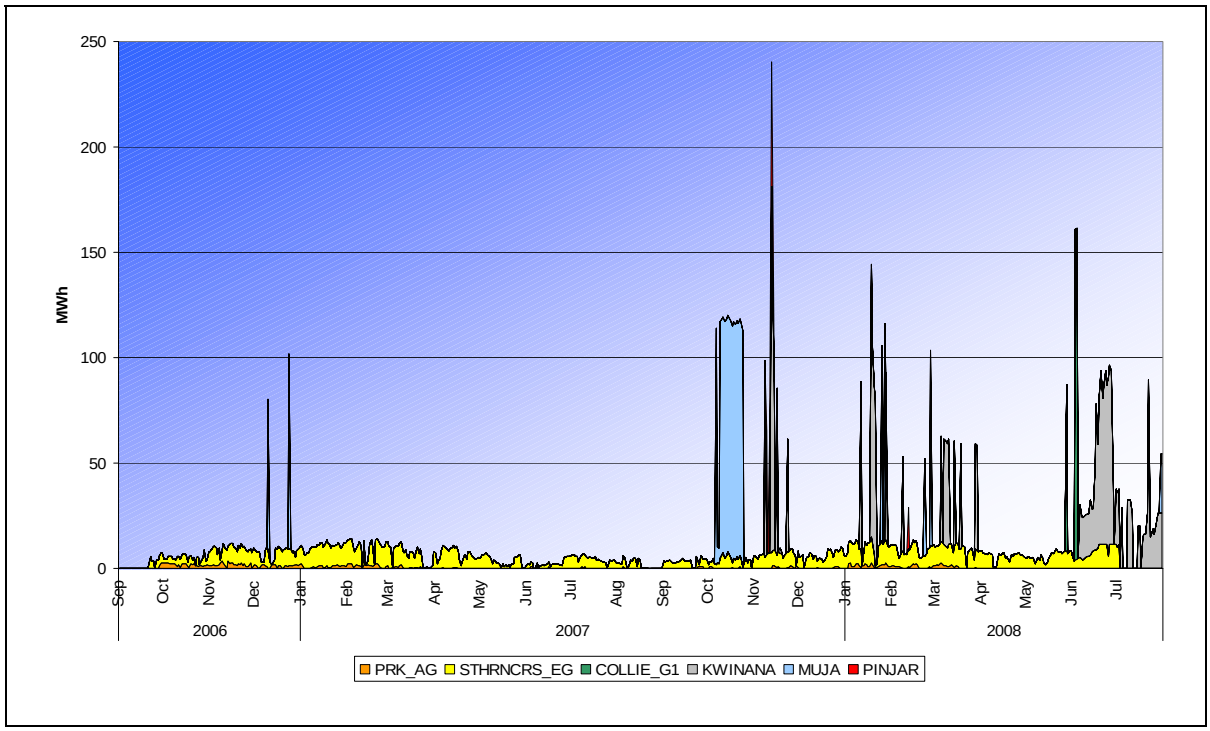
Clause 2.16.2(gB) of the Market Rules requires that the MSDC identify all availability declarations. There is also a requirement under clause 2.16.4(cA) to calculate any consistent or significant variations between availability declarations and the actual operation of a Market Participant in real-time.

A Market Participant submitting a STEM submission must include in the STEM submission an availability declaration.[27] 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.

Between market commencement and 31 July 2007, only two Market Participants regularly submitted a quantity greater than zero in an availability declaration: Southern Cross Energy and Goldfields Power. However, there have been many availability declarations from other participants in the year since then. Figure 23 includes declarations in respect of Verve Energy's Kwinana, Muja, Pinjar and Collie facilities, as well as declarations by Goldfields Power and Southern Cross Energy facilities. Figure 24 shows only Goldfields Power and Southern Cross declarations for the purposes of comparison to the 2007 Minister's Report.

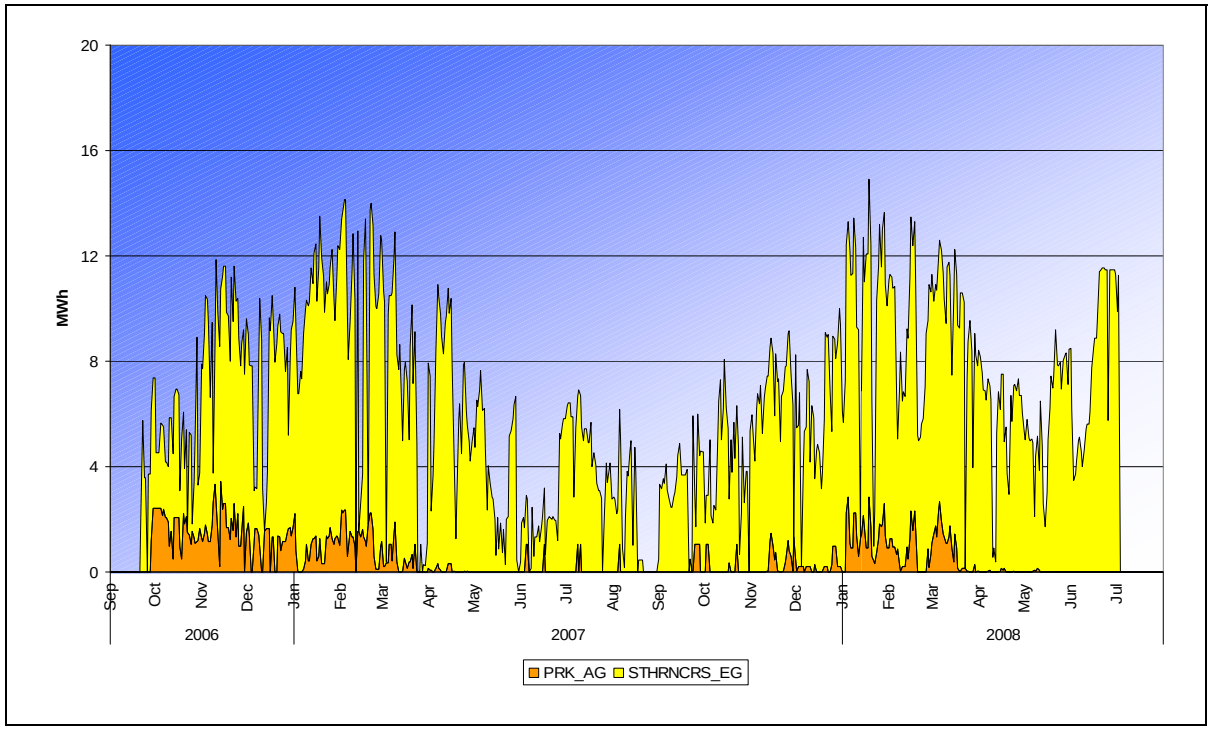
The Authority considers that the increase in the volume of energy (in MWh) the subject of availability declarations over the last year has become fairly significant in the context of the size of the WEM. According to the IMO, the key reason for this increase is an increased sophistication regarding compliance amongst participants.

Figure 23: Daily average availability declarations (MWh per trading interval)



[27] See clause 6.6.1.

Figure 24: Daily average availability declarations (MWh per trading interval) for Goldfields Power and Southern Cross



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 Supervisory Control and Data Acquisition (**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 commercially sensitive and so is not presented in this public version of the report.

3.10 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(cA) to calculate any consistent or significant variations between ancillary service declarations and the actual operation of a Market Participant in real-time.

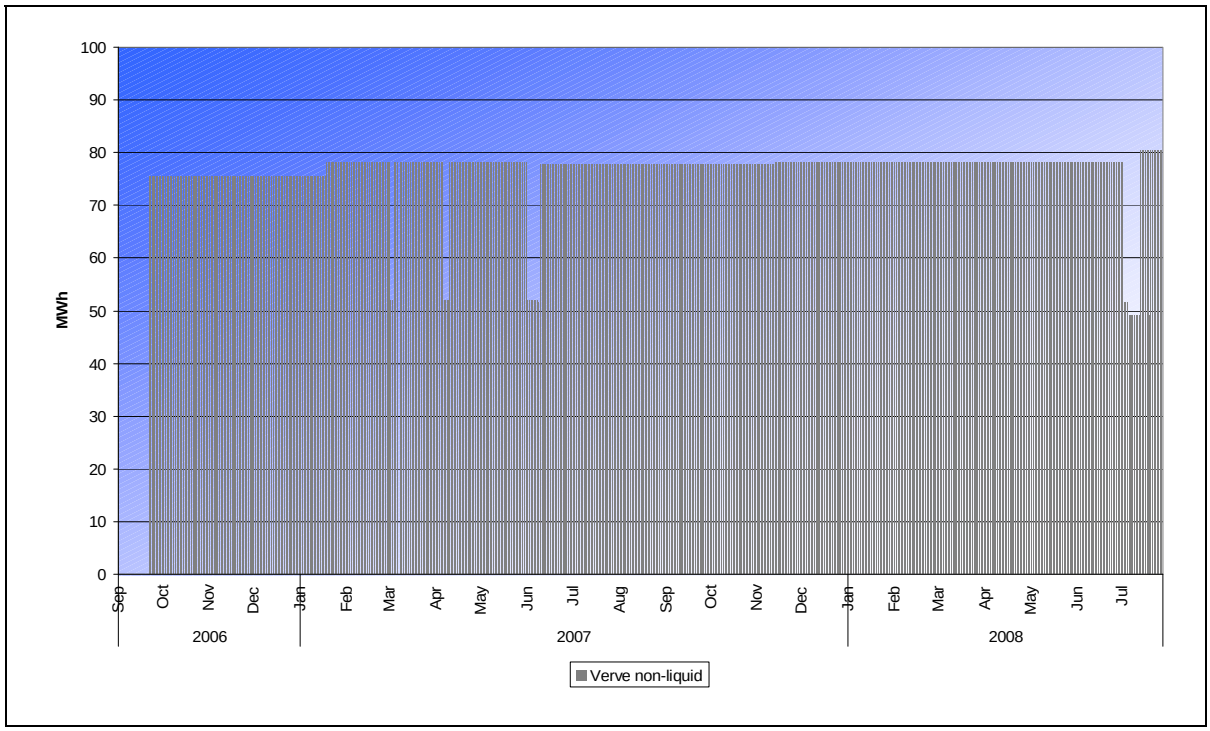
A Market Participant that is a provider of ancillary services must include in its STEM submission an ancillary services declaration.[28] The ancillary services declaration is to set out the MWh of energy, from both liquid and non-liquid facilities that the Market Participant has not included in the portfolio supply curve because it expects to have to maintain surplus capacity with which to provide ancillary services.

Between market commencement and 31 July 2008, the only Market Participant to submit an ancillary service declaration was Verve Energy. The quantities of energy to be

[28] See clause 6.6.1.

provided for ancillary services, as set out in Verve Energy's ancillary services declarations, are set out in Figure 25.

Figure 25: Ancillary services declarations [29]



As 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 3.17, the Authority will in future report on variations between ancillary service declarations and the actual operation of facilities in real-time.

3.11 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 bid prices or quantities relative to recent past behaviour.

The prices and quantities of STEM offers and bids by each Market Participant are illustrated in Figure 41 through Figure 54 in Appendix 3. It is clear from these figures that there are significant variations in the prices and/or quantities of STEM offers and 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 2008 (with frequent step changes in the quantities and/or prices of STEM offers and bids).

Given these significant variations in STEM offers and bids, it is difficult to develop a robust system for identifying substantial variations relative to recent past behaviour. In order to

[29] Note that Verve Energy's ancillary services declarations have only included quantities for non-liquid fuel. There is no ancillary services quantity evident for 27 October 2006 due to a market suspension on that day, and no ancillary services quantity evident for 7 March 2007 because System Management did not request that Verve Energy provide ancillary services on that day (peak demand was recorded on 7 March).

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 bids that is observed, the way that these conceptual issues are resolved will have a profound impact on the variations that are identified under this requirement. The IMO intends to progress its work in this area in co-operation with the Authority.

3.12 Evidence of Market Customers 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; and
- 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; and
  - 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, 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.

3.13 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. This is because, in effect, all of Verve Energy's capacity is available to provide balancing. The IMO derives 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. During the first year of the market's operation, the total capacity available through balancing had been relatively steady, at around 60 MWh per trading interval. Beginning in October 2007, the quantity available through balancing has increased substantially, and has averaged around 240 MWh per trading interval since then.

3.14 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 the participant to vary the output or consumption of one of its facilities from the level indicated in its resource plan, or to vary the output or consumption of one of its facilities holding capacity credits.

Figure 26 illustrates the number of increment dispatch instructions and decrement dispatch instructions per trading day, from market commencement to 31 July 2008. It is clear that there are two outliers on 3 January 2008 and 24 January 2008, where the total number of dispatch instructions increased to above 900 in a trading day. The first of these was the result of gas constraints due to a failure at the North-West shelf and the latter was due to large outages on the system.

Leaving aside the two outliers discussed above, it is clear from Figure 27 that dispatch instructions were most frequently issued during the first few months following market commencement, in June 2007, the beginning of 2008 and June to July 2008. In general, these were due to fuel constraints, which led to an increased likelihood that Verve Energy's facilities would run on liquid fuel. This, in turn, meant that System Management needed to rely on other Market Participant's facilities to provide balancing.

Figure 26: Daily average number of dispatch instructions

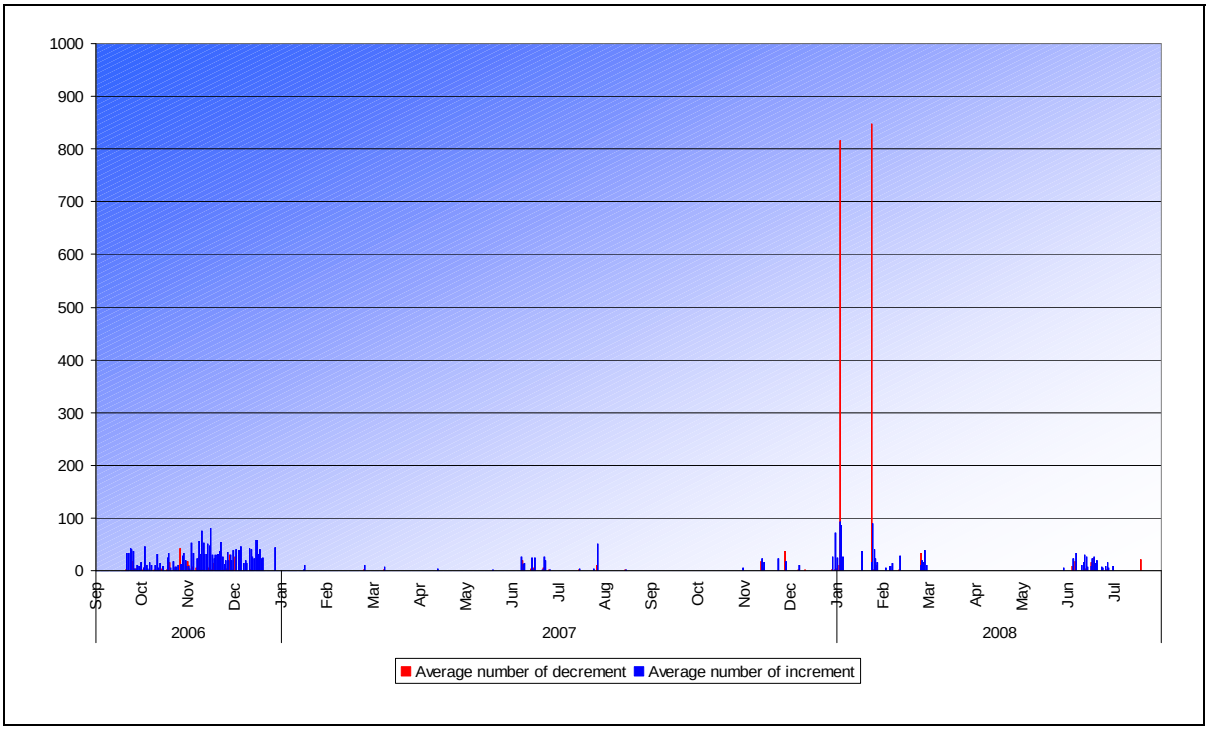
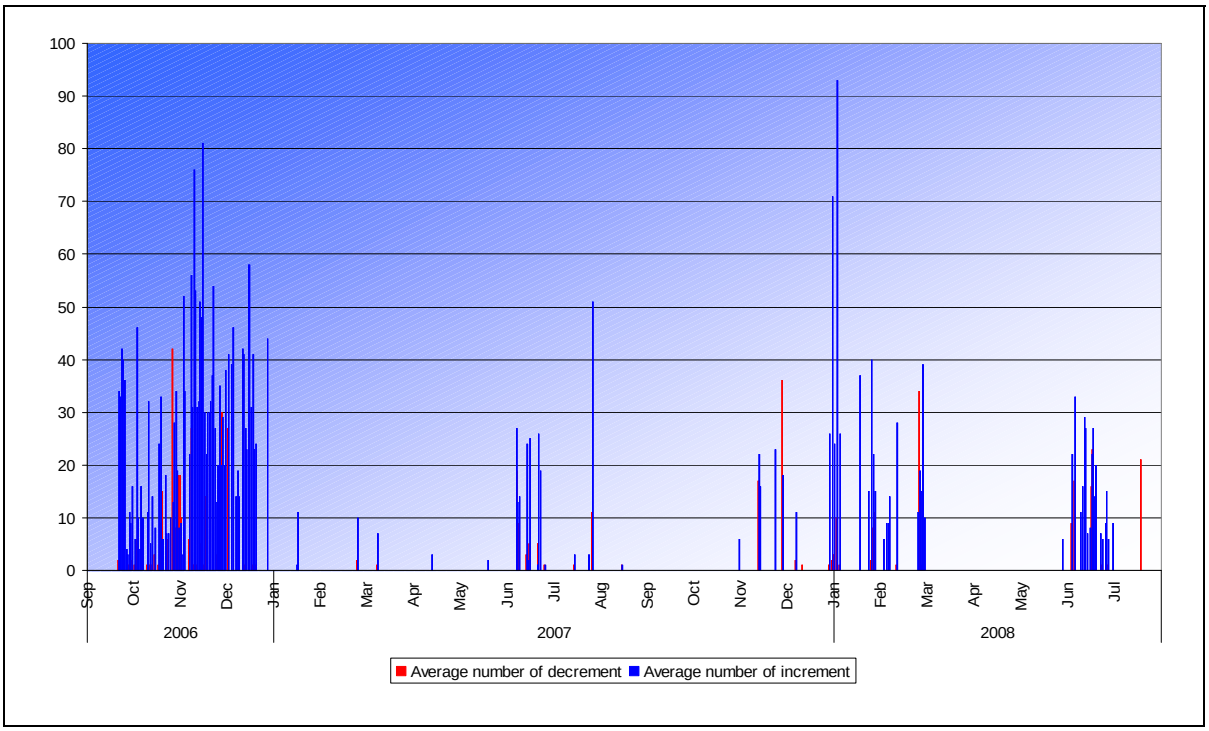


Figure 27: Daily average number of dispatch instructions – outliers removed



3.15 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.

Information on outages is confidential, and is not presented in this public version of the report. However, aggregated information can nevertheless be reported. In particular, the Authority notes that the quantity of energy subject to forced outages was exceptionally high in June and July 2008. This was in part because of the Varanus Island incident and other gas supply constraints that led to a lack of fuel, which caused a number of plant to be unavailable.

3.16 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 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 Authority notes that the rate of forced outages for some plant is significant. In some cases, the Authority understands that there are reasonable explanations for the high rate of forced outages. Nevertheless, for some plant the observed forced outage rate is significant. This raises the question as to whether the existing market design is encouraging appropriate generation asset management practices and providing the right incentives for plant availability. As discussed in section 4.4.3 there have been recent changes to the reserve capacity refund regime. The Authority intends to continue to closely monitor the rate of forced outages in the market.

3.17 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 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.

The Authority also notes that System Management has a deed of undertaking with Verve Energy for the provision of dispatch support services.[30] This deed was effective from 20 April 2008. When the Authority gave its approval to this deed it notified the parties of its expectation that a review of the building block data used to determine appropriate prices for these services would occur before 1 July of each year. A review of the costs did

[30] See the Authority web site at: http://www.era.wa.gov.au/2/629/42/ancillary_servi.pm.

not occur before 1 July 2008. The Authority is working to resolve the matters surrounding why this review did not occur with Verve Energy and System Management. The Authority will provide an update in relation to this matter in its next report to the Minister.

Clause 3.11.14 of the Market Rules requires that System Management 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* (***PSOP: Ancillary Services***)[31]. *PSOP: Ancillary Services* requires that the following process is 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.

The Authority understands that System Management is currently in the process of putting together a procurement strategy for ancillary services. However, the Authority considers that System Management's slow progress in this area is not meeting the expectations of the market. The Authority's view of System Management's procurement strategy for ancillary services is addressed in more detail in section 5.6.3 below.

Finally, the Authority notes that System Management has not entered into any balancing support contracts between market commencement and 31 July 2008. The Authority understands that prior to market commencement the then Western Power Corporation 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 4.5.3 below.

3.18 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.

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

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 2006, 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 2006 and 31 July 2007, the IMO received nine Rule change proposals, all of which had been commenced by the end of 2007. Between 1 August 2007 and 31 July 2008, the IMO received 32 Rule change proposals, of which all have commenced except one (which is at the Draft Report stage).

3.19 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 2008, the IMO has not provided any other information in the MSDC. The Authority will consider whether any such further information ought to be included going forward.

4 Effectiveness of the WEM, the IMO and System Management

4.1 Background

Clause 2.16.12(b) 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 Authority's Discussion Paper referred to in the previous section raised a number of issues in these and other areas that had emerged during initial consultation with stakeholders. The Discussion Paper adopted a slightly different ordering of the issues to that set out in the Rules, on the basis that it allowed for a more logical flow of ideas. In particular, network planning and connection issues were raised near the front of the Discussion Paper given their relevance to the workings of the reserve capacity market. This Report has, to this extent, adopted the ordering of issues used in the Discussion Paper.

Prior to discussing the effectiveness of the WEM across the detailed areas listed above, this section of the Minister's Report provides the Authority's overall view of the WEM over the last year.

4.2 Authority's overview of the effectiveness of the WEM

The summary of the data items in the MSDC and the analysis of the data undertaken by the IMO, as set out in section 3 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 2010/11 during the third reserve capacity cycle.[32]

Nevertheless, all but one of these new plant has been contracted to Synergy. This has two impacts. First, Synergy remains a dominant retailer and the contracts between it and the generator may serve to choke liquidity in the market. Second, there is an implicit (or perhaps explicit) financial guarantee from the State Government as owner of Synergy. Other retailers do not enjoy this advantage and new generation entrants probably view any other potential offtaker as more risky than Synergy. As a result, the unique position of Synergy is likely stifling retail market development and competition. Retail market competition is also likely to have been hampered by tariffs capped well below the underlying costs of supplying retail customers. This is an issue that the Authority believes must be addressed for the market to fully meet its objectives going forward.

At the same time, 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.

Price 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 tended to decline and become less volatile until the Varanus Island incident in early June 2008.

In this context, the Authority notes that market outcomes 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 and limitations, such as following the Varanus Island incident.

Given the close link between outcomes in the STEM and outcomes in the balancing market, the encouraging outcomes observed in the STEM – a trend towards lower and less volatile prices up until the Varanus Island incident – 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. However, it is unclear whether this capacity could be used to provide balancing at this stage because of 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.

[32] See the Executive Summary for references.

Despite these generally positive outcomes, the Authority notes that the STEM has generally exhibited relatively low volumes, as noted above. Given the cost of market management in the IMO is understood to be over $10 million, the return on this investment in terms of energy competition and benefit flow to the community, although unquantified, appears low. However, the Authority expects that the benefits of the STEM will increase over time as the competitiveness of the market increases.

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 this section and the remainder of this report.

4.3 Network planning and connection issues

The Discussion Paper raised a number of related issues surrounding network access, connection charges and planning.

4.3.1 Application process for network access offers

4.3.1.1 Outline in the Discussion Paper

As noted in the Discussion Paper, the Market Rules require that an application for certification of reserve capacity for a facility that has not yet entered service includes an access offer from Western Power that indicates that the facility is entitled to network access. In public consultation undertaken prior to the release of the Discussion Paper, some stakeholders raised concerns about the time taken to receive a network access offer from Western Power and suggested that delays in receiving a network access offer can delay participation in the reserve capacity mechanism. This, in turn, might impact on the competitiveness of, and outcomes in, the capacity market.

As part of that public consultation, Western Power commented that the process for providing a network access offer is necessarily a lengthy process. Due to the need to undertake modelling, assess costs and possibly undertake the regulatory test and seek Board and Ministerial approval, it can take up to 18 months to provide a network access offer from the time that Western Power begins its assessment of an application.

Western Power also commented that due to the large number of applications for network access it has received, it has adopted a queuing policy that assesses applications for network access in the order that they are received. This means that Western Power will not commence processing some recent applications for another 6 to 12 months.

4.3.1.2 Submissions received in response to the Discussion Paper

The IMO noted that the issue of new connections was, in its experience, a key concern of many potential investors in the WEM and that the IMO would support an improvement in the speed and transparency of the process for network access applications and approvals. Likewise, the Chamber of Commerce and Industry WA (**CCIWA**) supported simplification of the approvals process for new connections.

More specifically, Griffin Energy noted that transmission augmentation projects often have longer lead times than generation developments. Because the SWIS is operating near full capacity, the result is that new generation developments are being delayed by a lack of transmission capacity. This problem is exacerbated by the requirement for a new generator to have a network access offer in order to receive capacity credits, which has

led to the development of a queue for network access. Griffin Energy noted that projects in the queue will often not make it through to development, but will occupy a place in the queue. Griffin notes that a position on the queue is not far removed from the rights afforded by a network access offer, and that practices in relation to the queue should therefore be monitored. In particular, Griffin Energy considers that there should be increased transparency in relation to the access queue. In particular, information in relation to the proponent, location and size of the proposed project should be made public.

Landfill Gas and Power Pty Ltd (**LGP**) accepted the need for a network access offer to be received before a generator is eligible for capacity credits in order to ensure that certified capacity is delivered on time and system security is maintained. Further, LGP considered that Western Power's existing queuing policy offers a reasonable balance between the reward for early application and the risk of losing a place in the queue if the project is not ready to be connected. According to LGP, this policy has already been the subject of significant analysis by the Access Code Development Committee.[33] However, LGP suggested that the requirement for a network access offer could be relaxed for plants that are small relative to the forecast over-capacity amount.

Western Power pointed out that the two year lead time for the reserve capacity mechanism may not be adequate to ensure timely network connections. The planning of the network responds to additional generation requirements once the project becomes firm. This often does not provide sufficient time for completion of a network connection. While new connections can be processed within several months for small generators, applications for large generators take 12-18 months at a minimum to process and the construction of works can take two to three years plus, depending on the extent of required augmentations.

Western Power noted that the access queue currently includes 4,500 MW of new generation seeking to connect by the end of 2012. However, there is insufficient load growth in the SWIS to justify this quantity of new capacity. Western Power considered that this creates an issue, because units at the end of the queue could potentially provide a more efficient outcome, but will be unable to proceed. More generally, Western Power stated that the queuing policy provides equal treatment of all plant technologies, regardless of their wider market benefits.

4.3.1.3 Authority's View

In the Authority's view, the current state of affairs in relation to network access offers is unsatisfactory and unsustainable if the market is to achieve its objectives. While there is nothing preventing generation investors from starting construction ahead of the reserve capacity cycle and being guaranteed credits – and indeed this would be necessary in any case for base load developments – the current lead times and lack of transparency around connection offers are likely to be causing additional problems. In effect, new generation investment across the WEM is being delayed by resourcing constraints within Western Power, to which Western Power does not offer any specific solution. While the evidence indicates that projects may have been delayed in offering capacity to the market, the Authority notes that these delays have not led to a shortage of capacity in the market.

At the same time, it is unreasonable and inappropriate to expect that the network connection offer process will itself ensure the optimal coordination and timing of investment in network and generation infrastructure across the WEM. In fact, the

[33] The Access Code Development Committee (which consisted of industry and Government representatives), in conjunction with the Electricity Implementation Reform Group, developed the draft Electricity Access Code.

Authority considers that it is not the role of the queuing process to determine the 'winners' and 'losers' in terms of new plant build. What this highlights is the need for the queuing process to operate in a way that complements the reserve capacity mechanism so that efficient investment in new plant is promoted.

The means of addressing broader network planning and coordination issues will need to come from the completion of the road map for the development of the market discussed in section 6 below.

Nevertheless, the Authority considers that short to medium term improvements in the management of network access applications are possible in several areas and recommends changes to the market in the following areas to increase the effectiveness of the market in meeting its objectives.

First, the delays in dealing with network applications that stem from Western Power's processes and resourcing constraints need to be overcome and Western Power ought to address these as a matter of urgency. This is likely to require a review of Western Power's processes and capability for handling connection applications.

Second, greater transparency around the process for dealing with network applications and the status of applications in the queue may also be beneficial, by providing information to investors as to the nature and timing of other prospective developments. This would need to be balanced against participants' commercial needs for confidentiality.

In addition, the Authority considers that Western Power should examine the scope for providing more detailed information to the market on existing network capacity and constraints. While Western Power does publish an Annual Planning Report, this deals mainly with actual and intended extensions and augmentations to the grid rather than providing information about areas within the network capable of accommodating the output of new plant. Such information could provide a useful guide to investors about the appropriate location and timing of new plant.

Recommendation 1

Western Power should address its processes and resourcing constraints for assessing network connection applications. This is likely to require a review of Western Power's processes and capability for handling connection applications.

Recommendation 2

Western Power should provide greater transparency around its processes for dealing with network applications by proponents of proposed new generation plant and the status of the applications in the queue. This would need to be balanced against participants' commercial needs for confidentiality.

Recommendation 3

Western Power should examine the scope for providing more detailed information to the market on existing network capacity and constraints, above and beyond the information contained in its Annual Planning Report.

4.3.2 Network connection delivery

4.3.2.1 Outline in the Discussion Paper

The Discussion Paper noted the views of some stakeholders that following receipt of a network access offer, the owner of a new facility nevertheless bears the risk that Western Power will fail to provide a network connection by the start of the relevant capacity year. The result could be that the owner of a new facility is required to make payments to the IMO out of its reserve capacity security or is required to make reserve capacity refund payments because the network connection is not delivered on time, even though the new facility is otherwise ready for operation at the start of the relevant capacity year.

At the same time, the Discussion Paper noted that there had not yet been a situation in which the operation of a new facility has been delayed as a result of a delay in the delivery of a network connection. Nevertheless, to the extent that participants perceive delivery risk to arise, it may have negative implications for the effectiveness of the market.

4.3.2.2 Submissions received in response to the Discussion Paper

Griffin Energy noted that the risk that a network connection will not be delivered on time is a development risk, similar to a project's own construction risk or equipment manufacturing risk. These risks are normally mitigated through liquidated damage clauses negotiated between parties. However, Griffin Energy commented that since disaggregation, Western Power has moved away from accepting liability for costs incurred through not meeting contracted deliverables.

Conversely, Western Power did not consider that it was appropriate for it to be subject to the risk of paying liquidated damages for not meeting certain connection dates for applicants. This was because it operated under revenue-cap regulation and so any over- or under-recovery of revenue would be offset by lower or higher tariffs elsewhere.

LGP suggested that the risk of network connection delays leading to a participant having to make refunds of capacity payments could materially affect a project's financial viability. In this context, the IMO supported appropriately targeted incentives to address transmission-related project risk.

However, System Management highlighted that, to date, there had been no instance where a delay to network infrastructure had caused a delay to new generation facilities. Further, even if such a delay occurred, System Management considered that it would not expose a generation investor to having to make refunds of reserve capacity payments because, in System Management's view, a delayed network connection would constitute a 'forced outage' so that the generation project's inability to deliver energy into the network would constitute a 'consequential outage'. As a result, the investment risk for new generators is limited to deliveries of energy and is better managed through contractual mechanisms.

Synergy discussed the implications of Western Power's existing approach to connection charging for the location of generation investment. This issue is discussed further under sections 5 and 6 below.

4.3.2.3 Authority's View

The issue of accountability for network connection delivery is inseparable from the overall regime for managing connection applications. As discussed under the previous topic, the

Authority believes that Western Power ought to review its processes and capabilities with a view to minimising delays to new connections.

More generally, the Authority believes that Western Power needs to be more accountable for performing its network connection functions in a timely manner given the gravity of the potential commercial implications for participants. Western Power presently does not face any mechanism of risk or reward to provide it with the correct signals and incentives. Such a mechanism should incorporate offerings with liquidated damages that enable a fair sharing of the risks of late connections. A generator that fails or becomes bankrupt due to a failure by Western Power to deliver service has the possibility of undermining the market.

The Authority considers that the imposition of risk sharing arrangements in all areas of the market would be easier to implement under a constrained networks policy (see below).

In regard to Western Power's comment that liquidated damages payments would be offset by higher network tariffs elsewhere, the Authority disagrees. The Authority considers and recommends that liquidated damages payments should be incorporated into arrangements for delivery of network connections without impacting on network tariffs. In the Authority's view, such a change would improve Western Power's accountability for performing its network connection functions and increase the effectiveness of the market in meeting its objectives.

On the impact of delays to network connection on reserve capacity refunds, the Authority considers that System Management's interpretation of the refund arrangements is not one shared by other stakeholders. Consequential outages are defined in Clause 3.21.2 of the Market Rules as occurring where an outage of a facility is caused by a forced outage to another participants' equipment and where the outage of the facility would not otherwise have occurred. It is not clear that network infrastructure that is delayed could be defined as a forced outage. Where the network infrastructure that is delayed is a new network connection, it is not clear that the Market Rules would enable a forced outage to be declared. Where the network infrastructure is delayed by upgrades to existing network infrastructure, this may constitute a planned outage.

In any case, even if System Management's suggested interpretation of the arrangements were to apply, it would merely transfer the risk of delayed connections from the proponents of new plant to the market as a whole through reduced incentives on participants to make their capacity available.

Recommendation 4

Liquidated damages payments should be incorporated into arrangements for delivery of network connections by Western Power and, if they occur, should not impact on network tariffs.

4.3.3 Deep connection charges

4.3.3.1 Outline in the Discussion Paper

As noted in the Discussion Paper, stakeholders have raised several concerns regarding the determination of deep connection charges for network access applications. One issue was whether it was appropriate for similar applications for network access to face very different connection charges based on the order and timing of their application. Another issue was the transparency of the process for determining deep connection charges.

4.3.3.2 Submissions received in response to the Discussion Paper

A number of stakeholders criticised Western Power's deep connection charging approach to new connections.

Alinta reiterated its previous concern that a deep connection policy may lead to sub-optimal outcomes for the following reasons:

- It results in barriers to entry in markets upstream and downstream of the network, which can have a negative impact on competition and undermine the market objectives. In particular, capital contributions can impose a significant financial burden on generating plants.
- The connection of new generating plant to the network yields net benefits to users which should be recognised by limiting capital contributions to the forecast costs of dedicated connection assets only.
- Shallow connection charges are ultimately more transparent, because connection assets and costs can be readily identified.

LGP commented that while a deep connection charge was capable of providing locational investment signals, in practice, it was unlikely to have a substantial impact due to the long lead times involved and the other investment drivers involved, such as access to fuel and the need for environmental approvals. LGP also considered that greater transparency of access applications was unlikely to be feasible given the need to maintain confidentiality. However, LGP supported the development of modelling guidelines to bring some rigour or definition to Western Power's decision-making and timing.

Similarly, Griffin Energy considered that, generally speaking, deep transmission connection costs should be smeared across loads when they relate to the augmentation of the existing transmission system. In this way, new generators can confidently plan developments that connect to existing (or prudently planned) assets, knowing that they will incur the cost of connection to the existing transmission system but will not be liable for additional network augmentation. Griffin Energy also suggested that the process for determining network connection costs would be improved by more transparently describing the methodology used to determine these costs.

Synergy commented that Western Power's existing deep connection policy favoured generators sited in the Kwinana and Collie regions, where there is already access to connect to the high voltage transmission grid. Generators sited at the extremities, particularly wind farms, have had considerable difficulties in being connected at full capacity. Synergy also did not support the current access rules, which allow the retention/sale of transmission capacity rights associated with retired generation. Rather, Synergy suggested that Western Power should take back this capacity and release it to new generators.

The IMO commented that the deep connection charging policy complicated the calculation of the Maximum Reserve Capacity Price (**MRCP**), as (deep) connection charges are effectively included within each Capacity Credit that is not traded. The IMO considered that removing uncertainty in the determination of connection charges would benefit the market. The Authority notes that the determination of the MRCP was the subject of a recent Rule Change, following which the IMO was required to develop a market procedure setting out the principles to be applied, and the steps to be taken by, the IMO in developing and proposing the MRCP.[34] On 1 August 2008, the IMO published a

[34] See IMO, *Final Rule Change Report, Maximum Reserve Capacity Price, Ref: RC_2008_11*, 8 July 2008, available: http://www.imowa.com.au/Attachments/RuleChange/RuleChange_2008_11.htm.

Procedure Change Proposal[35] to create a new procedure for the determination of MRCP and called for public submissions. As no party expressed any concerns the IMO found it appropriate to adopt the procedure as proposed.

This procedure for determination of MRCP, which commenced on 13 October 2008, sets out the principles to be applied and steps to be taken by the IMO in order to develop and propose the MRCP as required under the Market Rules.

Finally, SkyFarming submitted that the current policy for distribution charging disadvantaged small generators far from existing network facilities but close to small load centres. As a consequence, SkyFarming proposed that the Distribution Demand Length Charge ought to be either abolished or else based on distance to the nearest similar-sized load.

4.3.3.3 Authority's View

The Authority shares many of the stakeholders' concerns about the integrity and timeliness of the locational signals provided by Western Power's current deep connection regime. In particular, the time taken to receive a network offer (including the proposed deep connection charge) means that the strength of any locational signal from connection charges is delayed and muted. More generally, the signalling value of deep connection charges is undermined by the lack of transparency surrounding Western Power's methodology for setting the charge. The Authority acknowledges that part of this lack of transparency is related to uncertainty over the Authority's own approach to the application of the New Facilities Investment Test (**NFIT**). However, as the Authority's approach becomes more established, the Authority recommends that Western Power should seek to formalise and publish its deep connection charge-setting methodology so that participants will be in a better position to predict what their connection charges will be and make their connection application decisions accordingly.

The use of a deep connection approach to connection charges is intimately related to the present 'unconstrained' approach to network planning (see below). In general, deep connection charges are only required where connecting generators are obliged to fund downstream network augmentations to accommodate their output. By contrast, the use of a 'constrained' approach to connection charging (as in the NEM), implies that connecting generators are not obliged to maintain the network transfer capability available to other network users.

On SkyFarming's proposal that the Distribution Demand Length Charge ought to be either abolished or else based on distance to the nearest similar-sized load, the Authority considers that this is a matter best addressed as part of the Authority's assessment of Western Power's access arrangements, and suggests that SkyFarming consider making a submission as part of that process.

On Synergy's proposal that Western Power have resumptive rights over transmission capacity associated with retired generation, the Authority notes that it has previously

[35] See IMO, *Procedure Change Proposal - Market Procedure for Determination of the Maximum Reserve Capacity Price, Ref: PC_2008_06*, 1 August 2008, available: http://www.imowa.com.au/Attachments/MarketProcedures/PC_2008_06_20080801_ProcedureChangeProposal.pdf.

considered and rejected this idea in its earlier decision on Western Power's access arrangement.[36]

The Authority notes that Western Power, in its original access arrangement proposal, proposed a 'use it or lose it' policy for unused network capacity. The Authority rejected the proposal for Western Power to be able to unilaterally confiscate a users' existing rights to capacity on the network. The Authority will give this matter further consideration during the review of Western Power's proposed revision of its access arrangement, which commenced in October 2008, and will seek stakeholders' views on this matter. The Authority remains open to other mechanisms for encouraging transmission capacity made available by plant retirement to be efficiently utilised.

Recommendation 5

While the Authority recognises that Western Power is seeking guidance on the application of the New Facilities Investment Test, Western Power should formalise and publish its deep connection charge-setting methodology as soon as possible, so that participants will be in a better position to predict what their connection charges will be and make their connection application decisions accordingly.

4.3.4 Network planning

4.3.4.1 Outline in the Discussion Paper

The Discussion Paper noted the concern expressed by some stakeholders regarding the transparency and responsiveness of the network planning process, notwithstanding the availability of Western Power's Annual Planning Report.

4.3.4.2 Submissions received in response to the Discussion Paper

The IMO explained that the present approach to network planning assumes that the network remains 'unconstrained' following new connections. This could inhibit new generation investment by imposing unnecessary deep connection costs.

Griffin Energy considered that the network planning process should be better integrated with the reserve capacity process in order to ensure that sufficient transmission access is available to new generation developments in a timely manner.

Synergy also submitted that network constraints and planning were issues for new generators, particularly renewable plant such as wind farms. Synergy noted that, although transmission constraints had been recognised and Western Power's construction programme brought forward, constraints were likely to remain. Such constraints would distort the location of new plant and undermine several of the market objectives.

Therefore, Synergy suggested that the Authority undertake a review that assesses:

- the implications of a carbon price on network investment;
- the state of the South West Interconnected Network with regard to accommodating the location of potential new generation; and

[36] Economic Regulation Authority, *Final Decision on the Proposed Access Arrangement for the South West Interconnected Network - Submitted by Western Power,* 2 March 2007, para 937. Available at: http://www.era.wa.gov.au/cproot/5020/2/20070302%20Final%20Decision%20WP%20AA%20SWIN.pdf

- the availability of transmission capacity to the market when generation plant is retired.

Synergy suggested that this review be undertaken in time to input into the Authority's next review of the Western Power access arrangement.

LGP found the existing transmission planning process to be satisfactory but nevertheless supported a review to facilitate an increase in renewable energy.

Western Power argued that there was a need to consider network planning processes as part of longer term State development plans in order to promote optimal outcomes. Such an approach should allow for issues related to fuel, environment, electricity and energy infrastructure to be considered with a view to determine suitable locations for future generation plant and industry. Under this approach, Western Power considered that it would be able to plan network development more accurately, providing new generators with a greater degree of certainty about the capacity of the network to cater for new projects.

Western Power also noted that the large number of applications for network access, and the uncertainty in regard to which applications will proceed, makes it increasingly difficult to plan for adequate network reinforcements.

In regard to transparency of network planning decisions, Western Power noted that confidentiality requirements from new network applicants affect the transparency of the process. In order to increase the transparency of the network planning process, it would be necessary for proponents of new generation plant to provide more information. Western Power and supporting Government agencies are currently undertaking a range of work to provide greater transparency and streamline processes, including a focus on increased price certainty with respect to network connection costs.

4.3.4.3 Authority's View

The Authority does not consider that the solution to the present problems in the network planning process is for the Authority itself to take on the role of central planner for the WEM. Ideally, network planning should be informed by and responsive to participants' investment decisions. In this regard, the Authority reiterates its comments made above regarding the need for greater transparency in the management of network connection applications and in the availability of information about spare capacity and constraints in different parts of the network.

The Authority also considers that the proposed road map for the development of the market (see section 6 below) will potentially assist with any review of the network planning arrangements and recommends that the road map consider the appropriate approach to network planning as a matter of priority. In this context, the Authority believes that there is a fundamental choice to be made between the current 'unconstrained' and a 'constrained' network planning policy, as applies in the NEM. The Authority believes that a continuation of the unconstrained network policy will make progress on new connections and network accountability very difficult to achieve and could be expected to lead to continually rising costs. A move to a constrained network approach is likely to see cheaper and faster new connections, but would require fundamental market redesign. In particular, the operation of the reserve capacity mechanism in ensuring that sufficient capacity enters the market would need to be reconsidered. Under the existing unconstrained network approach, planning can be undertaken on the basis that all generation capacity in the market will be available to meet peak demand. There is certainly a risk of outages, but this can be addressed in setting the reserve margin. Under a constrained network approach,

however, in addition to outages some generation capacity may be unavailable to meet peak demand as a result of network constraints. Therefore, under a constrained network, the existing reserve capacity mechanism would need to be adjusted to take into account network constraints or there would be a risk that demand would be unserved at peak times. In addressing network constraints, however, it would be important that the reserve capacity mechanism sends price signals that are consistent with investment decisions that efficiently reflect the location of network constraints.

In the Authority's view, consideration of such a fundamental market redesign is not an indication of failure of the reform process. Rather, the SWIS now has a platform that makes better, more economically-based market reform possible.

Recommendation 6

The proposed road map process for the development of the market should consider the appropriate approach to network planning in the South West Interconnected System, focussing on the competing 'constrained' and 'unconstrained' planning frameworks as a matter of priority.

4.4 Reserve capacity mechanism issues

4.4.1 Incentives for new generation

4.4.1.1 Outline in the Discussion Paper

The Discussion Paper noted concerns expressed in preliminary consultation and in the drafting of the 2007 Minister's Report regarding the incentives that the WEM provides to invest in new generation plant. In that Minister's Report, the Authority considered evidence of new investment and noted that a mix of new plant had entered the market since the commencement of the reserve capacity mechanism. However, the Authority noted that it was difficult to judge the appropriateness of the mix of new investment that had occurred, and inappropriate to assess investment outcomes in the short-term.

During the Authority's preliminary consultation, some stakeholders again raised the issue of investment incentives provided by the WEM. In particular, stakeholders have suggested that, to date, investments in the SWIS have either been driven by the wholesale procurement process run by Synergy, have occurred as a result of participants investing in plant primarily to meet the energy needs of discrete mining or mineral processing facilities, or have occurred as a result of participants seeking to make use of their fuel assets. Stakeholders suggested that uncertainty about access to fuel and access to the network in Western Australia and broader uncertainties about carbon trading were keeping other potential new entrants from participating in the market.

At the same time, some stakeholders considered that incentives to invest within the reserve capacity mechanism could be excessive due to the methodology for setting the capacity price, as discussed in section 4.4.2.

4.4.1.2 Submissions received in response to the Discussion Paper

A number of stakeholders considered that while the reserve capacity mechanism provided some incentive for the development of peaking and to some extent mid-merit plant, it did little to encourage the development of base load plant.

Griffin Energy commented that the reserve capacity mechanism creates a disproportionate incentive for investment in low-capital cost plant, although this is somewhat counterbalanced to a degree by opportunistic investments. Having said this, Griffin Energy considered that it was too early to interpret actual patterns of investment in new generation plant in the WEM.

LGP considered that to the extent that the Market Rules required STEM prices to be based on short run marginal cost (**SRMC**), the reserve capacity mechanism mainly served to promote peaking plant rather than base load or mid-merit units.

Synergy was also of the view that the reserve capacity mechanism does not – by deliberate design – provide significant incentives for the construction of base load plants. In undertaking power procurement for new generation plant, Synergy identified the following requirements to bring a base load plant into the market:

- competitively priced, long-term fuel supplies;
- firm access to transportation infrastructure (including, where necessary, for gas transportation);
- long-term bilateral contracts with retailers for energy sales; and
- allocation of risks associated with climate change policies and overall certainty as to the eventual legislative obligations.

While there have previously existed barriers to entry in the market, most notably as a result of gas shortages, limited network access and uncertainty about future carbon prices, Synergy acknowledged that many of these issues were now being addressed by the Office of Energy.

System Management described a number of purported weaknesses of the reserve capacity mechanism. First, the reserve capacity cycle is two years, creating a disincentive for plant with longer lead times to be developed. Second, the reserve capacity mechanism does not necessarily account for the different cost structures of different types of plant. Finally, the reserve capacity mechanism does not account for the different ancillary service requirements of different technologies of plant, especially intermittent generation.

In addition, System Management expressed concern that the final deadline of 1 December for new plant to be commissioned could mean that new and unproven machines are relied upon to meet the expected summer load.

Verve Energy argued that the existing reserve capacity mechanism does not provide appropriate incentives for a diversity of new generation, in particular mid-merit plant – the current arrangements promote the installation of peaking plant.

More generally, the IMO noted that since the WEM commenced, a substantial number and capacity (over 3 GW) of new generation projects had either been delivered or announced for commissioning by October 2011. The IMO listed the key deterring factors to investment in the longer term as fuel constraints, network access, uncertainty surrounding an emissions trading scheme and financial market conditions.

SkyFarming also noted uncertainty surrounding a CPRS and Federal renewables target as influential factors for investment in different types of plant.

4.4.1.3 Authority's View

The Authority notes the comments of stakeholders that the reserve capacity mechanism may not itself promote the development of new base load plant. However, it should be remembered that the reserve capacity mechanism is not intended to work in isolation. Rather, it is designed to work jointly with the day-ahead market (and bilateral agreements) to promote the right mix of plant. After all, even STEM prices based on SRMC will provide infra-marginal rents to base load plant[37] when the bids of mid-merit and peaking plant set the price in the day-ahead market. Such rents will contribute to the capital costs of base load plant. In other words, capacity payments are not the sole means of recovering the fixed costs of new base load plant in the WEM design.

Nevertheless, the Authority acknowledges that while the WEM design may in principle offer appropriate incentives for investment in new capacity, the existing structure of retail and generation in the WEM may raise barriers to new base load plant not facilitated in some way by Synergy. In particular, if there were greater retail competition and liquidity, there may be greater incentive for base load plant construction. This is because more 'floating' or available retail customers provide greater opportunities for new base load generation to find contract support. For these reasons, the Authority considers that it is important to monitor the development of retail competition and the impact that this will have on incentives for investment in new plant. The Authority notes that the Office of Energy is currently undertaking a retail tariff review and a review of the costs and benefits of the introduction of full retail competition (**FRC**). In the Authority's view, the development of retail competition, and options to encourage competition and liquidity, are matters that ought to be considered as part of the proposed road map process discussed below.

Quite apart from the state of retail competition, the Authority considers that the incentives for investment in new capacity would be significantly affected by a merger between Synergy and Verve Energy, which the Authority understands the new Government may be considering. Such a merger would be likely to substantially undermine the liquidity of bilateral contracting and make it even harder for new generation proponents to secure contract support for new generation development.

The Authority notes that since the release of the Discussion Paper, the IMO has published its 2008 Statement of Opportunities.[38] According to the IMO, a total of 4,920 MW of existing capacity (generation and demand side management (**DSM**)) and capacity under construction will be eligible to provide reserve capacity in 2010/11, compared to a reserve capacity requirement of 5,146 MW in the same year. This leaves a shortfall of 226 MW to be met by new capacity not in existence or under construction. The IMO also noted that the latest Expressions of Interest process undertaken in the first quarter of 2008 identified 1,036 MW of potential new capacity for 2010/11,[39] although it acknowledged that not all of this capacity is likely to proceed.

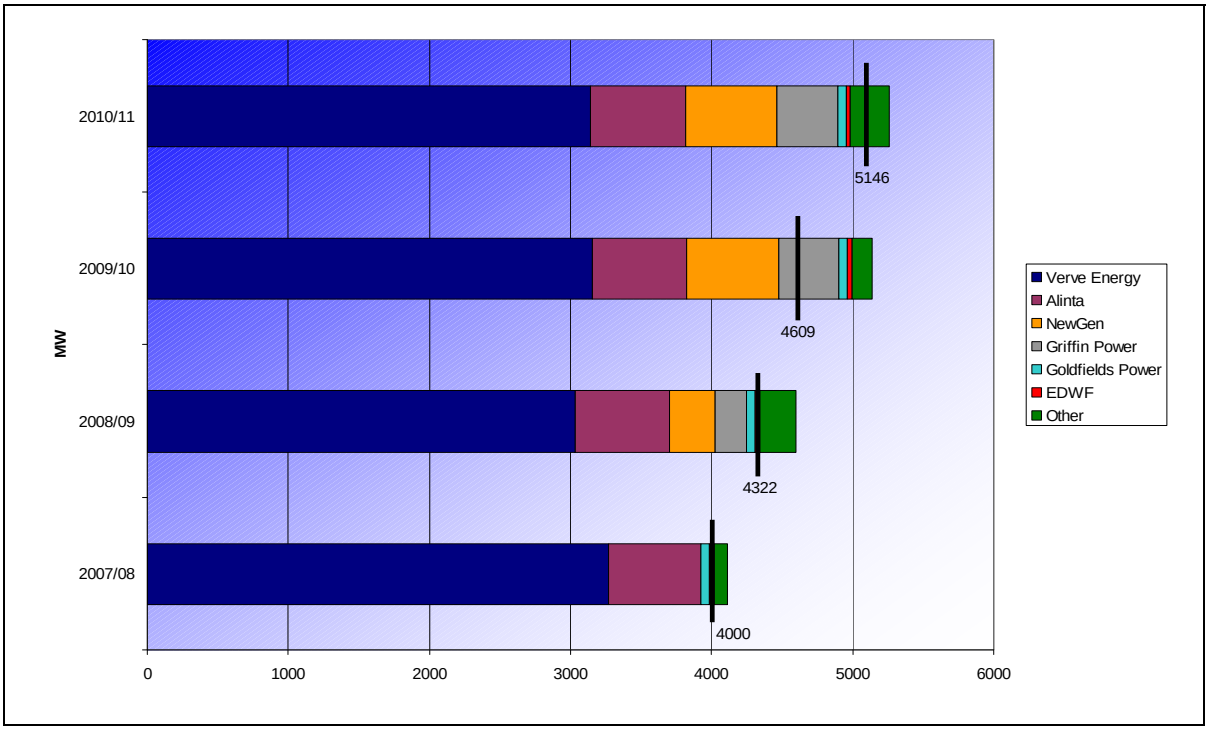
Figure 28 provides a summary of the capacity credits assigned to participants for each of the reserve capacity cycles completed so far, as well as the reserve capacity requirement for each year. For each year, the number of capacity credits assigned to participants has exceeded the reserve capacity requirement.

[37] That is revenues in excess of their SRMC.

[38] IMO, *Statement of Opportunities*, July 2008, available at: http://www.imowa.com.au/Attachments/RC_Attachments/2008_SOO_Final_v0.1.pdf.

[39] IMO, *2008 Call for Expressions of Interest for New Capacity, Summary of Results*, available at: http://www.imowa.com.au/Attachments/ReserveCapacity/SummaryOfExpressionsOfInterest-2008.pdf.

Figure 28 Capacity credits assigned



Recommendation 7

The development of retail competition and options to encourage competition and liquidity should be considered as part of the proposed road map process recommended in this report.

Finding 1

The incentives for investment in new capacity would be significantly affected by a merger between Synergy and Verve Energy. Such a merger would be likely to substantially undermine the liquidity of bilateral contracting and make it harder for new generation proponents to secure contract support for new generation development.

4.4.2 Reserve capacity price

4.4.2.1 Outline in the Discussion Paper

The Discussion Paper invited comments on the appropriateness of the mechanism for determining the reserve capacity price. This followed concerns expressed by some stakeholders that the reserve capacity price is not sufficiently influenced by actual demand for and supply of capacity in the market, even allowing for changes to be implemented in October 2008. In particular, where a reserve capacity auction is not run, the capacity price is effectively an administered price (based on the MRCP) that is likely to be higher in the event of excess capacity than it would be if the capacity price were determined in a market. This led some stakeholders to suggest a move to a market-determined capacity price.

4.4.2.2 Submissions received in response to the Discussion Paper

Griffin Energy commented that the reserve capacity price does not provide an investment signal per se. Bilateral trade of capacity provides a capacity price that is based on the market price based capital cost of constructing the specific facility.

Synergy argued that the Market Rules inevitably lead to an outcome of excess capacity over the Reserve Capacity Requirement, but that this is the result of the lumpy and indivisible nature of generation capacity. Synergy also noted that excess capacity imposes costs on retailers and the pass-through of these costs to customers has not always been possible.

Most stakeholders did not consider the move to a market-determined reserve capacity price to be a matter of urgency.

The Energy Supply Association of Australia (**ESAA**) agreed with a market-determined price in principle and supported its examination, but was cautious about a change that could undermine investment confidence.

LGP considered that the strong availability of capacity compared to the forecast requirement suggested that the market was achieving its objectives.

The IMO suggested that a move to a market-determined capacity price could have unintended consequences. In particular, it could lead to highly volatile capacity prices. The IMO further noted that it had recently finalised substantial changes to the determination of the MRCP in consultation with stakeholders.

Synergy also considered that a move to a reserve capacity price that is determined by the market would potentially discourage new entrant generators because a market price may be highly volatile from one year to the next and would not provide price certainty.

Western Power highlighted that the reserve capacity price may not reflect the cost of any particular project because of the differential network connection costs that can occur at different points of the network. In particular, intermittent generators such as wind farms are likely to face significant network connection costs as a result of their location in areas of lower network capacity. Western Power considered that these costs are unlikely to be reflected in the reserve capacity price. However, at the same time, intermittent generators generally do not contribute to meeting load at system peak, despite receiving significant capacity credits to do so.

In the longer term, Western Power suggested that a move from unconstrained to constrained access would assist in limiting overinvestment in the network. However, Western Power recognised that this would require changes in the market design.

4.4.2.3 Authority's View

The Authority notes that the IMO has recently published its Final Rule Change Report on changes to the determination of the MRCP.[40] This change is intended to provide for greater flexibility in the determination of the reserve capacity price, so that it can be set in a more cost-reflective and efficient manner. Under the change, the detail that previously

[40] IMO, *Final Rule Change Report, Maximum Reserve Capacity Price, Ref: RC_2008_11*, 8 July 2008, available: http://www.imowa.com.au/Attachments/RuleChange/RuleChange_2008_11.htm. The maximum reserve capacity price sets the maximum bid that can be made in a Reserve Capacity Auction and, if no Reserve Capacity Auction is required, is used as the basis for determining an administered Reserve Capacity Price.

existed in the Rules has been replaced by general provisions and the detail will be included in a new market procedure to be developed by the IMO. The Authority is required to approve changes in the MRCP on an annual basis.

The IMO recently published its proposed market procedure for the calculation of the future MRCP.[41] Submissions on the proposed procedure have closed, and the IMO is in the process of coming to its decision. At this stage, it appears that the MRCP will continue to be based on the costs of an open-cycle gas turbine power station and will not take explicit account of the prevailing balance between demand for and supply of capacity.

In any case, at this stage, there appears to be little stakeholder impetus for a move to a fully market-determined capacity price. The Authority considers that it is too early to consider a move to a competitive reserve capacity price in the absence of a blueprint for future market development. Therefore, this is an issue that could be considered as part of the proposed road map process (see section 6 below).

Recommendation 8

The proposed road map process should consider a move to a competitive reserve capacity price in the context of the future direction of market development.

4.4.3 Reserve capacity refund payments

4.4.3.1 Outline in the Discussion Paper

The Discussion Paper raised the question of whether the existing reserve capacity refund mechanism promotes the market objectives, particularly in relation to the reliability of supply. In general, refund payments are higher during peak periods than off-peak periods. However, some stakeholders commented that periods during which system demand is likely to be highest are not necessarily periods in which a failure to comply with reserve capacity obligations is most likely to have an impact on the market.

4.4.3.2 Submissions received in response to the Discussion Paper

The ESAA noted that the reserve capacity refund methodology favours reliability during summer peaks even though reliability may be highly valued at other times, such as when a significant amount of plant is out of service for maintenance. Therefore, the ESAA suggested adopting a methodology that reflects the marginal cost impact on the market of not generating.

Verve Energy argued that the current methodology for calculating reserve capacity refund payments provides (potentially) excessive signals to market participants to maximise plant availability and to minimise outages. Verve Energy suggested that current arrangements might be adversely affecting maintenance practices and encouraging the overly hasty return to service of plant at excessive cost. Additionally, Verve Energy supported a move to market-based reserve capacity refunds – arguing that such a system should result in a more appropriate level of supply security year-round, unlike existing arrangements, which place excessive emphasises on security of supply during the summer peak period at the expense of other times of the year.

[41] IMO, *Market Procedure for: Determination of the Maximum Reserve Capacity Price*, Version 1, 1 August 2008, available at: http://www.imowa.com.au/Attachments/MarketProcedures/PC_2008_06_20080801_ProposedNewProcedure.pdf.

System Management noted that reserve capacity refund payments are intended to encourage participants to return plant to service to meet the summer peak. Nevertheless, System Management observed that the willingness of participants to return plant to service at different times of the year did not appear to be affected by the applicable refund rate. System Management recognised that the current structure of reserve capacity refund payments does not necessarily create the right signals, as capacity can also be highly valued at other times of the year due to outages. However, more closely tying refunds with the effect of plant unavailability on the power system could create a greater risk that participants shield or hide forced outages from System Management. System Management considered that it was now an appropriate time to review the reserve capacity refund mechanism and consider whether variable rates based on seasons is the best option.

Griffin Energy noted that the reserve capacity refund was based on sound theory but expressed concern that the current timing of the reserve capacity mechanism requires new facilities to enter operation at the beginning of the hot period, when capacity refund payments are high. Griffin Energy considered that it is illogical to require new facilities to enter operation during the period of highest demand and when capacity price risk is highest.

Griffin Energy also commented that capacity refund payments are biased towards penalising high capacity factor plant. Such plant are on call, 24 hours per day and outages or partial deratings are picked up and penalised at every occurrence, even if there is sufficient capacity in the market to meet demand. For low capacity factor plants, outages or partial deratings are not picked up unless the plant is called. Griffin Energy considered that this results in high capacity factor plant being penalised disproportionately to low capacity factor plant and suggested that if anything, it is low capacity plant that should bear the brunt of capacity refunds, as they have been specifically built to meet shortfalls during high-priced periods. Griffin Energy would welcome a review of the application of capacity refund payments (even though such a review has been recently undertaken). Finally, Griffin Energy suggested that a more appropriate refund quantum might be the cost difference between the failed plant and the plant dispatched to meet supply as a result of the failure.

4.4.3.3 Authority's View

The Authority notes that there has recently been a review of the reserve capacity refund regime as part of a Rule change proposal submitted by the IMO.[42] This led to some simplifications and other relatively minor changes to the refund methodology. In general, the existing arrangements seem to incentivise the desired behaviour from generators. The Authority intends to continue monitoring outcomes in this area and considers that the Rule change proposal mechanism should be capable of handling any enhancements that may be required.

[42] IMO, *Final Market Rule Change Report, Calculation of Reserve Capacity Refund, Ref: RC_2007_08*, 23 October 2007, available at: http://www.imowa.com.au/Attachments/Rulechange/RuleChange_2007_08.htm.

Recommendation 9

Any review or enhancements of the Reserve Capacity Refund regime should be considered through the rule change mechanism.

4.5 Bilateral, STEM and balancing markets

4.5.1 Bilateral contracts for energy and capacity

Currently, the majority of bilateral trade in the market is accounted for by the vesting arrangements between Verve Energy and Synergy. 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 dominance of the vesting contract between Synergy and Verve Energy in the bilateral contract market, the Authority does not at this stage have a strong 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 5.4. However, the Authority does consider that the market objectives are likely to be promoted more strongly if new entrant generators had a greater choice of retailers (other than Synergy) with whom to deal. This reiterates the importance of ensuring a rapid transition to more cost-reflective retail tariffs in order to promote more dynamic retail competition.

4.5.2 STEM

4.5.2.1 Outline in the Discussion Paper

The Authority's Discussion Paper noted that the timing of gate closure in the STEM had been raised as an issue in the previous Minister's Report and was raised again in preliminary consultation for this year's Report. Moving the STEM closer to real-time or introducing multiple gate closures would enable participants to base their bids and offers on more accurate information, including about likely demand and possible gas pipeline constraints. Some stakeholders commented that such changes – by reducing risks – would also encourage participation in the STEM.

In this context, the Authority has also previously noted that moving the STEM gate closure closer to real-time would involve a substantial change to the market and would likely be a costly exercise.

4.5.2.2 Submissions received in response to the Discussion Paper

Alinta noted that the STEM submissions are due by 9:50 AM, but parties are not made aware of their imbalance position on the Dampier to Bunbury Natural Gas Pipeline until noon at the earliest, and sometimes as late as 2:00 PM. The result is that market participants face significant uncertainty when making STEM submissions day ahead. In the longer-term, introducing multiple gate closures or moving gate closures closer to real-time would provide more certainty in decision making and lead to a more efficient outcome. In the shorter-term, a closer alignment of the timelines in the gas and electricity market would also increase the level of certainty. However, Alinta noted that the

possibility of enhancements to existing systems should be explored because a complete market system rebuild would entail significant cost.

Verve Energy supported a mechanism that allows re-bidding in the STEM, to better reflect circumstances that can occur due to plant availability and fuel interruptions. Verve Energy considered that moving the STEM closer to real-time and/or introducing more gate closures should increase trading volumes through greater price certainty.

LGP noted that moving the STEM closer to real-time or introducing multiple gate closures would reduce risk to participants and potentially reduce prices.

Chamber of Commerce and Industry WA reiterated its support for introducing two gate closures, or gate closures closer to real-time, on the basis that this should encourage greater market participation.

Synergy likewise considered that the inability of market participants to adjust their contracted position or resource plans within the trading day, without incurring penalties for deviations, results in a less than efficient outcome in the market. However, Synergy considered that moving the market closer to real-time, or allowing multiple gate closures, is not an insignificant change to the Market Rules, procedures, processes and systems. Any such change would therefore require considerable review, modeling and debate between regulators, market participants and the Office of Energy. Synergy considered that the processes to address this important concern are well in train and will result in appropriate outcomes.

Many of these comments were echoed by the IMO, who noted that the day-ahead nature of the STEM may not adequately allow prices to capture short-term fuel constraints and creates risks for generators that may discourage their participation in the STEM. However, the IMO went on to emphasise that moving the STEM closer to real-time would impose considerable implementation and operational costs, especially in light of the relatively small size of the SWIS.

As between the two options in the Discussion Paper of moving the STEM closer to real-time and introducing multiple gate closures (referred to as rebidding), the IMO stated a preference for the latter. Moving the STEM closer to real-time would allow more dispatch-reflective prices and allow Independent Power Producers (**IPP**) to adjust their positions, as well as reducing the residual amount of balancing required by Verve Energy. However, it would also raise issues for dispatch if System Management was required to plan dispatch solely in the last hours before real-time. Allowing multiple gate closures would allow System Management to start planning dispatch a day ahead, but enable changes to be made if conditions changed. This greater flexibility would improve the efficiency of dispatch, although it could raise issues of market power if dominant participants had the opportunity to rebid and add complexity and cost to the market. Therefore, any change should be carefully analysed to ensure its benefits exceeded its costs.

Griffin Energy commented that it does not believe that there were significant benefits to changing the timing of STEM closure at this early stage of the market's development. According to Griffin Energy, there is insufficient volume traded in the STEM to warrant the potentially high costs of altering systems and processes.

System Management noted that there is limited trading in the STEM at present and questioned the need to progress changes to the timing of the STEM in light of this limited trading. System Management also noted that moving the STEM closer to real-time would require extensive planning and significant investment. Having said that, System

Management reiterated its previous suggestion that rebidding should be allowed in certain limited circumstances.

4.5.2.3 Authority's View

The Authority notes that there is fairly widespread support for greater alignment between the timing of the STEM and the timing for gas pipeline nominations, particularly in the current environment of gas supply constraints. However, the Authority also acknowledges concerns expressed by many stakeholders that changing STEM gate closure or introducing multiple gate closures could involve significant transitional costs and agrees with the contention made by Synergy that such changes should be subject to rigorous cost-benefit analysis in light of the relatively small size of the WEM and the SWIS more generally. This is an issue that could best be dealt with as part of the proposed road map (see section 6 below).

Recommendation 10

The proposed road map process should consider the case for greater alignment between short term energy market timing and the timing for gas pipeline nominations in the context of the future direction of market development.

4.5.3 Balancing

4.5.3.1 Outline in the Discussion Paper

Despite some recent changes to the balancing arrangements, some stakeholders commented in preliminary consultation that the current balancing arrangements expose Verve Energy to differences between real-time dispatch and day-ahead forecasts of dispatch. In this context, it was suggested that moving the STEM closer to real-time would improve the cost-reflectivity of the balancing prices that Verve Energy receives.

In addition, some stakeholders supported a move to competitive balancing. In the last Minister's Report, the Authority noted that the ability of generators other than Verve Energy to offer real-time balancing at that early stage of the market was substantially constrained, so that achieving a competitive balancing market would be difficult.

4.5.3.2 Submissions received in response to the Discussion Paper

LGP supported the notion that Verve Energy be kept whole in respect of the risks it incurred due to the misalignment of gas scheduling with the STEM. LGP suggested 'dual pricing' as a natural extension of the recent ex post balancing adjustment and much simpler than moving the STEM to real-time.

Synergy considered that, compared with the status quo under which Verve Energy acts as the 'swing generator', it would be more efficient to allow all generators to offer balancing via incremental offers and decremental bids. However, Synergy noted that this would be a substantial change to the market, and the merits of such a change should be carefully scrutinised against its costs.

The ESAA noted that Verve Energy may not recover all of its costs under the present market design and considered it important that the balancing market has cost-reflective pricing to ensure efficient outcomes. The ESAA acknowledged that it may take some time

for sufficient competition to develop to make competitive balancing viable, but otherwise supported moving to competitive balancing as quickly as possible.

System Management warned that any change to competitive balancing would require extensive planning and significant investment – up to many millions – and should not be undertaken lightly, nor without extensive consultation with participants.

Similarly, the IMO suggested that a move to competitive balancing would require considerable work on the IMO's and participants' systems. The IMO also argued that enabling parties other than Verve Energy to provide balancing services could reduce the efficiency of dispatch as well as offer Verve Energy opportunities to exercise market power given that it would continue to remain a dominant provider. Ultimately, however, as the market increased in size, it would become increasingly difficult for Verve Energy to remain the sole provider of balancing services.

Verve Energy stated that the difference between day-ahead forecasts and real-time dispatch could lead to uneconomic outcomes – generally when Verve Energy itself is dispatched out of merit order before lower cost IPP plant. Verve Energy supports the introduction of a competitive balancing market.

4.5.3.3 Authority's View

As with the issue of moving the STEM closer to real-time, the Authority agrees in principle with competitive balancing. The main obstacle to such a change is the implementation and transitional costs in the context of the relatively small size of the market. This also raises the question of the role of the STEM if competitive balancing were introduced. The Authority suggests that this issue be considered as part of the road map discussed in section 6 below.

Recommendation 11

The proposed road map process should consider the case for a move to competitive balancing in the Wholesale Electricity Market, in the context of the respective roles of balancing and the short term energy market in the future direction of market development.

4.6 Administrative matters

4.6.1 Rule change process

4.6.1.1 Outline in the Discussion Paper

The Authority's Discussion Paper noted that some stakeholders had expressed concerns about the IMO having a conflict of interest given its responsibilities within the Rule change process. In the 2007 Minister's Report, the Authority noted that there are arrangements in place to minimise the potential for any conflicts to impact on Rule change proposals, but that it would continue to monitor the situation.

In addition, some stakeholders had commented that the Rule change process is very reliant on the Market Advisory Committee (**MAC**), which was described as a collection of vested interests. Other comments referred to the inflexibility of the Rule change process and the large volume of changes of which participants need to keep abreast.

4.6.1.2 Submissions received in response to the Discussion Paper

Griffin Energy generally believed that Rule changes are processed in a transparent and timely manner, particularly highlighting the importance of the MAC in streamlining the Rule change process. However, Griffin Energy considered that there was potential for conflict of interests to arise with the IMO being both Rule administrator and Rule enforcer, as well as being a statutory body answerable to government.

LGP was generally satisfied with the Rule change arrangements but noted that ideally, separate institutions would administer the Market Rules and conduct market operations. However, LGP was satisfied that there are sufficient checks under the current regime, with the Authority monitoring Rule change proposals. LGP also highlighted its support for a review of the Rule change timescales, so as to include an intermediate speed between 'fast' and 'normal'.

CCIWA commented that it is satisfied with the current Rule change process, and stressed that the provision of an adequate consultation period must continue to be ensured.

The IMO acknowledged comments from several participants regarding the length of the Rule change process (potentially more than 19 weeks) and suggested that it could be streamlined by shortening the time provided for submissions and the final decision. However, the IMO noted that the complexity of different Rule change proposals implies that a single timeline may be inappropriate, and urged caution so as to ensure that there is adequate time allowed at each stage in the process for sufficient analysis and consultation.

SkyFarming expressed its frustration at the delivery format of new Rule changes, and suggested that a summary of new Rule changes be included in the body of the email that alerts participant to such changes.

Synergy commented that it considers the IMO's current Rule change processes as being appropriate given the relative infancy of the market. Like Griffin Energy, Synergy commented on the value of the MAC.

4.6.1.3 Authority's View

The Authority considers that stakeholders appear to be reasonably satisfied with the Rule change process. It may be possible to shorten the change period by reducing time allowed for consultation, but there does not seem to be a strong imperative for this at the present time.

4.6.2 Price transparency

4.6.2.1 Outline in the Discussion Paper

The Discussion Paper explained that some stakeholders were concerned about a lack of transparency surrounding the prices for bilateral contracts in the WEM, and that this can have an impact on the effectiveness of the market. It was suggested that transparency might be increased to some extent by surveying market participants as to expectations of buy and sell prices for standard contracts, and reporting aggregated results in some way.

4.6.2.2 Submissions received in response to the Discussion Paper

The IMO agreed that price transparency is a key prerequisite for effective and efficient market design and operation, and stated its commitment to reviewing its web site over 2008/09 in an attempt to improve user-friendliness.

The ESAA argued that, in the absence of a compelling market failure, it would be highly inappropriate for government to intrude in the operation of the bilateral contracts market, particularly by exposing confidential contractual prices. Rather, price transparency could be improved by ensuring an efficient and open STEM and reserve market. By way of example, the NEM provides transparency through the spot market while bilateral derivative contracts remain confidential. The ESAA suggested that there may be benefits in the IMO, or another relevant body, providing the market with additional information such as new entrant generation costs in the form of a regular report.

Griffin Energy commented that lack of price transparency is built into the design of a net-pool market. Unless this is changed to a gross-pool design, or the STEM begins trading considerably more volume than it presently does, pricing signals will remain opaque.

LGP signaled that it did not support increased price transparency, as this would require disclosure of commercially confidential bilateral contract arrangements. LGP submitted that project returns can be adequately estimated from knowledge of cost structures and tariff revenues.

While Western Power stated that it was currently undertaking a range of work to provide greater transparency and streamline processes, including a focus on increased price certainty with respect to network connection costs, it was unable to provide further details.

4.6.2.3 Authority's View

It appears that within the framework of the existing market design, most participants understand that it would be difficult to introduce greater transparency in the market for bilateral contracts. However, greater transparency in fuel markets may be possible and useful. In the Authority's view, as noted by Griffin Energy, this issue goes partly to the choice of market design: a 'net pool' structure such as the WEM requires a degree of confidentiality surrounding bilateral contracts, whereas under a 'gross' pool design such as the NEM, all electricity must be traded through the spot market. Having said that, even though the NEM is a gross pool market, participants in the market do enter into confidential contracts that are important for investment decisions. This is a matter to be considered as part of the road map discussed in section 6 below.

Recommendation 12

The proposed road map process should consider the appropriate level of transparency in the market for bilateral contracting, given the existing and likely future nature of the Wholesale Electricity Market design.

5 Specific events, behaviour or matters

5.1 Background

Clause 2.16.12(c) 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.

5.2 Fuel availability

5.2.1 Outline in the Discussion Paper

The Discussion Paper noted that a number of stakeholders raised a variety of concerns about fuel availability, prices and delivery constraints in the Authority's initial consultation for the Minister's Report.

5.2.2 Submissions received in response to the Discussion Paper

5.2.2.1 Broader gas supply issues

CCIWA considered that Government policy which encourages diversification of supply in the domestic energy market will better enable investors to make rational decisions based on the economic and risk profiles of alternate energy sources. CCIWA suggested that the most appropriate solution is for the Government to develop a State Energy Policy. The State Energy Policy should, among other things, provide a framework for investment in energy infrastructure and include Government response plans for emergency operations. Finally, the CCIWA said that although participants acted in good faith during the recent Varanus Island incident, this could not always be assumed under the existing market design.

Western Power was also of the view that Western Australia requires an energy policy to maximise the State's ability to effectively manage:

- security of fuel supply;
- market signals in regard to the adequacy of fuel diversity; and
- the effects of escalating fuel prices.

In this context, Western Power made the point that at least two events in 2008 have demonstrated the vulnerability of natural gas supply for electricity generation. Further, Western Power noted that to the extent fuel restrictions lead to the dispatch of generation based on fuel availability, the requirement for network capacity and hence network costs is likely to increase.

Griffin Energy noted that both the reduced availability and increased price of gas in the last two to three years, and the Varanus Island incident are part of the risk profile for gas supply, which should be factored into future investment decisions. In contrast, policy decisions – including in regard to regulation of gas pipelines, regulation of petroleum exploration and production, and the design of an emissions trading scheme – lead to significant uncertainty. Policy in regard to these issues should be transparent and made with the long-lived investments of the generation sector in mind.

The DomGas Alliance commented that a competitive WEM depends on competition between gas and coal. At current prices, natural gas is no longer competitive with coal for base load power generation and over time, higher gas prices will lead to higher coal prices and higher wholesale and retail electricity prices. The DomGas Alliance submission supported a range of policy measures intended to promote a competitive gas market in Western Australia.

By contrast, SkyFarming argued that current fossil fuel prices (including for gas) were too low given the ongoing depletion of these resources and the present lack of a carbon tax.

5.2.2.2 Implications for WEM design

Submissions from a number of stakeholders including LGP, the ESAA, Verve Energy and the IMO supported the view expressed in the Discussion Paper that investors were best placed to evaluate fuel availability and price when making investment decisions, and the use of a fuel other than gas does not in itself suggest a flaw in the design of the WEM. Having said that, LGP and Verve Energy noted that if the current fuel supply issues prove only to be short-term, investment in non-gas fired plant (new diesel-fuel plant, distillate peaking plant) could turn out to be sub-optimal.

Griffin Energy voiced concerns about the impact of lack of diversity and security of supply on the generation reserve margin. Griffin Energy considers that the reserve margin should reflect the high reliance in the SWIS on undiversified gas supplies.

Verve Energy argued that the rigid, annual review of the STEM maximum price cap is undesirable, since the current arrangements cannot accommodate short-term fuel price spikes and can result in generators being forced to sell energy below SRMC.

System Management noted that fuel supply issues had a direct impact on the security and reliability of the power system. For example, System Management noted that the Market Rules compel non-Verve Energy participants to produce in accordance with resource plans that are set the previous day. However, resource plans may not be achievable or appropriate to situations with significant fuel constraints. Under a high risk or emergency operating state, System Management can dispatch out of merit order, but System Management considered that there should be a more general trigger that allows rebidding of resource plans in certain, limited circumstances.

System Management also raised the specific issue of increasing the requirement for on-site storage of alternative fuels from 12 hours to 24 hours.

The IMO noted that the day-ahead nature of the market may not adequately allow prices to capture short-term fuel constraints that become known only after offers are submitted. The IMO further commented that the uncertainties around on-the-day fuel constraints expose generators (especially Verve Energy) to risks and either discourage participation in the STEM or incentivise inefficient behaviour. A related concern raised by the IMO was that IPP schedules are fixed a day ahead, thereby constraining IPPs' output from changing, even where this would be efficient.

Several other submissions also highlighted the problems caused by the interaction between the day-ahead nature of the STEM and uncertainty over fuel constraints. For example, Alinta referred to the fact that the STEM is run by 9:50AM, however, parties are not made aware of their imbalance position on the Dampier to Bunbury Pipeline until at least noon. This creates uncertainty for participants, with implications for electricity supply and prices. In response, Alinta suggested a closer alignment of timelines for the electricity and gas markets and in the longer term, a move to multiple gate closures or moving gate closure closer to real-time.

The ESAA also mentioned this issue and supported a review of energy price limits by the IMO as well as a change to the Market Rules allowing participants the ability to rebid.

LGP observed that the uncertainty caused by the day-ahead design of the STEM probably causes offers to be overpriced to compensate for risk. LGP acknowledged that it was not directly affected by this issue, but would support a review and Rule change to address it nevertheless.

Verve Energy highlighted that generators face significant risks that bids and offers posted a day-ahead in the STEM may not reflect actual costs due to fuel curtailments – this risk generally results in under-recovery of costs. Verve Energy is particularly exposed to these risks due to its role as the balancing provider (Verve Energy is paid according to its STEM submissions and not according to the fuel used).

5.2.3 Authority's View

On broader fuel supply issues, the Authority observes that gas supply constraints are pushing all fuel prices up. Over time, this should encourage the development of different gas reserves for electricity generation that may have previously been uneconomic. While the timeframe for the commissioning of new supply is uncertain, the Authority considers that investors are in the best position to assess the relevant opportunities and risks. The role of an emissions trading scheme in determining fuel choice is yet to be understood. However, to some extent, this will depend on the amount of 'headroom' that high gas prices give to coal.

The Authority also notes that the former Government announced a review of the State's gas security in the wake of the Varanus Island incident. The review is to be undertaken by the Office of Energy and is to report within six months.[43]

On the WEM implications of fuel issues, the Authority notes that the direction of comment seems to be to modify the market to better align with the gas day (or vice versa). This issue was discussed in section 4.5.2 above in relation to changes to the timing of the STEM.

Finally, the proposal made by System Management to increase the requirement for on-site storage of alternative fuels from 12 hours to 24 hours could be dealt with through the Rule change process if it had broad support.

[43] http://www.mediastatements.wa.gov.au/Pages/RecentStatements.aspx?ItemId=130664&days=7.

Recommendation 13

The proposed road map process should consider the extent to which the design of the market enables participants to manage short-term and long-term fuel constraints in a way that promotes efficient market outcomes.

5.3 Greenhouse and renewables schemes

The Discussion Paper did not explicitly raise the issue of the implications of an emissions trading scheme and an expanded mandatory renewable energy target. However, many of the issues were highlighted in the question about wind energy (see section 5.7 below). Nevertheless, the Authority considers it worthwhile to make some observations on the effect that the prospective CPRS and expanded Mandatory Renewable Energy Target (**MRET**) is having on the WEM.

5.3.1 Authority's View

The Authority notes that a CPRS serves to put a price on emissions of CO_2 and other greenhouse gases. This ensures that investment and operating decisions in the WEM and elsewhere will take account of the negative externality associated with such emissions. This should help promote efficiency and hence the Market Objectives.

The introduction of a CPRS does imply some additional risks for the WEM. Depending on the design of the scheme, there may be implications for the financial viability of generators in the WEM as well as for the availability and reliability of generation plant in the WEM. There may also be implications for the financial viability of small retailers due to higher spot prices (and therefore greater prudential obligations) as well as the risks that retailers face as a result of ongoing tariff regulation. Indeed, uncertainty over the ultimate design of a CPRS may already be discouraging investment in non-renewable sources of electricity.

In contrast to a CPRS, an expanded MRET deliberately favours certain generation plant technologies over others. In the absence of a CPRS, an MRET scheme could provide a 'second-best' means of reducing greenhouse gas emissions. However, with the likely commencement of a CPRS in 2010 or soon after, an expanded MRET is more likely to promote investment in renewable plant (particularly wind) that is not justified by the prevailing price of carbon and is hence inefficient. It appears to the Authority that this may already be occurring in the WEM due to the relatively greater clarity over the design of the enhanced MRET scheme compared with the uncertainty surrounding the proposed CPRS. Similarly, the favourable market and ancillary services cost concessions given to wind generation could safely be removed.

In addition, the Authority notes concerns raised by the IMO in its submission to the Commonwealth Department of Climate Change in which the IMO refers to the various risks that would flow from an expanded MRET and are already being observed. These risks primarily relate to the emergent expansion of wind power in the WEM as a result of an enhanced MRET and include:

- reduced availability and reliability of generation capacity on the system, which will require an increase in the system's reserve plant margin and installation of stand-by generation;

- short-term fluctuations in the output of intermittent plant, which can lead to greater system frequency variations and voltage control problems; and
- high levels of overnight generation output coinciding with low system demand, which would require output from highly efficient thermal plant to be curtailed and the operating regimes of base load plant materially changed.

The IMO also noted the currently limited degree of available transmission capability and this Report elsewhere notes the problems associated with network connection and queuing. These network issues are being exacerbated by the current proposals for substantial increases in wind generation to be connected to the network.[44] This highlights the importance of addressing those network issues as a matter of urgency.

5.4 The vesting contract

5.4.1 Outline in the Discussion Paper

As noted in the Authority's Discussion Paper, some stakeholders commented on the operation of the Vesting Contract between Verve Energy and Synergy, including how the Vesting Contract interacts with the WEM.

5.4.2 Submissions received in response to the Discussion Paper

LGP contended that the Vesting Contract results in the bulk of Verve Energy's capacity and low-cost energy being supplied to Synergy, leaving no capacity credits and only marginal-cost energy for bilateral contracting with other retailers, placing such retailers at a disadvantage. LGP also questioned the STEM trading activities of Synergy and Verve Energy, labelling the purchase of energy by Verve Energy from Synergy as counter-intuitive, and warranting an investigation by the Authority.

5.4.3 Authority's View

In the 2007 Minister's Report the Authority noted that the vesting contract is a transitional mechanism to support the development of the market and that the vesting contract is designed to roll-off over time. The purpose of the roll-off and associated Synergy displacement tenders is to provide scope for other generators to enter into contracts with Synergy in order to promote competition in generation development. Recognising this, the Authority's view was that it would be inappropriate to consider a change to these arrangements at that stage.

Since the 2007 Minister's Report, the Authority notes that displacement of the vesting contract has progressed. Synergy's 2007 Annual Displacement Statement of Opportunities[45] notes that during the course of 2007 Synergy undertook a tender process to fulfil its obligation to meet a tendered displacement quantity of 400 MW for the 2010 capacity year. During 2008, Synergy has been undertaking another tender process to meet its ongoing obligations under the vesting contract, with successful tenders to be progressively appointed during the second half of 2008.

Subsequent to the completion of the 2007 Minister's Report, the Authority detected anomalous behaviour by Synergy in regard to the Vesting Contract, which has

[44] See section 4.3 above and section 5.7 below.

[45] Synergy, *Annual Displacement Statement of Opportunities*, 30 November 2007.

implications for the effectiveness of the market. This issue was also referred to by LGP in its submission (see above).

The Authority's concern with Synergy's behaviour is that Synergy has been taking advantage of the facility that Synergy has under the Vesting Contract to effectively buy from the STEM during low-priced periods and to sell back into the STEM during high-priced periods. The Authority's analysis of the market data suggests that Synergy's behaviour was as follows:

- During periods when the STEM price was low, Synergy had been buying from the STEM rather than nominating under the Vesting Contract and had, in this way, accumulated a long position under the Vesting Contract. This is suggested by the fact that Synergy was a net buyer in the STEM during August, September and October 2007.
- During periods when the STEM price was high, Synergy had been over-nominating under the Vesting Contract and running down its accumulated long position under the Vesting Contract. At the same time as it had been over-nominating under the Vesting Contract, Synergy had been selling into the STEM. This is suggested by the fact that Synergy had been a net seller in the STEM during the first three weeks of January 2008. It is also suggested by the fact that Synergy had been observed to consistently over-nominate under the Vesting Contract for the first three weeks of January 2008.
- When Synergy had run up against the monthly energy limits under the Vesting Contract, Synergy had then taken energy from the balancing hedge in the Vesting Contract. This is suggested by the fact that Synergy had been observed to nominate flat amounts during the later part of January 2008.

The effect of this behaviour was that Synergy was able to acquire energy at low prices through the Vesting Contract and sell that energy at high prices into the STEM. This behaviour has implications for the effectiveness of the market:

- Verve Energy will be required to run additional generation plant during high priced periods in order to meet Synergy's over-nominations under the Vesting Contract. Verve Energy will receive the Vesting Contract price for this over-nominated energy, which is unlikely to cover Verve Energy's costs during these periods.
- Synergy's sale of excess energy will displace other generation capacity from being dispatched in the STEM.
- The net effect can be that Verve Energy will be required to run high cost generation plant to meet Synergy's nominations, which will effectively be displacing lower cost plant from dispatch in the STEM.

This form of behaviour is unlikely to be consistent with the market objectives. These issues were discussed with both Synergy and the Office of Energy. The Office of Energy has since informed the Authority that the Vesting Contract has been amended, with effect from 1 October 2008. These amendments included amendments to the balancing hedge to address the concerns raised by the Authority regarding Synergy's behaviour. The intention of the amendments is to ensure that Synergy is limited in its use of the balancing hedge. The Office of Energy has also informed the Authority that further amendments will be made to the Vesting Contract as a consequence of the electricity tariff review, and that these amendments will include further refinement of the balancing hedge and the nomination limits. The Authority will continue to monitor Synergy's behaviour in regard to the Vesting Contract.

5.5 Retail market reform

5.5.1 Outline in the Discussion Paper

The Discussion Paper raised the implications of retail market arrangements for the integrity of the WEM. The key issues noted were the speed of progress to cost-reflective retail electricity tariffs and the implementation of full retail competition.

5.5.2 Submissions received in response to the Discussion Paper

The ESAA argued that retail market arrangements have important implications for the ongoing effectiveness of the WEM – in particular, the ESAA argued that for DSM to be appropriately valued, it is imperative that retail prices be fully cost reflective.

Griffin Energy contended that limiting retail tariff increases to 10 per cent a year would effectively delay FRC until well into the next decade, which in turn would undermine the effectiveness of the WEM.

LGP expressed strong concerns regarding the existing arrangements for the procurement of Supplementary Capacity. LGP noted that under the existing arrangements for the funding of Supplementary Capacity, the costs of Supplementary Capacity are allocated across all purchasers of capacity credits from the IMO. LGP noted that the largest holder of capacity credits supplies the largest retailer under a vesting contract (some 90 per cent). This leaves smaller market participants to source capacity credits directly from the IMO, and under the existing funding arrangements for Supplementary Capacity, these smaller market participants face the costs of Supplementary Capacity.

5.5.3 Authority's View

In the Authority's view, the nature of comments on this issue reflects the retail dominance of Synergy. The Authority considers that the full objectives of the market will not be achieved in a real sense unless Synergy's dominance is reduced. This, in turn, will require that reform takes place to enable new entrants to compete in the retail market to a significant degree. In the Authority's view, such reforms must include a more rapid move to cost-reflective retail tariffs than implied by the former Government's proposed tariff glide path. Without more cost-reflective retail tariffs, it is likely that Synergy's dominance will become further entrenched, thereby distorting both retail and wholesale market outcomes. Such issues would be compounded by a merger of Synergy and Verve Energy, which – if it proceeded – would, among other things, be likely to seriously deter new generation and retail entry. The full benefits of retail competition would also require the introduction of FRC in electricity, which is currently under review by the Office of Energy.

The issue raised by LGP is currently the subject of a Rule Change proposal,[46] and the Authority considers that the issue is best dealt with through this process.

Finding 2

Cost-reflective retail tariffs are necessary to avoid distortions at both retail and wholesale market levels.

[46] RC_2008_27.

Finding 3

Distortions at the retail and wholesale market levels would be compounded by a merger of Synergy and Verve Energy, which – if it proceeded – would, among other things, be likely to seriously deter new generation and retail entry.

5.6 Ancillary services

5.6.1 Outline in the Discussion Paper

The Discussion Paper noted that consultation for the 2007 Minister's Report raised the issue of competitive supply of ancillary services. The Authority noted that the Market Rules provide for System Management to enter into an ancillary service contract with participants other than Verve Energy under certain circumstances, including that doing so is a less expensive alternative to ancillary services provided by Verve Energy. In the 2007 Minister's Report, the Authority stated that it would continue to monitor developments in the delivery of ancillary services.

5.6.2 Submissions received in response to the Discussion Paper

Alinta noted that System Management is currently running a competitive tendering process for system restart services, and would welcome an extension of the application of the tender process to other ancillary services in the near future.

System Management also referred to its current Expression of Interest process for system restart services and mentioned that it would follow a similar process for spinning reserve. System Management suggested that competitive procurement of ancillary services was 'superficially attractive', but that the feasibility of this approach was dependent on a detailed understanding of the need for ancillary services.

The IMO pointed out that under the Market Rules, System Management was already able to contract with providers of ancillary services other than Verve Energy when either Verve Energy could not supply the service or if an alternative provider was likely to be cheaper. The IMO further highlighted that it was presently working with System Management on a draft System Management Ancillary Services Procurement Plan, which would define the requirements and timelines of a competitive Ancillary Services procurement process. This plan was intended to be published by the end of September 2008.

Verve Energy supported the competitive delivery of ancillary services, highlighting the point that competitive delivery of ancillary services goes hand-in-hand with the delivery of competitive balancing services. Verve Energy supported a review of the payment mechanism for ancillary services, stating that the current methodology exposes them to increased risk of revenue under-recovery.

LGP stated that while it would welcome competitive procurement, given the small component of ancillary service costs in retail tariffs, it is largely satisfied with current arrangements.

5.6.3 Authority's View

The Authority strongly supports further moves towards competitive procurement of ancillary services – especially for important high cost services such as spinning reserve. The Authority understands that there are complexities associated with competitively procuring ancillary services, however, the delays in putting in place an ancillary services procurement strategy by System Management ultimately delays any potential benefits that would arise from implementing such a strategy, and hence impacts on the effectiveness of the market. The Authority anticipates significant progress on this matter during the coming year.

5.7 Impacts of wind energy

5.7.1 Outline in the Discussion Paper

The Discussion Paper highlighted some of the implications of increasing amounts of wind energy in the SWIS. Most of these implications flowed from the intermittent nature of wind energy and its often remote location. The Authority noted that the MAC has established a renewable energy generation working group to consider and assess these issues, including the treatment of renewable energy generation in the reserve capacity mechanism, the allocation of ancillary service charges and low-load compensation mechanisms.

5.7.2 Submissions received in response to the Discussion Paper

Griffin Energy commented that an increase in wind energy in the SWIS will lead to indirect costs due to increased standby generation, inefficient operation of existing base load plant and additional investment in the transmission system. Griffin Energy suggested that while smearing these costs across all customers is not likely to maximise efficiency, it may be necessary to achieve government policy objectives.

The IMO outlined several reliability and security issues posed by the rapid increase in penetration of wind generation, including:

- reduced availability and reliability of generation capacity;
- short-term fluctuations in output of intermittent plant; and
- disruptions to the operation of base load plant, due to high levels of overnight generation output coinciding with low levels of system demand.

The IMO observed that potential costs arising from the above issues need to be identified and quantified, and mechanisms to efficiently allocate such costs will need to be developed.

LGP recognised that intermittent generation will increase requirements and costs for ancillary services. Given the REWG (Renewable Energy Working Group) has been established to report to the MAC, LGP considered that this matter should be addressed in that forum.

SkyFarming contended that the system costs associated with variation in output by wind generation could largely be mitigated through locational diversification of wind generation plant. Therefore, there were benefits from encouraging wind farms to locate far apart from

one another. SkyFarming referred to experience in Nordic countries, where wind energy production generally remained within the bounds of 10 per cent and 80 per cent of maximum capacity.

Western Power suggested that the main impacts of wind energy would be the following:

- Dispatch of intermittent, unscheduled generators can displace base load plant designed for continuous operation. This will generally increase total generating costs in the short and long-term and will result in lower efficiency of production.
- Because of the variability of wind generation, additional gas turbines are likely to be required in reserve to provide fast response capability to accommodate positive and negative changes in wind generation production. Western Power estimated that for 200 MW of wind capacity, around 50 MW of gas turbine capacity would be required for load-following purposes.
- Intermittent generation will have specific requirements in order to maintain voltage control, for fault recovery capabilities and to acquire and transmit operational data needed to efficiently run the turbines and integrate them in the power system.
- The location of intermittent generation will likely require significant capacity upgrades.

Given the magnitude of these impacts, Western Power considered that it is vital that these impacts are assessed through detailed system modelling. Based on this modelling, the market rules and regulatory arrangements should be reviewed to ensure they are consistent with and will support increased renewable generation.

Verve Energy stated that increased wind energy penetration might have adverse implications for base load thermal plant overnight. In addition, a lack of appropriate pricing signals for participants to shut down generation might jeopardise the security and reliability of the system. Verve Energy also highlighted that increased wind energy penetration will drive the need for additional ancillary services – the cost of these services is likely to be borne by participants not directly using them.

System Management commented that greater penetration of wind energy in the market would have an impact on the quantity of load-following ancillary service that is required. Greater penetration of wind energy will also result in a greater need for downward dispatch or even decommitment of other generation facilities. These facilities will be paid not to generate, or not to generate to their full extent. Both of these effects will increase costs to all market participants.

5.7.3 Authority's View

The Authority notes the general support amongst stakeholders for wind energy to pay for the costs it imposes on the power system. This is an issue being considered by the REWG and the Authority recommends allocating these costs on a causer pays basis as a means of promoting efficiency and the effectiveness of the market in meeting its objectives. More generally, the implementation of a CPRS is likely to provide the best mechanism for eliminating cost subsidies and transfers towards wind generation.

Recommendation 14

Wind generators should pay for the costs they impose on the power system on a causer pays basis.

5.8 Impacts of demand side management

5.8.1 Outline in the Discussion Paper

The Authority's Discussion Paper highlighted some issues with the participation of DSM in the WEM. These issues largely related to the extent to which DSM ought to be treated similarly to other forms of capacity for the purposes of the reserve capacity mechanism.

5.8.2 Submissions received in response to the Discussion Paper

CCIWA considered that one of the predominant factors preventing DSM from operating in the market is the lack of industry knowledge and awareness. CCIWA supported tariff structures that promote energy efficiency and encourage demand side responses, including time of use tariffs. CCIWA also noted that negotiated contracts between retailers and individual consumers could also facilitate demand side responses.

The ESAA noted that DSM is likely to play an increasing role in the SWIS in coming years and argued that, in order for DSM to be appropriately valued, retail prices must be fully cost reflective (referring to the discussion of retail market arrangements – see section 5.5 above).

Griffin Energy argued that the existing capacity mechanism is not well structured for administering the participation of DSM, as it rewards investment in new capacity whereas DSM tends to require little or no up-front investment. Griffin Energy considered that an alternative mechanism should be investigated, such as an auction for the right to receive power during periods that would otherwise be subject to rolling blackouts. Griffin Energy also noted that the DSM Working Group has made sensible modifications to the treatment of DSM, such as requiring DSM proponents to prove their resources and applying an appropriate refund regime. While these changes may lead to less DSM in favour of more generation capacity, especially in periods of high economic growth, Griffin Energy considered that this merely reflects efficient market signals.

The IMO noted that it has recently conducted a review of provisions related to DSM, proposing a number of measures to streamline and reduce the costs of System Management's processes related to the scheduling and dispatch of DSM. In addition, the IMO raised the same issue as Griffin Energy of whether the existing reserve capacity payment structure, under which all providers of reserve capacity receive the same payment, is appropriate for DSM participants. The IMO expressed its interest in examining, with industry, whether DSM payments should be restructured to better reflect the underlying cost structure of DSM projects providing reserve capacity, including whether the potential complexity of such a system could be justified.

LGP supported the participation of DSM, but considered that existing arrangements were unreasonably favourable, even to the extent that its existence may lack evidence. LGP suggested that DSM was hampered by (i) Western Power's onerous connection

requirements for the paralleling of small 'island' backup generators and (ii) the two-year ahead requirement in the Market Rules in respect of certifying capacity.

SkyFarming suggested that the key barrier to DSM is the low price of electricity, which encourages rather than discourages greater electricity consumption.

Western Power considered that a barrier to participation of DSM is the requirement that DSM be appropriately valued in the context of network augmentation assessments. This currently occurs on a case-by-case basis, but Western Power considered that an overarching methodology should be developed, and suggested that DSM should be valued below firm generation capacity given its lower reliability.

5.8.3 Authority's View

The Authority considers that the market objectives require DSM to be treated in a competitively neutral manner to other forms of capacity for the purposes of the reserve capacity mechanism (and other WEM arrangements). In particular, this involves recognising that DSM is a less 'firm' or reliable resource than thermal generation and thus may need to demonstrate its existence on an ongoing basis. The Authority notes that a Rule change proposal aimed at recognising these differences is being progressed by the MAC.[47]

More generally, the Authority recognises that there are alternative arrangements that could be put in place to govern the participation of DSM in the market, including the proposal made by Griffin Energy for auctions for the right to receive power during periods that would otherwise be subject to blackouts. The Authority considers that these alternatives could be considered as part of the road map process. The Authority notes that the Australian Energy Market Commission (**AEMC**) is currently undertaking a review of potential amendments to the Market Rules in the NEM to better facilitate the participation of DSM in that market. Ultimately, the AEMC intends to identify barriers to participation by efficient DSM in the NEM and to develop proposals for rule changes to reduce or remove these barriers where efficiency would be improved.

Recommendation 15

Alternative arrangements to govern the participation of demand side management, including auctions for the right to receive power during periods that would otherwise be subject to blackouts, should be considered as part of the road map process recommended by the Authority in this report.

5.9 System Management

5.9.1 Outline in the Discussion Paper

The Discussion Paper noted that some stakeholders expressed concerns about System Management remaining within Western Power. In particular, some stakeholders commented that moving System Management out of Western Power and joining it with the IMO might be a more appropriate structure.

[47] IMO, *Rule Change Notice, Demand Side Management – Operational Issues*, RC_2008_20, 18 July 2008, available at: http://www.imowa.com.au/Attachments/RuleChange/RuleChange_2008_20.htm.

5.9.2 Submissions received in response to the Discussion Paper

LGP gave its support to combining the IMO and System Management, and commented that from a probity perspective System Management should not be a part of Western Power. However, LGP was generally satisfied with the current arrangements.

Synergy also commented that it is generally satisfied with the manner in which System Management has undertaken its role to date. Synergy noted that there is no formal retail electricity market operator in Western Australia, with most of these functions undertaken informally by Western Power. Synergy considered that the establishment of an industry-funded retail market operator is a pre-requisite for the introduction of FRC.

Western Power argued that system security requires constant cooperation between Network Management and System Management systems/functions and the need for such cooperation was likely to increase as capacity and fuel constraints became tighter. The current situation provides significant synergies in areas like network outage scheduling, data management and information sharing. Hence, the ring-fenced position of System Management within Western Power (as opposed to within the IMO) was appropriate.

Verve Energy stated that the current arrangements are satisfactory, and opposes the amalgamation of System Management and the IMO.

Western Power also considered that System Management has more incentive to operate the system efficiently as an integrated and ring-fenced entity within Western Power since there are a number of financial (systems and processes) and supporting functions (corporate affairs and human resources) that benefit from this arrangement. Western Power predicted that the operating costs of System Management would rise sharply if the function was fully separated from Network Management.

System Management commented at length that separating System Management from Western Power would lead to significant informational disadvantages and a dramatic increase in costs for what is a relatively small market. Retaining System Management within Western Power allowed for the sharing of resources and facilities such as SCADA systems, control room, the planning function and technical personnel. System Management also contended that generator dispatch cannot be readily divorced from bulk transmission control. Moreover, many other jurisdictions maintain transmission operation and system operation within the one institution, such as New Zealand, the UK and certain European counties. Finally, the independence of System Management is ensured by its ring-fenced status and it conducts its functions in an impartial manner.

5.9.3 Authority's View

In the Authority's view, the integrity of the market requires that System Management acts, and is perceived to act, independently of Western Power Networks and other market stakeholders. This requires greater transparency around the actions of System Management and potentially more robust informational and organisational ring-fencing arrangements.

More specifically and immediately, the Authority is concerned about the extent of System Management's informal and non-transparent relationships vis-à-vis other market players with respect to dispatch arrangements. The Authority notes that the Market Rules require System Management to document the procedures by which Verve Energy is scheduled and dispatched. System Management has not yet done so, but has committed to doing

so this financial year (2008/09). The Authority considers that this is an important step in improving the transparency of System Management's relationships with Verve Energy.

System Management's delays in respect of its obligations regarding the procurement and management of ancillary service contracts (as discussed in section 5.6.3) raises concerns regarding its effectiveness in managing the procurement of ancillary services on behalf of the market.[48] This suggests that System Management may not see it as a priority to administer competitive ancillary service provision – borne out by it, to date, not having competitively procured ancillary services.

The Authority also notes that the IMO's audit report of System Management's compliance with the Market Rules[49] concludes that System Management has not updated various Power System Operational Procedures to reflect amendments to the Market Rules. System Management has proposed to the IMO a date by which these procedures will be updated. The Authority will continue to monitor System Management's progress in updating these procedures.

More generally, to the extent that the annual audits of the IMO and System Management identify issues for both the IMO and System Management, these need to be transparently addressed to ensure that obligations are properly administered.

The Authority notes that Rule Change Proposal RC_2008_33 addresses compliance monitoring and reporting. In particular, the proposal is to introduce a formal requirement for the IMO to report to the Minister on the IMO's compliance with the Market Rules. The proposal is also to remove the exception that the IMO and System Management are taken to comply with the Market Rules if they use reasonable endeavours to comply but have failed to do so. This would make the compliance obligations of the IMO and System Management more stringent.

The Authority will continue to monitor the compliance of the IMO and System Management to the extent that this is relevant to their effectiveness in carrying out their functions under the regulations, the Market Rules and Market procedures, and will provide updates in future reports.

Recommendation 16

System Management should be made subject to more robust informational and organisational ring-fencing to ensure greater transparency and independence.

5.10 Audit of the IMO and System Management

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

[48] Refer to earlier discussion in section 3.17.

[49] IMO, *Assessment of System Management's internal procedures and business processes with the Market Rules, and System Management's compliance with the Market Rules and Market Procedures*, 10 September 2008.

5.10.1 Audit of the IMO

Clause 2.14.3 of the Market Rules sets out the requirements for the audit of the IMO:

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.

PA Consulting has provided three audit reports to the IMO, addressing each of the matters set out in Clause 2.14.3:

- 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.

In conducting its audit of the IMO's compliance with the Market Rules for this year, PA Consulting has adopted an incremental approach. PA Consulting has looked at those clauses where the Market Rules are new or amended since last year's audit report, the Market Procedures or Internal Procedures are new or amended since last year's audit, or the Market Procedures or Internal Procedures relate to areas of recorded breaches of the Market Rules by the IMO since last year's audit report.

In conducting its audit of the IMO's compliance with the Market Rules, PA Consulting has, among other things, identified all new or amended obligations placed on the IMO by the Market Rules, mapped those obligations to the applicable Internal Procedures, reviewed the Internal 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. The IMO's compliance with the Market Rules includes compliance in regard to planning processes such as the Long Term Projected Assessment of System Adequacy (**PASA**) study.

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.

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 changes, etc. to its market software resources to determine whether these procedures comply with the Market Rules and good industry practice given

the nature of the IMO's business. PA Consulting has also 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 and compare favourably with industry best practice.

5.10.2 Audit of System Management

Clause 2.14.6 of the Market Rule sets out the requirements for the audit of System Management:

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.

As with its audit of the IMO's compliance, PA Consulting has adopted an incremental approach to its audit of System Management's compliance with the Market Rules for this year. In conducting its audit, PA Consulting has, among other things, identified all new or amended 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. A number of instances of non-compliance – including the updating of Power System Operational Procedures noted in Section 5.9.3 – have been noted, but PA Consulting does not believe that these are material. System Management's compliance with the Market Rules includes compliance in regard to planning processes such as the Short Term PASA study and the Medium Term PASA study.

6 Recommended measures to increase the effectiveness of the market

Clause 2.16.12(d) of the Market Rules requires that the Minister's Report include any recommended measures to increase the effectiveness of the market in meeting its objectives.

6.1.1 Outline in the Discussion Paper

In the Discussion Paper, the Authority asked stakeholders whether existing processes such as Rule changes were sufficient to provide adequate transparency and direction as to the resolution of certain higher-level WEM issues, or whether the implementation of a 'road map' process for the systematic development of the market should be considered. The types of issues that would come within the road map included moving STEM gate closure nearer to real-time, the case for a competitive balancing market and the network planning regime.

6.1.2 Submissions received in response to the Discussion Paper

Alinta supported the proposal that the long-term development of the market should be guided by a systematic and consultative process and that the first step in that process should be to establish a broad road map outlining the necessary changes and the most effective way of implementing those changes. More specifically, as well as supporting multiple gate closure or moving the STEM closer to real-time, Alinta suggested adopting a physical dispatch engine in the STEM process to more accurately reflect the underlying power system and allow disaggregated bidding.

Griffin Energy considered that it is sensible to introduce guidelines, regularly reviewed, that at least provide some forethought as to how the WEM might evolve. However, Griffin Energy commented that enthusiasm for market evolution should be tempered with acknowledgement of the physical constraints on the SWIS. In particular, real market reform can only come about with the dismantling and/or privatisation of the state owned incumbents.

While generally satisfied with the existing rate of WEM development, LGP urged the importance of implementing the outcomes of the Office of Energy's Electricity Retail Market Review, with significant price rises being necessary to ensure the sustainability of Verve Energy and of retailer.

The CCIWA commented that it has long advocated the need for an overarching State Energy Policy, and that the further development of the WEM should be undertaken as part of a cohesive strategy contained in an overarching State Energy Policy.

The ESAA highlighted that it is essential that the full costs and benefits of any major structural market changes be considered going forward, so as not to undermine the investment certainty arising from a stable market design.

The IMO drew attention to the fact that it intends to submit a three-year Market Rules Evolution Plan for the MAC's consideration in accordance with the its 2008/09 Operational Plan. As part of this process, the MAC will be requested to consider the prioritisation and timing of various market development issues. In light of the long-term nature of many of

the issues, the IMO proposed to initiate, in conjunction with the Authority, the Office of Energy and market participants, a long-term market road map, which would identify the steps required to achieve long-term objectives, such as competitive balancing and (potentially) a real-time market.

Western Power commented that existing arrangements do not appear to provide much scope for market development, as 'the current market is unable to support efficient investment in new generator and the transmission network'. According to Western Power, any market design review would require reconsideration of current contractual arrangements. Western Power stated its support for efforts to review and improve current planning arrangements in a consultative manner.

System Management also commented that existing arrangements provide little, if any, avenue for the development of the market. The focus of the MAC is necessarily on ad hoc Rule changes rather than matters pertaining to the broader market design. System Management was greatly concerned that future developments could have a detrimental effect on the security of the SWIS. System Management also believed that the formation of an appropriate forum to oversee market development would be beneficial to the market as a whole, and that the forum should have broader participation than the existing members of MAC.

6.1.3 Authority's View

The Authority's view on how the WEM can be improved in order to promote the market objectives can be broken into three parts.

First, the Authority has made a number of recommendations and observations in relation to improvements within the existing market design. While the Authority's observations will not be repeated here, it is worth recounting the Authority's recommendations for increasing the effectiveness of the market in meeting its objectives, within the context of its current design. These are:

- Western Power should address its processes and resourcing constraints for assessing network connection applications. This is likely to require a review of Western Power's processes and capability for handling connection applications.
- Western Power should provide greater transparency around its processes for dealing with network applications by proponents of proposed new generation plant and the status of the applications in the queue. This would need to be balanced against participants' commercial needs for confidentiality.
- Western Power should examine the scope for providing more detailed information to the market on existing network capacity and constraints, above and beyond the information contained in its Annual Planning Report.
- Liquidated damages payments should be incorporated into arrangements for delivery of network connections by Western Power and, if they occur, should not impact on network tariffs.
- While the Authority recognises that Western Power is seeking guidance on the application of the New Facilities Investment Test, Western Power should formalise and publish its deep connection charge-setting methodology as soon as possible, so that participants will be in a better position to predict what their connection charges will be and make their connection application decisions accordingly.
- Wind energy should pay for the costs it imposes on the power system on a causer pays basis.

- Greater transparency around the actions of System Management to ensure its actual and perceived independence, such as potentially more robust informational and organisational ring-fencing arrangements.

Second, the Authority acknowledges the response of stakeholders to the question of whether there is a need for the long-term development of the market to be dealt with in a more systematic manner than through the Rule change and similar processes.

As noted in section 1.2 above, there are numerous high-level issues of persistent or emerging concern in the WEM. These include:

- the appropriateness of the continued use of an 'unconstrained'[50] approach to network planning and connections;
- implications of the existing structure of the Western Australian electricity generation and retail sectors;
- moving to a market-determined capacity price;
- moving the STEM closer to real-time or adopting multiple gate closures[51];
- appropriateness of separate liquid and non-liquid STEM price caps to prevent market manipulation;
- removal of STEM SRMC bidding rules and maximum prices;
- the desirability of moving towards a single maximum STEM price;
- the introduction of competitive balancing;
- the appropriate institutional allocation and location of responsibilities of system management, network management and market operation; and
- for the longer term, consideration of the merits of an energy-only market.

Most of these matters go to the fundamental market design of the WEM and hence raise questions that go beyond what might reasonably be dealt with through the Rule change and similar processes. Even those matters more limited in their scope – such as a move to a market-determined capacity price and moving the STEM closer to real-time – ought to have their appropriateness assessed within the context of a longer term plan for the development of the market.

Therefore, the Authority also recommends that a 'road map' be developed, laying out a strategy for the future development of the WEM across a range of dimensions. These dimensions should include:

- the regime for network planning, access and new connections;
- major modifications to the STEM and balancing that interact with other aspects of the market design; and
- the role of the capacity market (if it is to be maintained) vis-à-vis the STEM and balancing.

In the Authority's view, the direction, shape and timing of the road map ought to be driven by the Office of Energy as the key policy-making body in the WEM. However, it should take input from stakeholders including participants, the IMO and the Authority.

[50] Western Power's current unconstrained approach to network connection refers to its obligation to ensure sufficient spare network capacity is maintained when new generators are connected to ensure that the provision of covered services to other (existing) generators is not compromised.

[51] Gate closure refers to the cut-off time for STEM submissions to the IMO in respect of the relevant Scheduling Day.

The road map should identify issues that need to be resolved in the immediate future as well as in the medium and long-term. For example, the regime for network planning could be seen as a medium term issue, given its relevance to the timing and pattern of generation investment, whereas any consideration of a shift away from having a capacity market towards an energy-only market design should be a matter to be resolved in the long-term.

Most importantly, given the relatively small size of the Western Australian electricity market, consideration of the above issues should incorporate analysis of the costs and benefits of any change. The Authority believes that the terms of reference for the road map must specify the fundamental requirement for full cost reflectivity to be included in any market (re)design. Any cross-subsidies should be made directly and explicitly by government to the groups it wishes to assist.

Recommendation 17

A 'road map' for the market should be developed, laying out a strategy for the future development of the Wholesale Electricity Market to further promote the Wholesale Market Objectives.

The direction, shape and timing of the road map ought to be driven by the Office of Energy as the key policy-making body in the Wholesale Electricity Market.

Finally, the Authority considers that the market objectives will be difficult to meet in the longer term unless certain fundamental underlying structural and regulatory policy matters are addressed. These matters are:

- The non-cost reflectivity of current regulated retail tariffs;
- The absence of a timetable for the transition to FRC; and
- The dominant roles of Synergy and Verve Energy in the market.

Addressing these issues are important pre-requisites for the WEM to best promote the Wholesale Market Objectives going forward.

APPENDICES

Appendix 1 Glossary

AER	Australian Energy Regulator
AEMC	Australian Energy Market Commission
CCGT	Combined cycle gas turbine
CCIWA	Chamber of Commerce and Industry Western Australia
CPI	Consumer price index
CPRS	Carbon pollution reduction scheme
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
FRC	Full retail competition
IMO	Independent Market Operator
IPP	Independent Power Producer
LGP	Landfill Gas and Power Pty Ltd
MAC	Market Advisory Committee
MCAP	Marginal cost administrative price
MRDG	Markets Rules Development Group
MRCP	Maximum Reserve Capacity Price
MRET	Mandatory Renewable Energy Target
MSDC	Market Surveillance Data Catalogue
MW	Megawatt
MWh	Megawatt hour
NFIT	New facilities investment test
NIEIR	National Institute of Economic and Industry Research
NEM	National Electricity Market
PASA	Projected Assessment of System Adequacy
PSOP	Power System Operation Procedure
SCADA	Supervisory Control and Data Acquisition
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

DomGas Alliance

Energy Supply Association of Australia

Griffin Energy Development Pty Ltd

Independent Market Operator

Landfill Gas and Power Pty Ltd

SkyFarming Pty Ltd

Synergy

Verve Energy

Western Power (including separate comments from System Management)

Appendix 3 MSDC Summary

STEM price duration curves and MCAP duration curves

Figure 29: Price duration curves during off-peak periods (1 August 2007 to 31 July 2008)

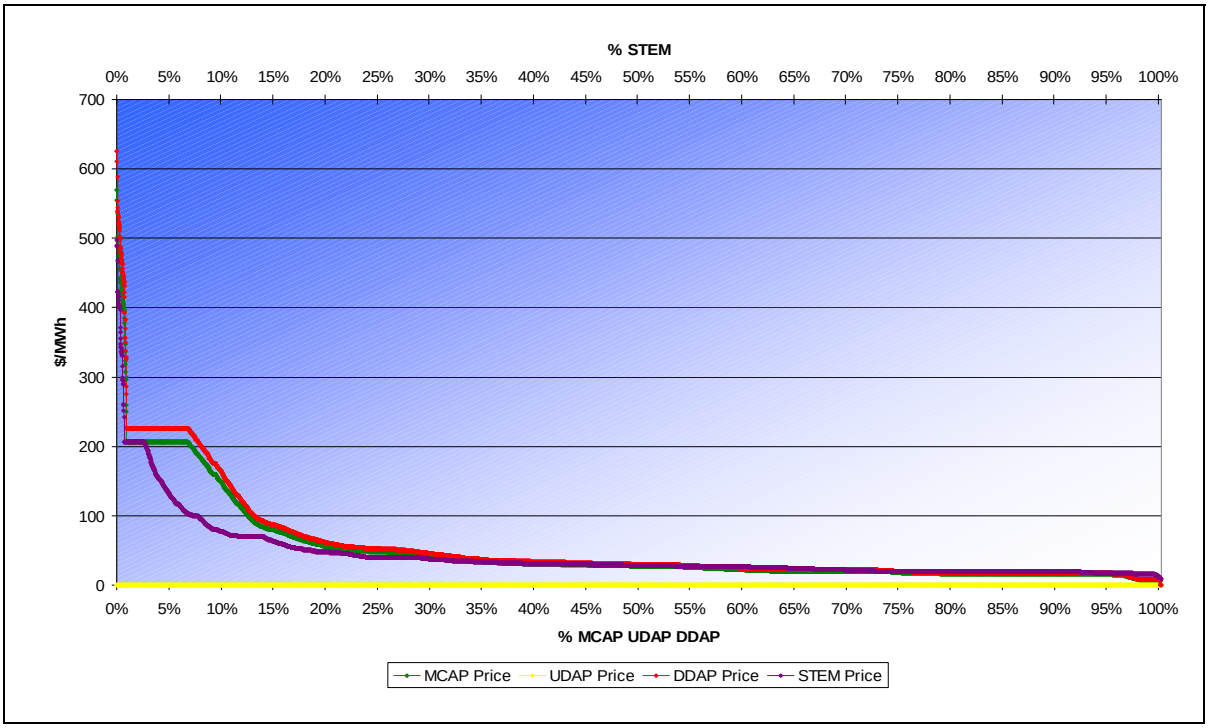
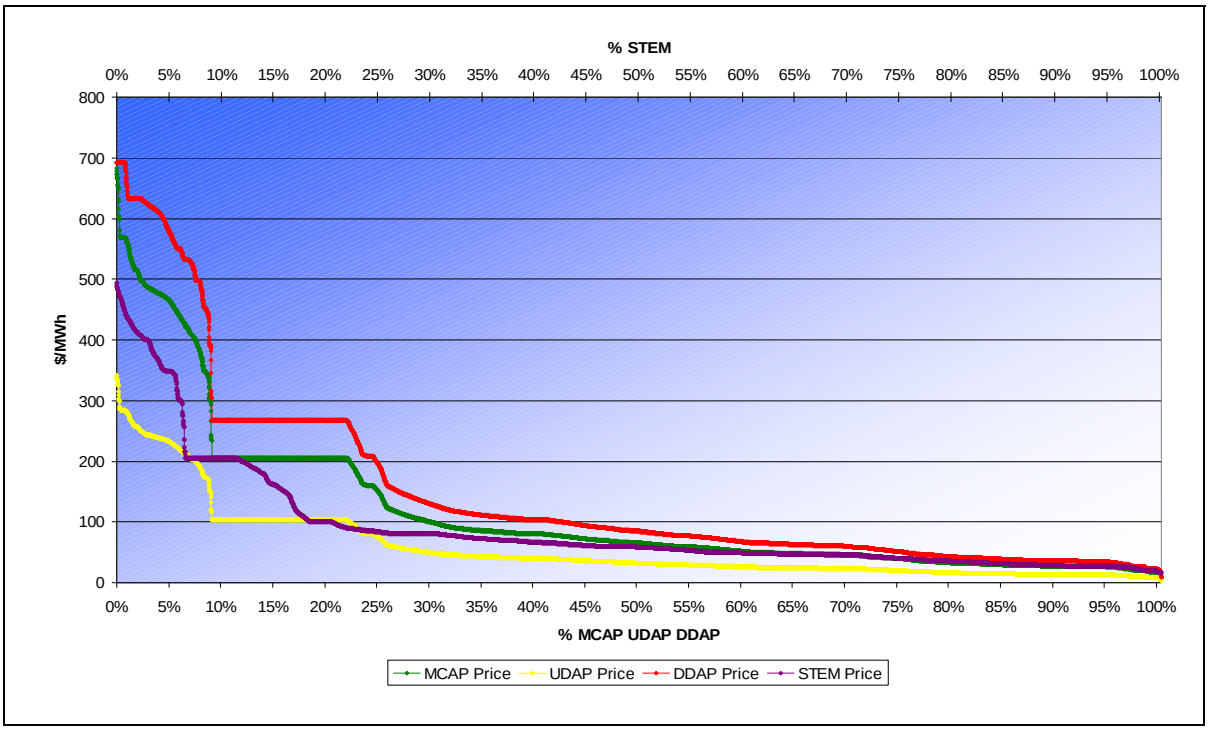


Figure 30: Price duration curves during peak periods (1 August 2007 to 31 July 2008)



Standing data prices used in balancing

Figure 31: Average daily standing data balancing prices for non-liquid facilities (peak)

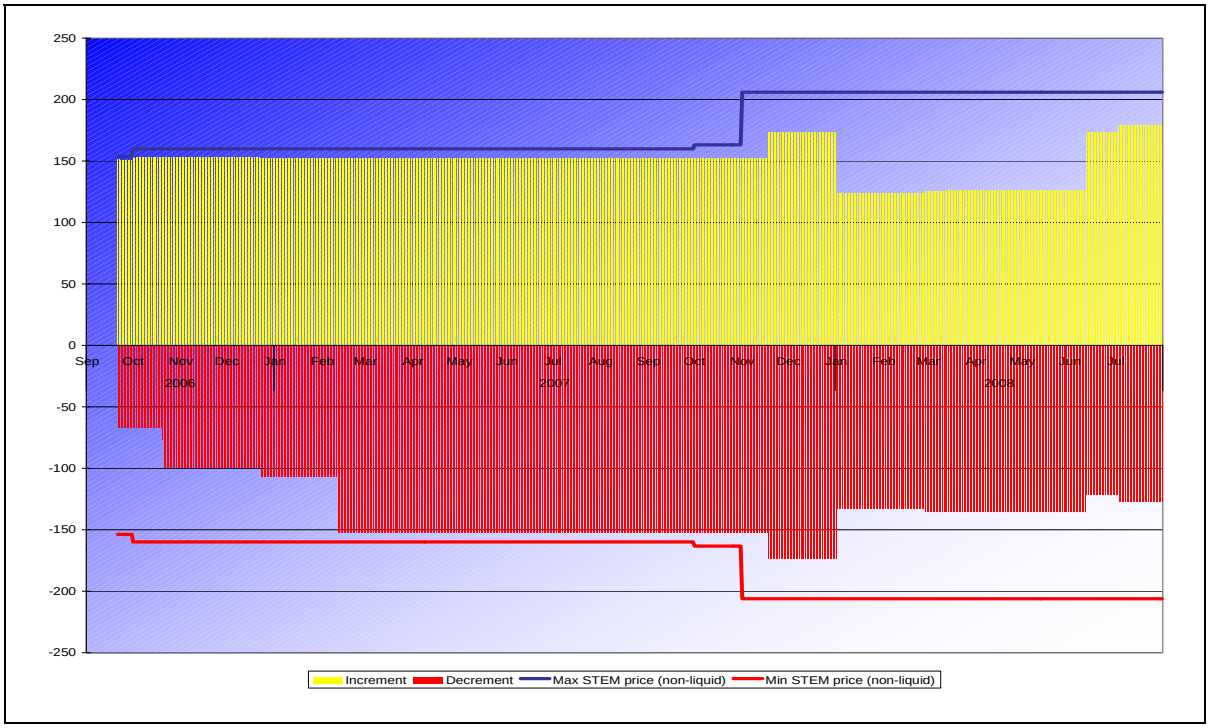


Figure 32: Average daily standing data balancing prices for non-liquid facilities (off peak)

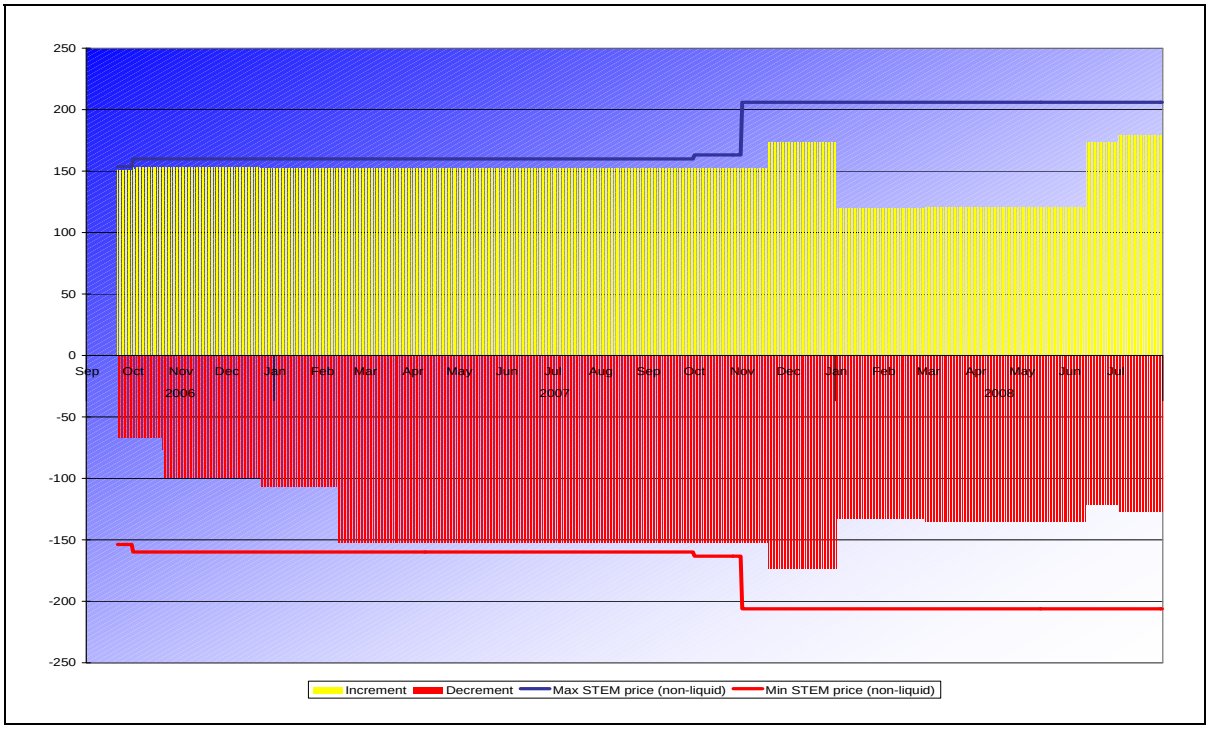


Figure 33: Average daily standing data balancing prices for liquid facilities[52]

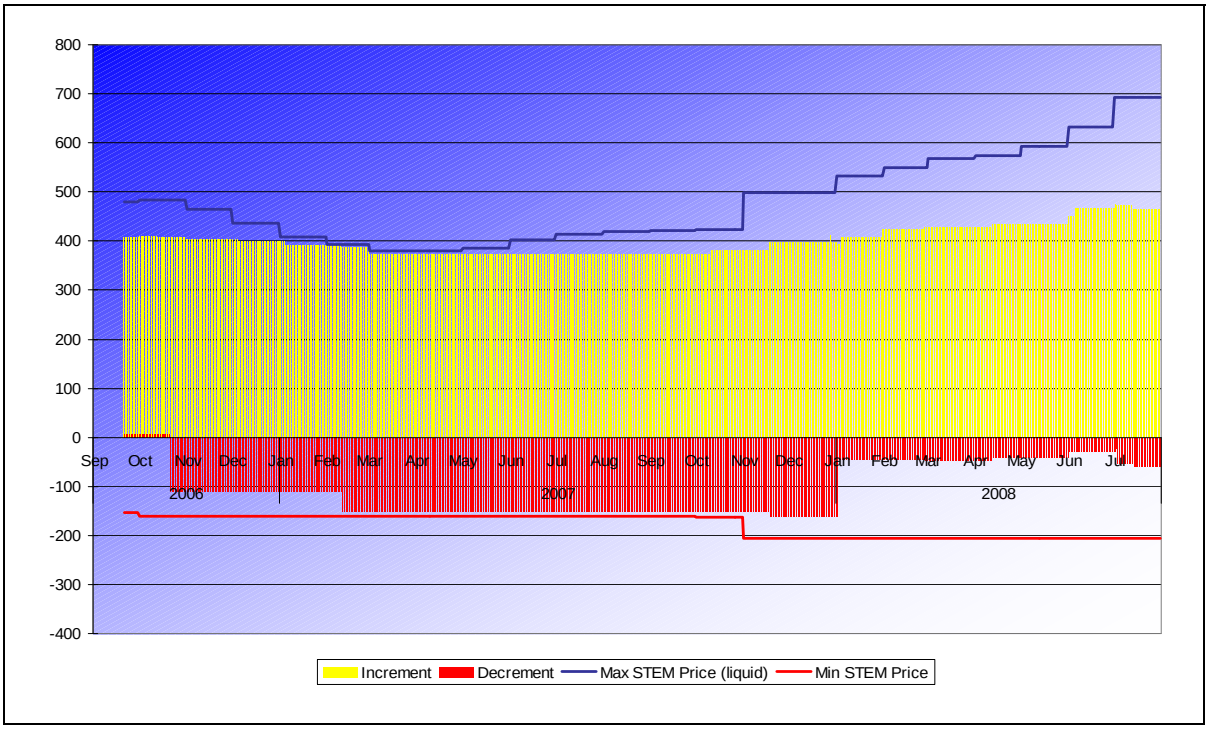
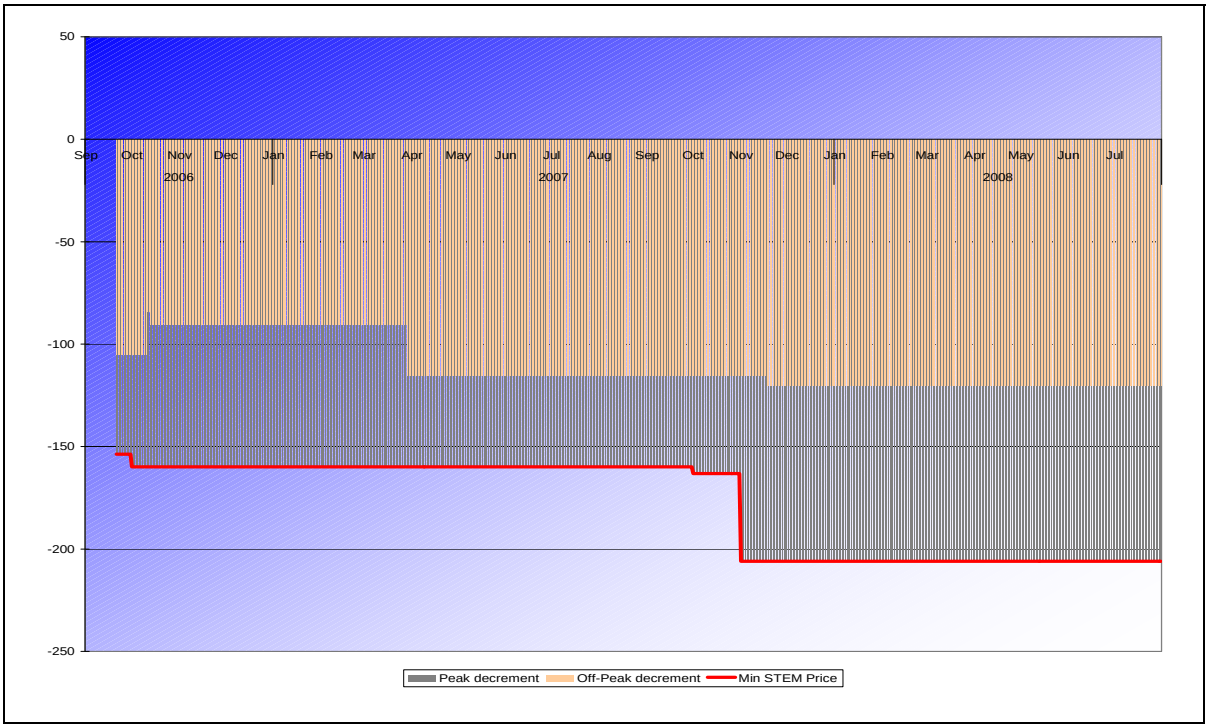
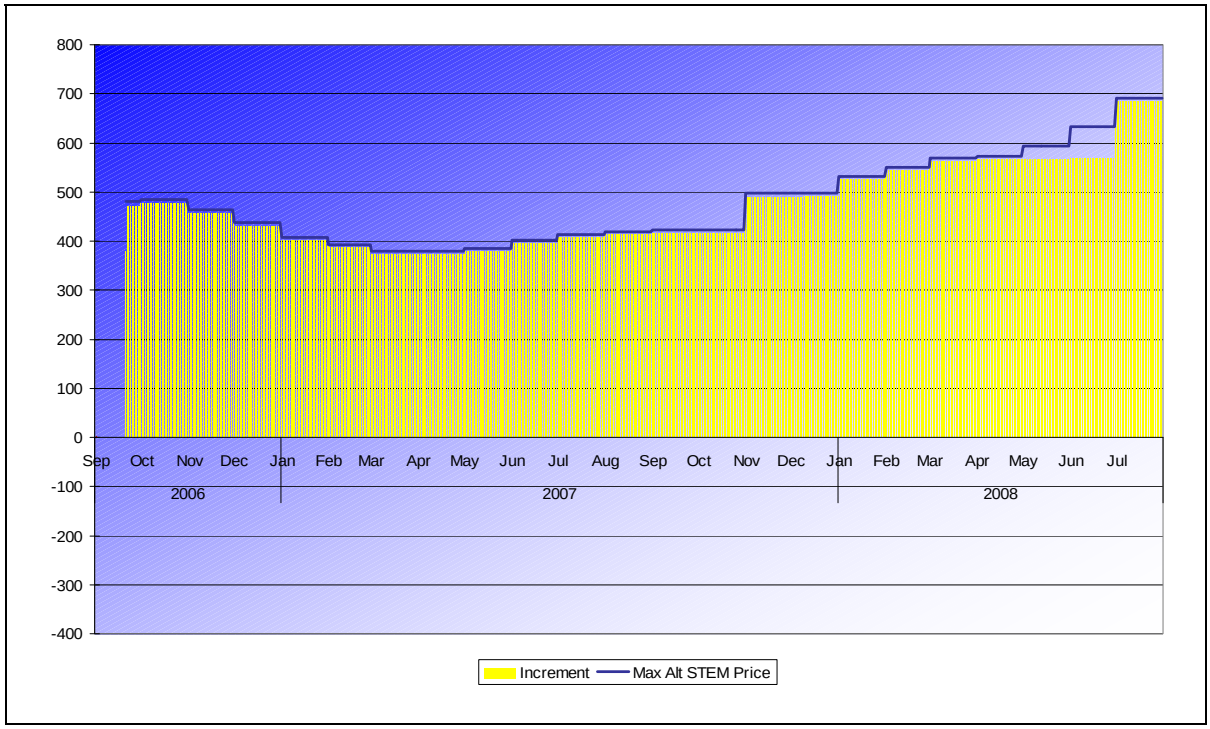


Figure 34: Average daily standing data balancing prices for intermittent generation



[52] Average daily standing data balancing prices during peak and off-peak intervals are equal for both increment and decrement. Since the magnitude of any difference is so small, only peak periods have been presented.

Figure 35: Average daily standing data balancing prices for curtailable load [53] [54]



[53] 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, only peak period have been presented.

[54] 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 36: Summary statistics for MCAPs during off-peak trading intervals, by month

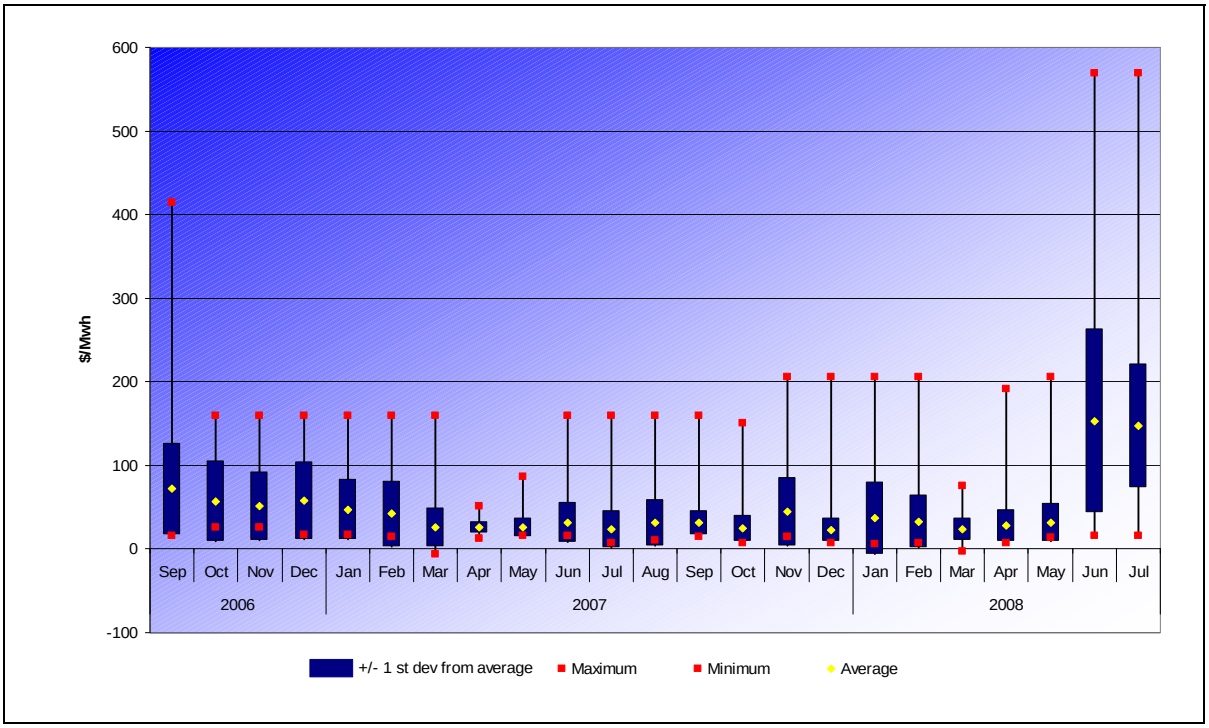


Figure 37: Summary statistics for MCAPs during peak trading intervals, by month

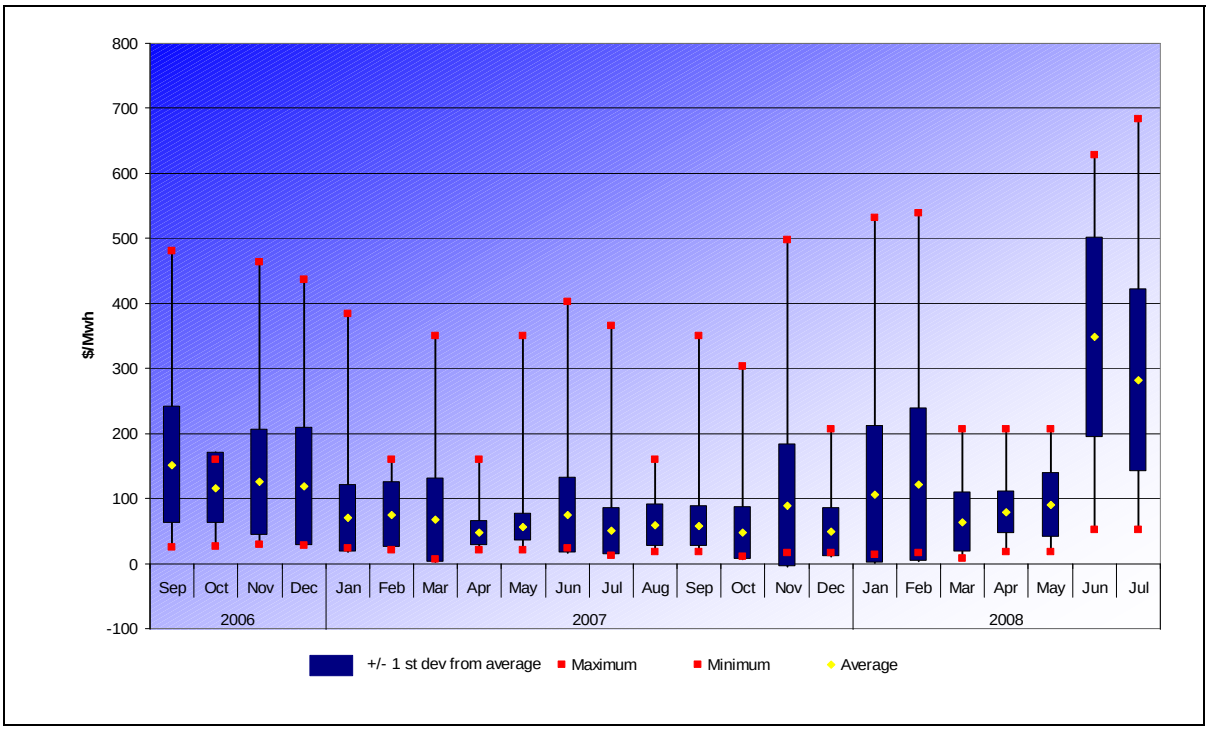


Figure 38: Summary statistics for DDAPs during off-peak trading intervals, by month

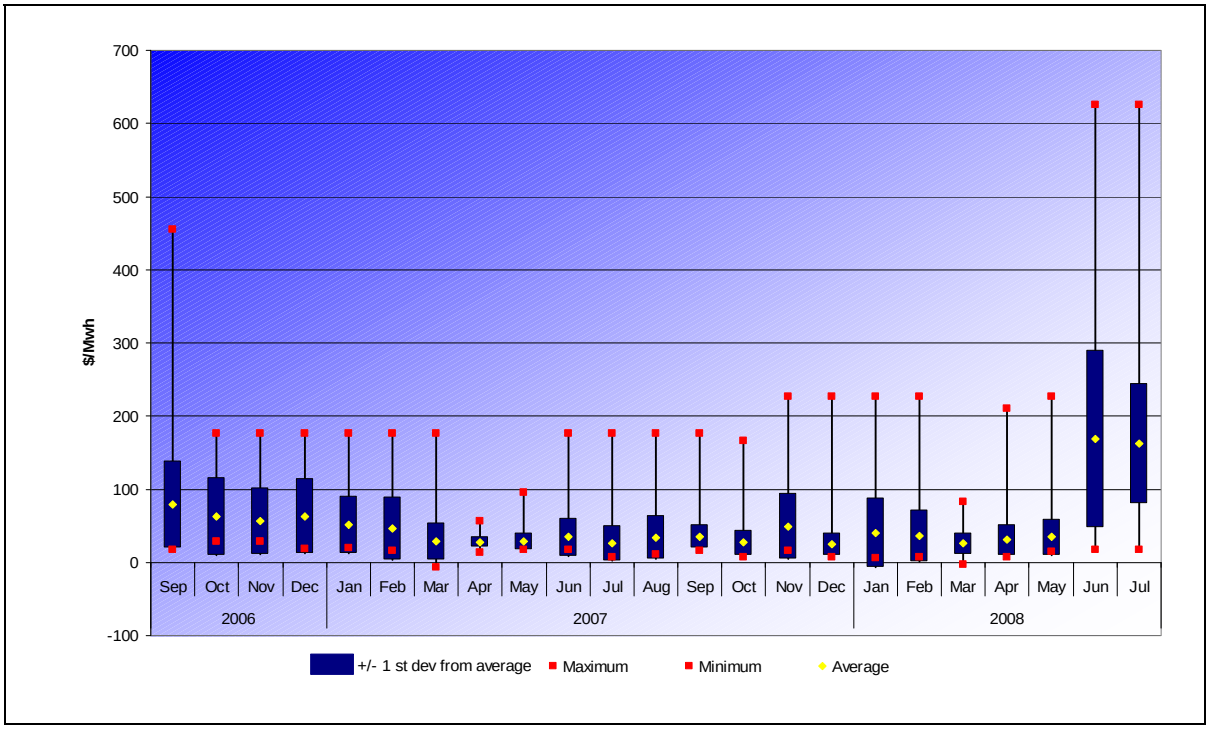


Figure 39: Summary statistics for DDAPs during peak trading intervals, by month

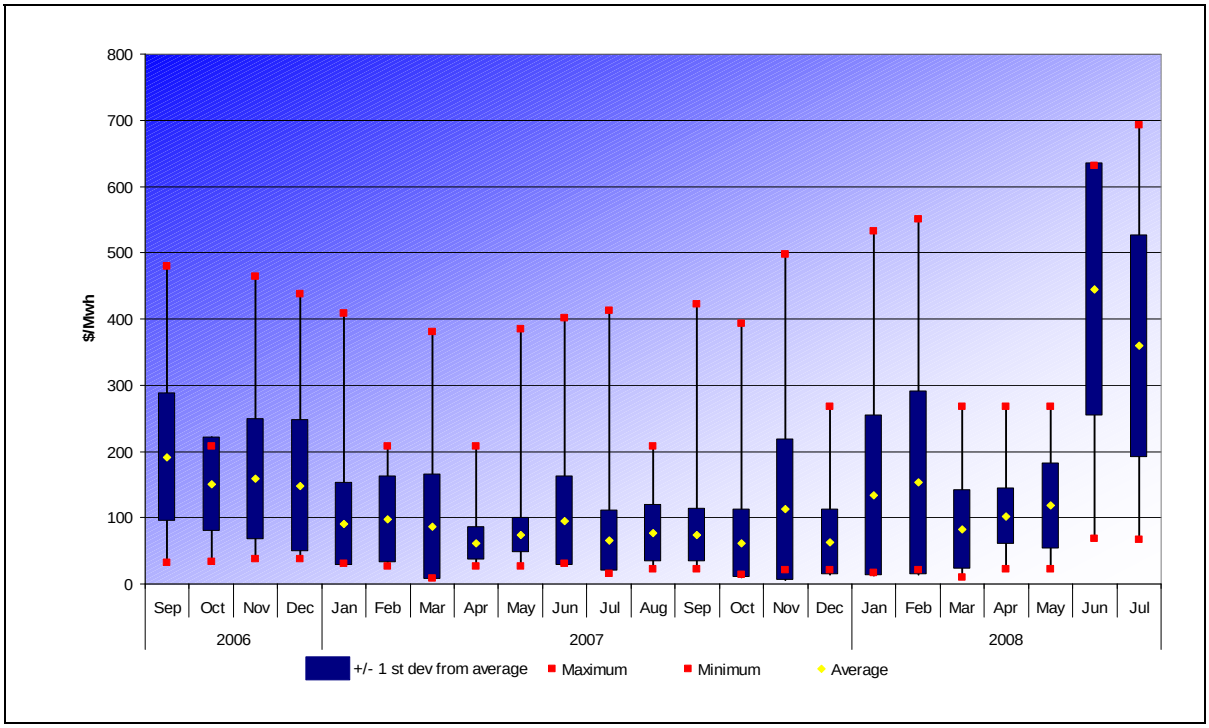
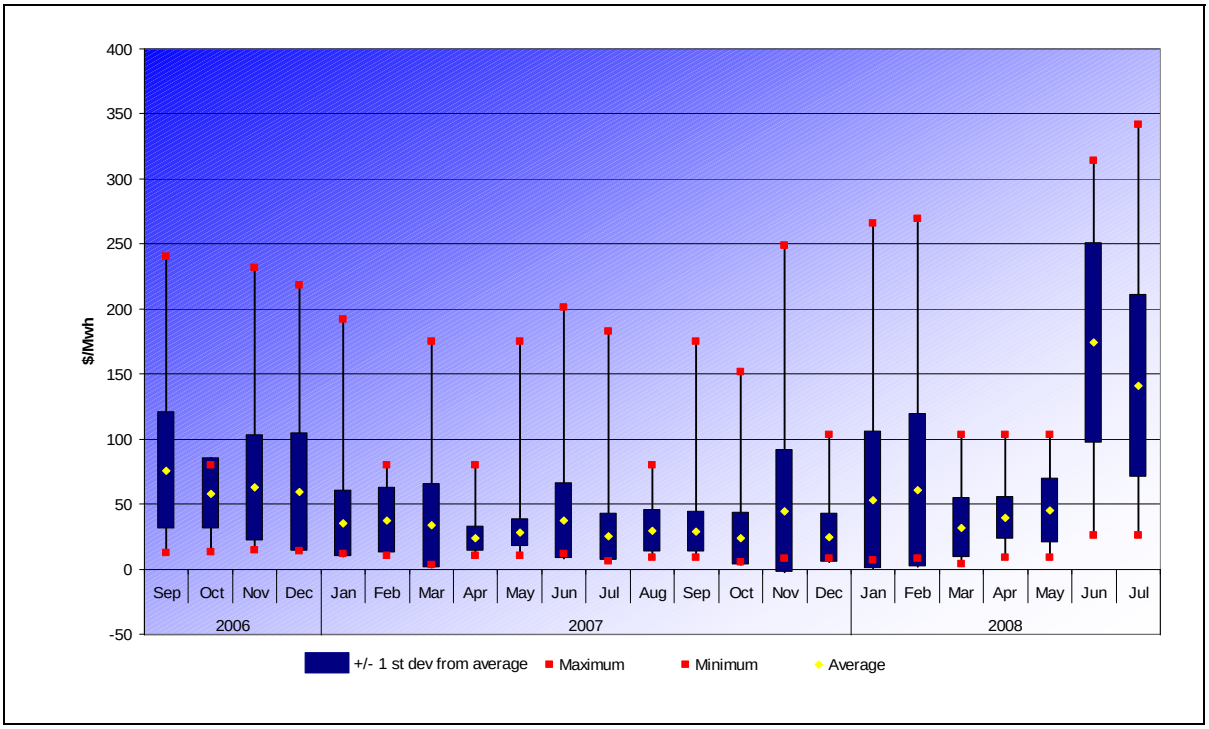


Figure 40: Summary statistics for UDAPs during peak trading intervals, by month[55]



[55] 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 41: Alcoa's daily average STEM offers (cumulative MWh per trading interval)

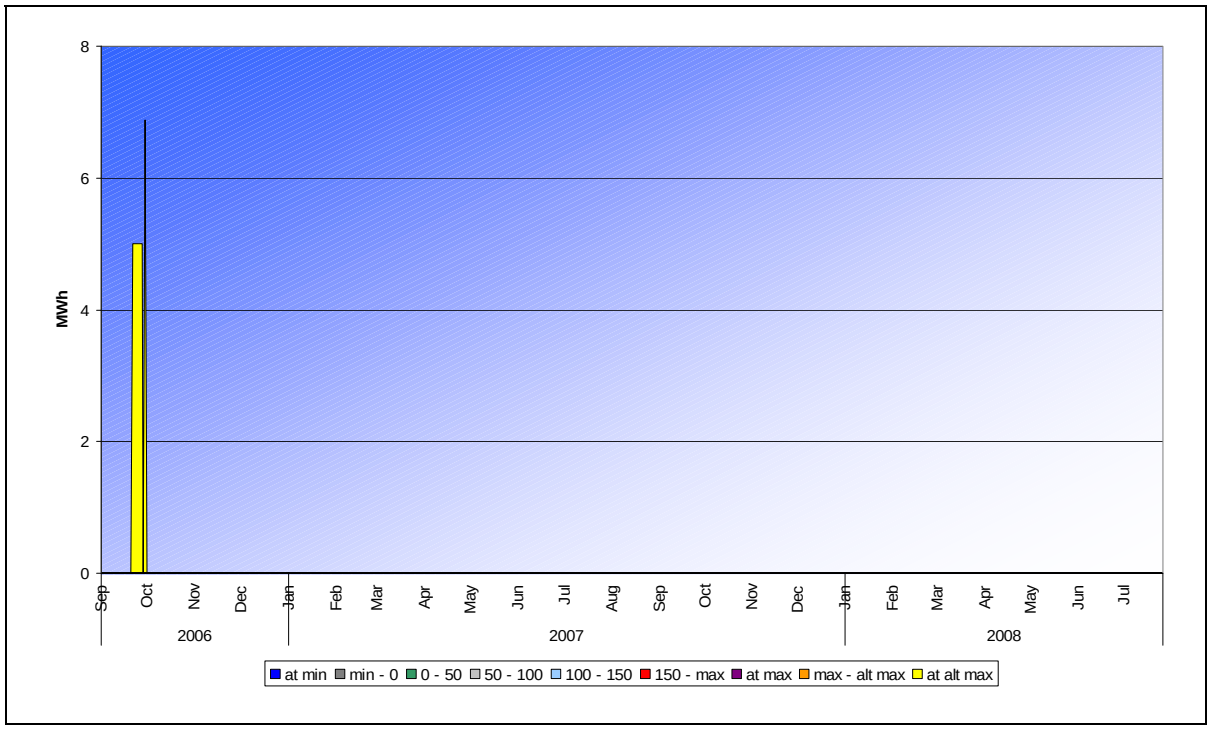


Figure 42: Alinta's daily average STEM offers (cumulative MWh per trading interval)

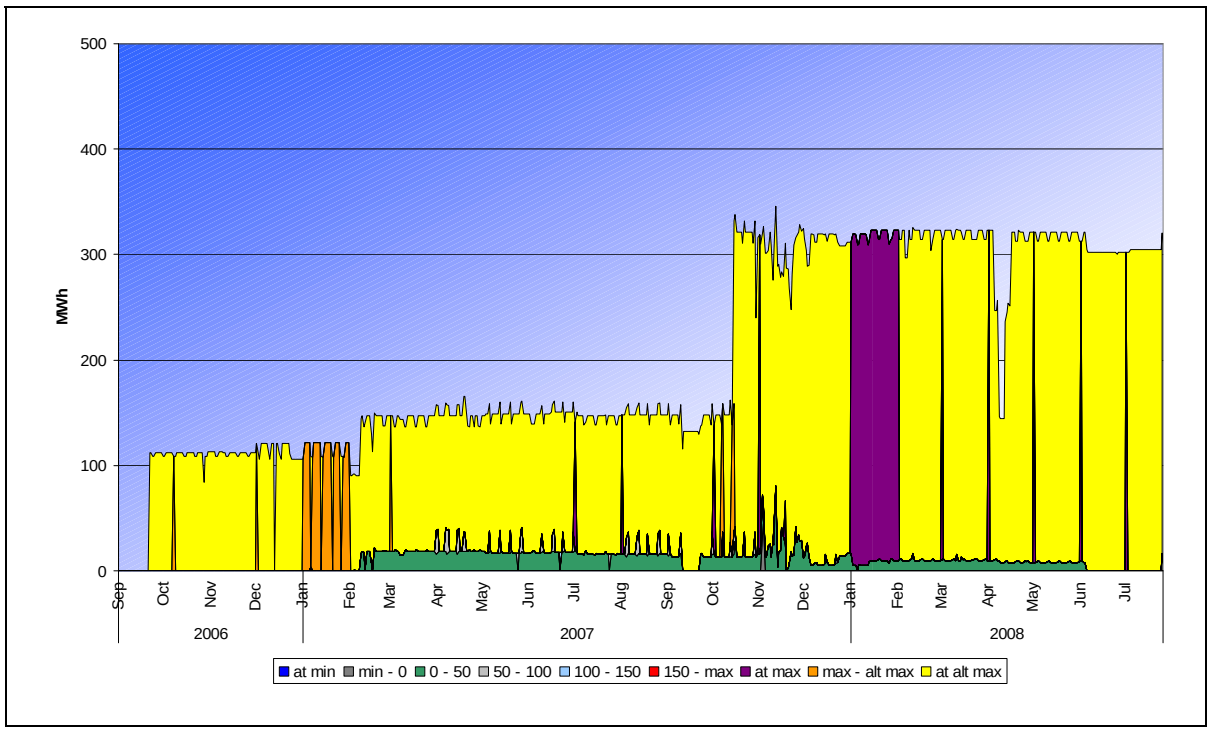


Figure 43: Goldfields Power's daily average STEM offers (cumulative MWh per trading interval)

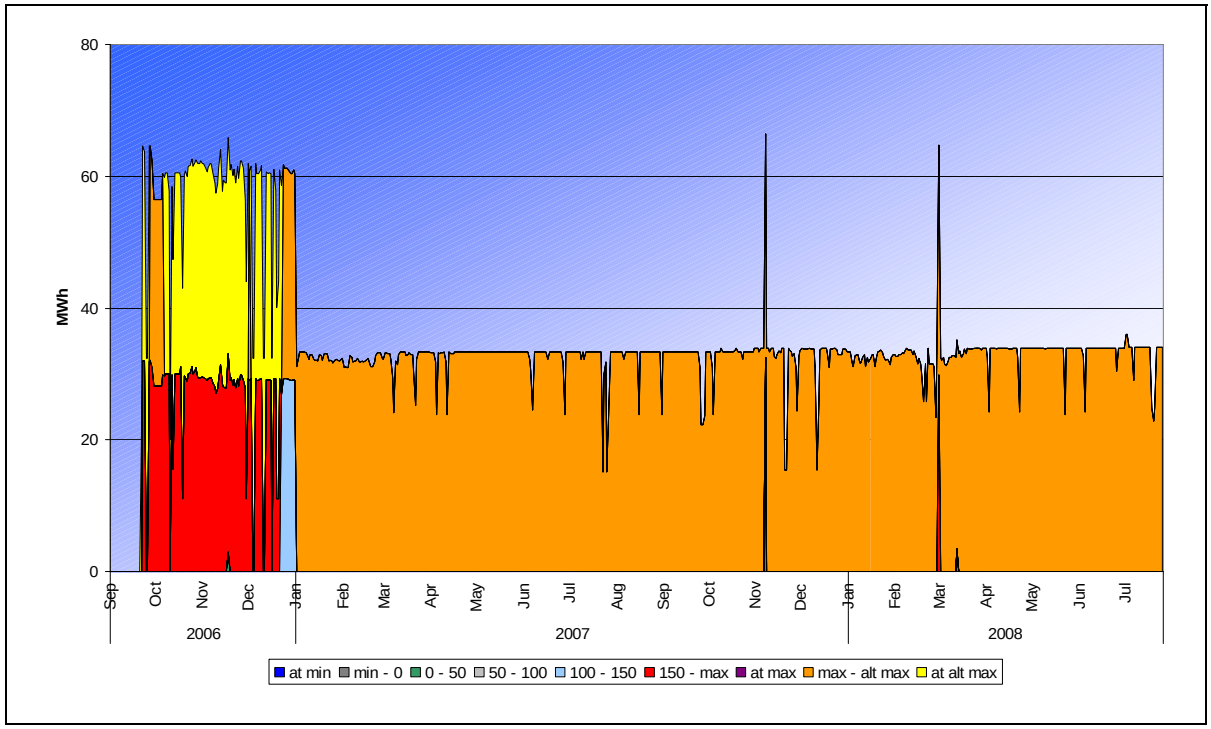


Figure 44: Perth Energy's daily average STEM offers (cumulative MWh per trading interval)

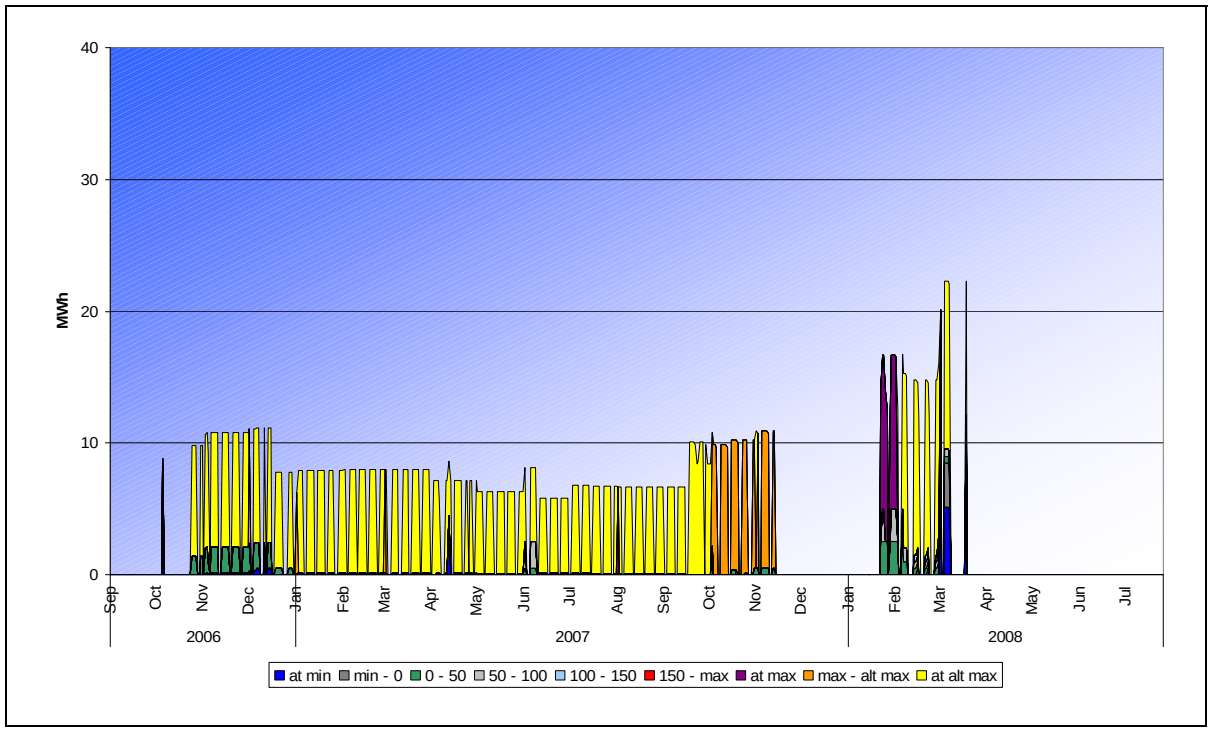


Figure 45: Southern Cross Energy's daily average STEM offers (cumulative MWh per trading interval)

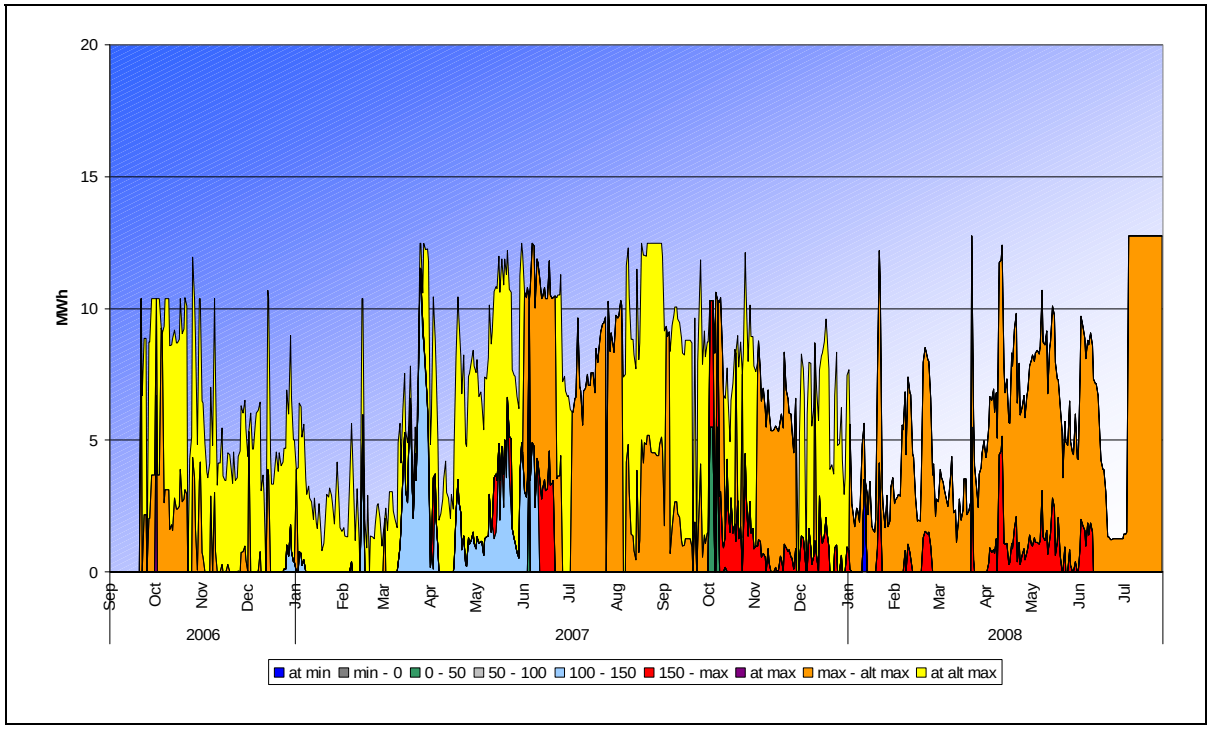


Figure 46: Synergy's daily average STEM offers (cumulative MWh per trading interval)

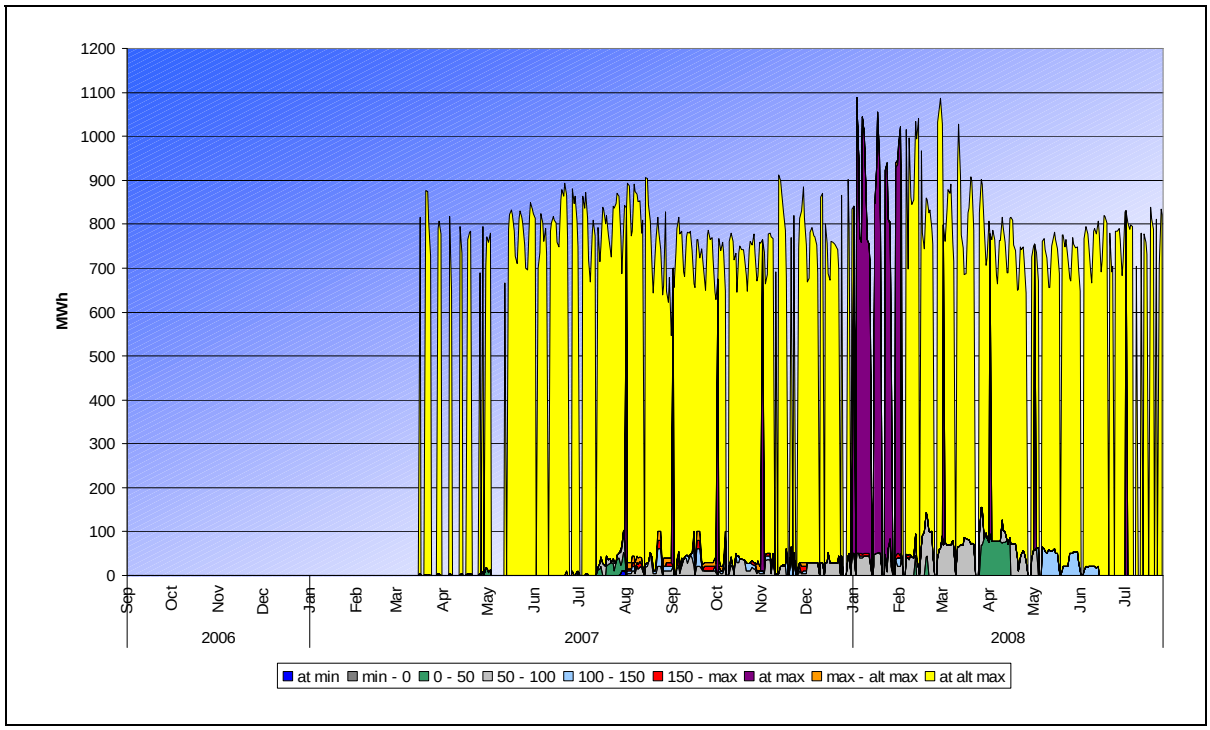
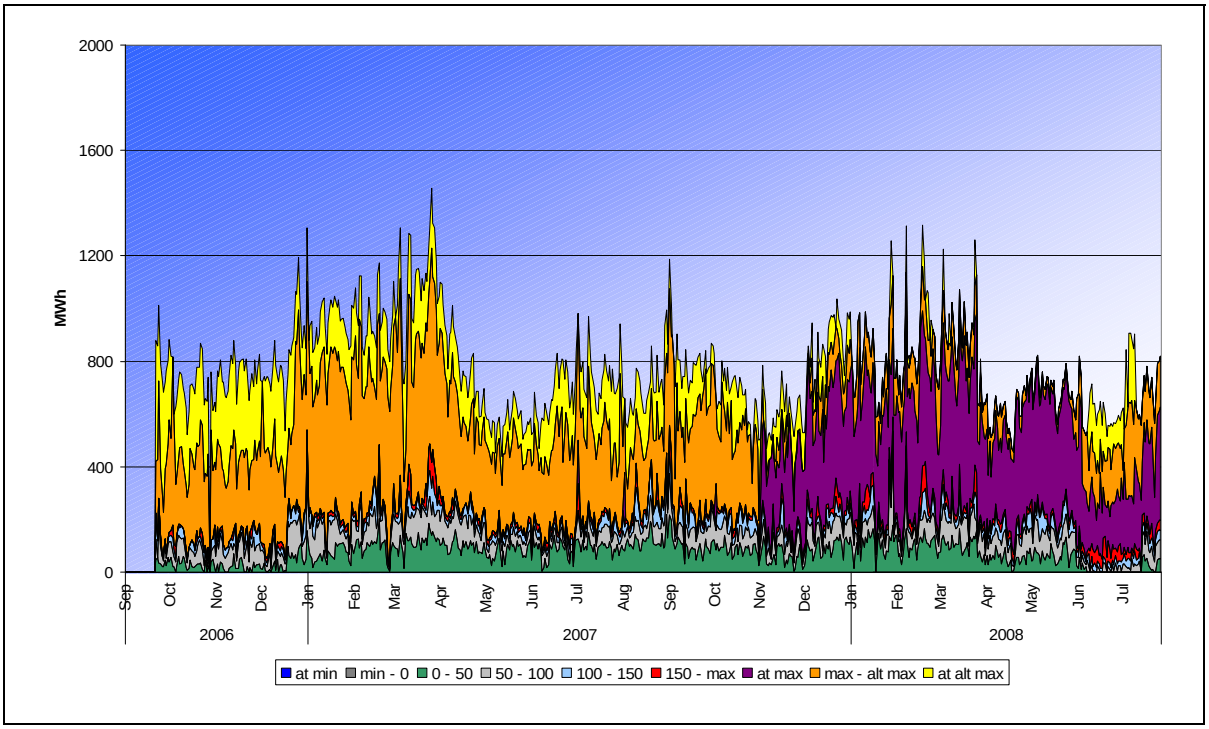


Figure 47: Verve Energy's daily average STEM offers (cumulative MWh per trading interval)



STEM bids

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

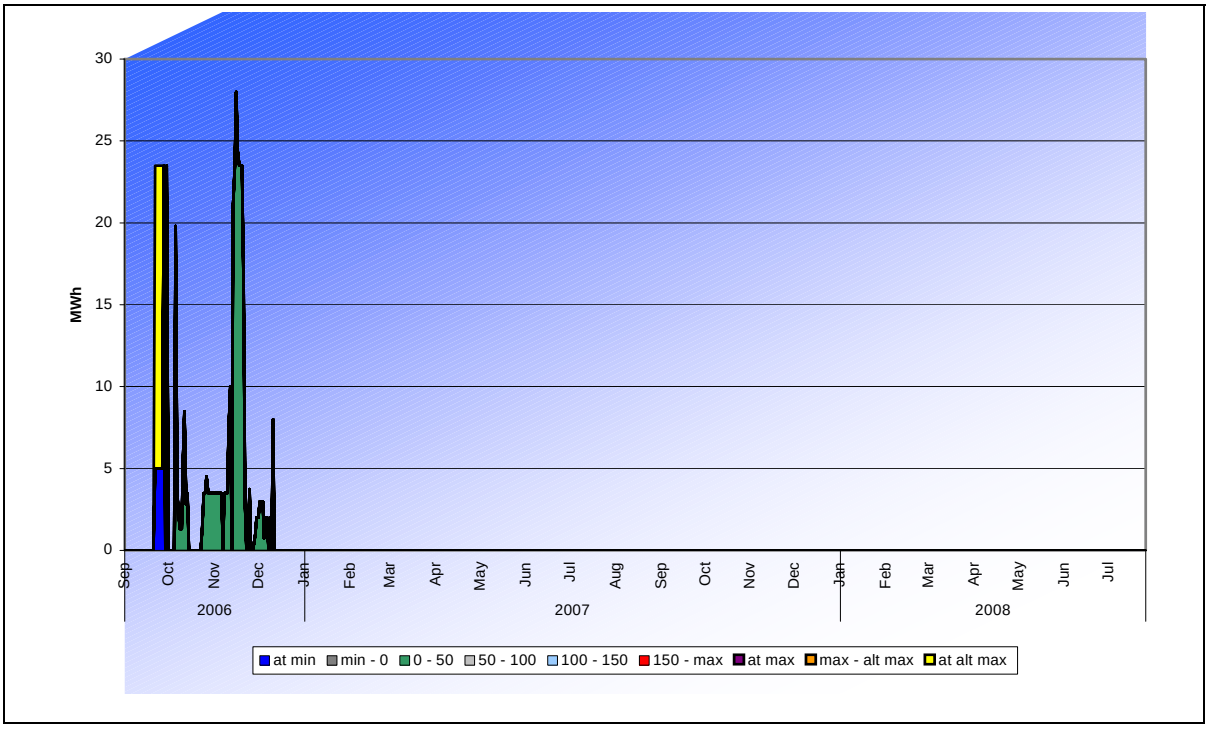


Figure 49: Alinta's daily average STEM bids (cumulative MWh per trading interval)

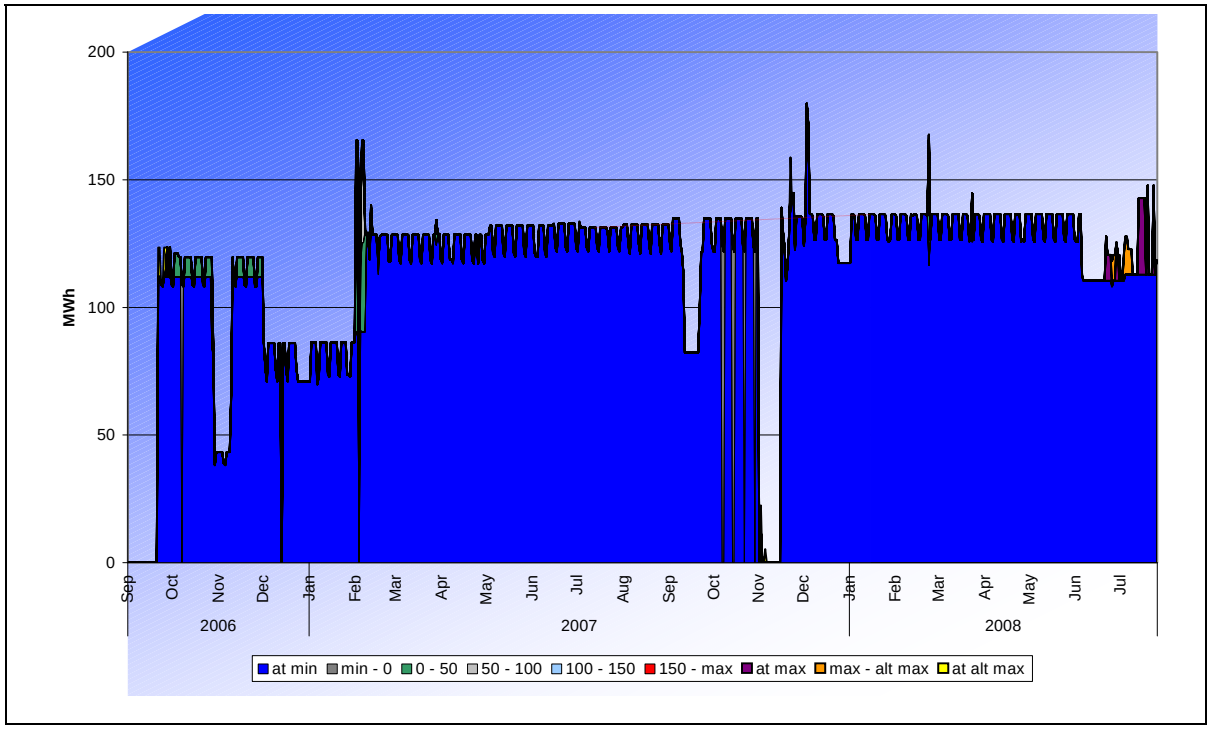


Figure 50: Goldfields Power's daily average STEM bids (cumulative MWh per trading interval)

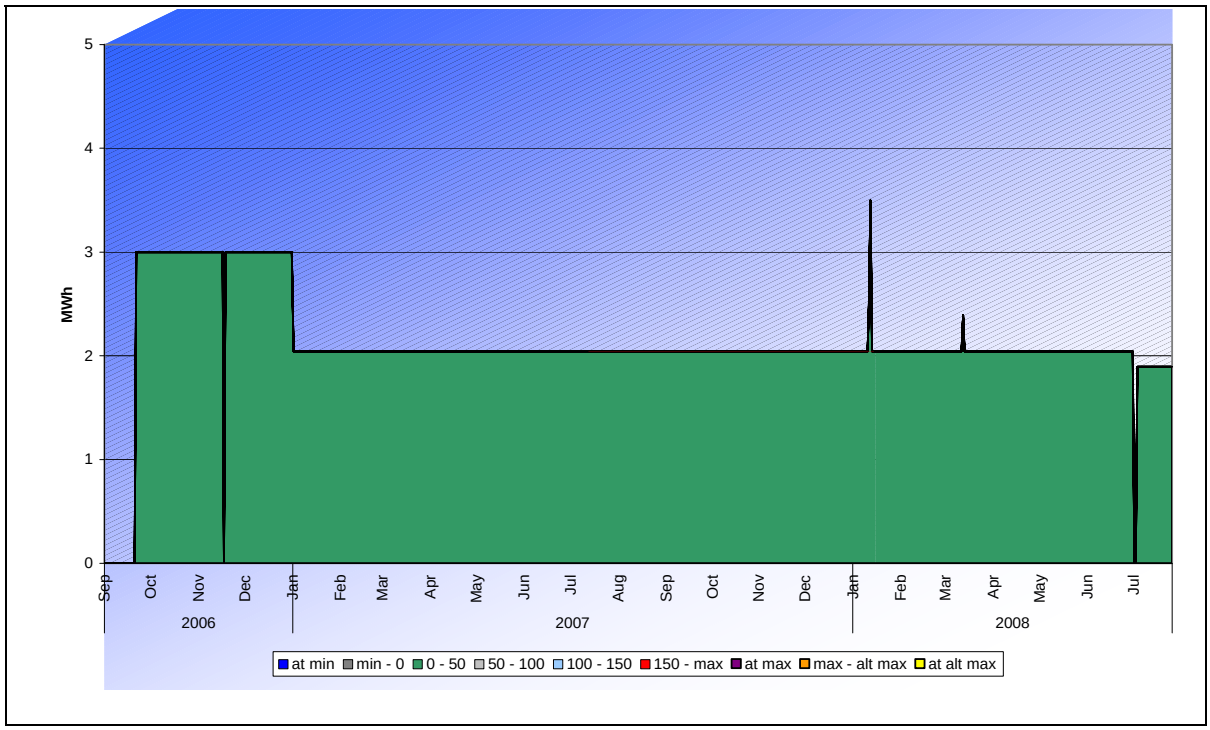


Figure 51: Perth Energy's daily average STEM bids (cumulative MWh per trading interval)

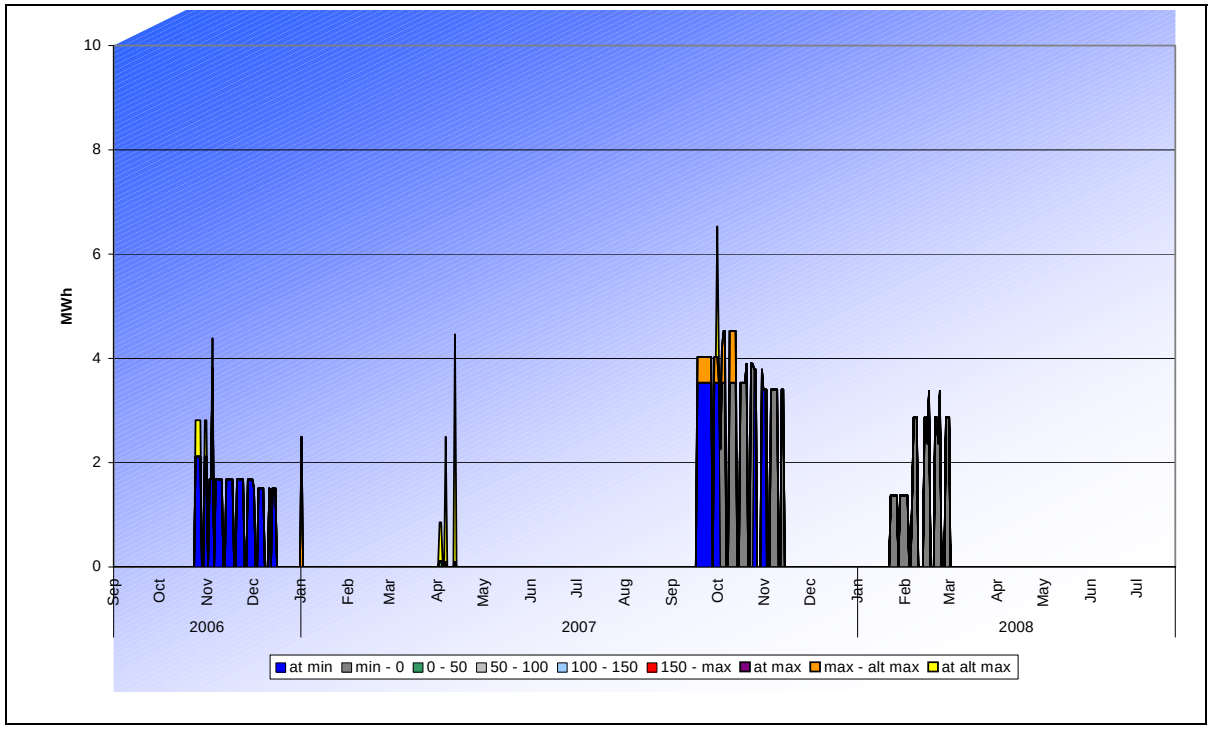


Figure 52: Southern Cross Energy's daily average STEM bids (cumulative MWh per trading interval)

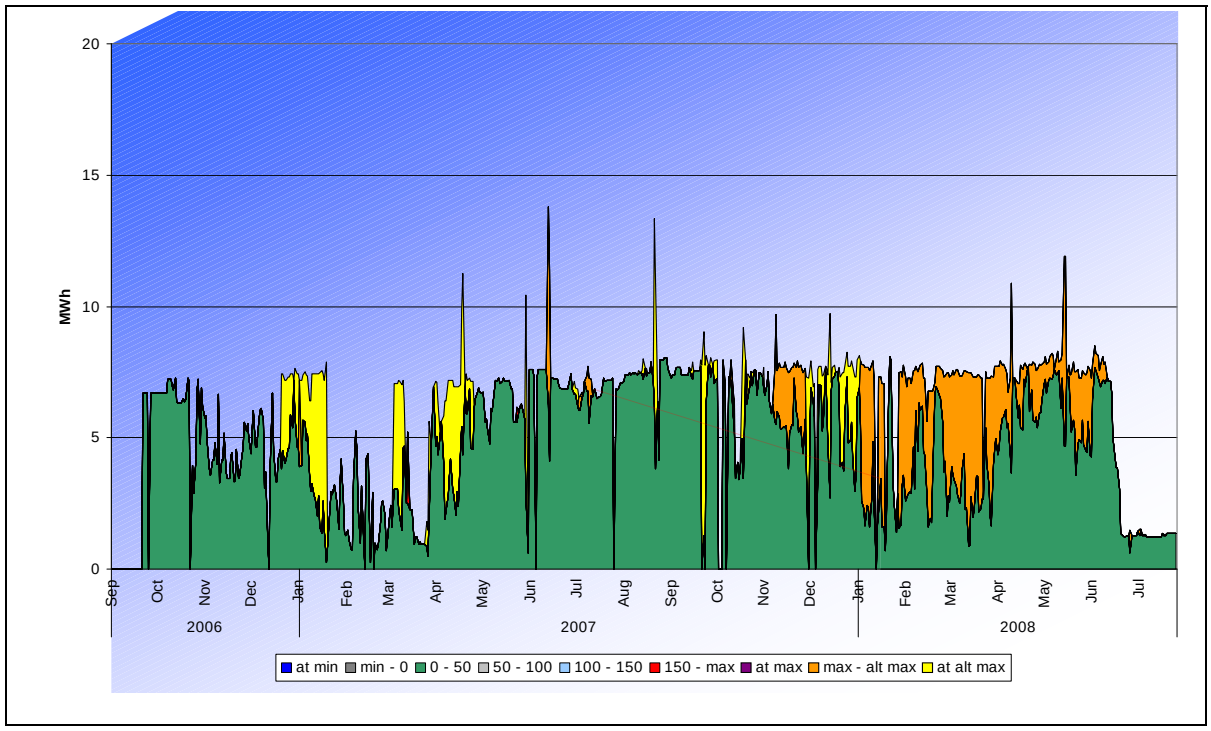


Figure 53: Synergy's daily average STEM bids (cumulative MWh per trading interval)

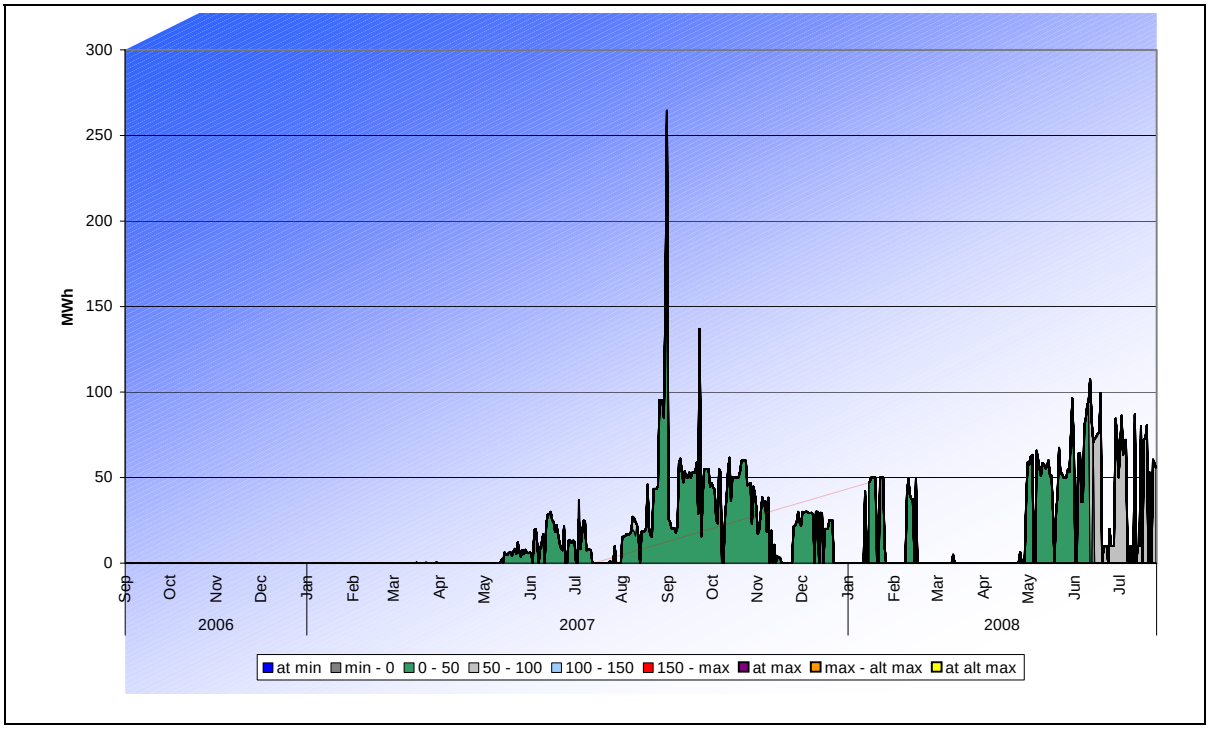


Figure 54: Verve Energy's daily average STEM bids (cumulative MWh per trading interval)